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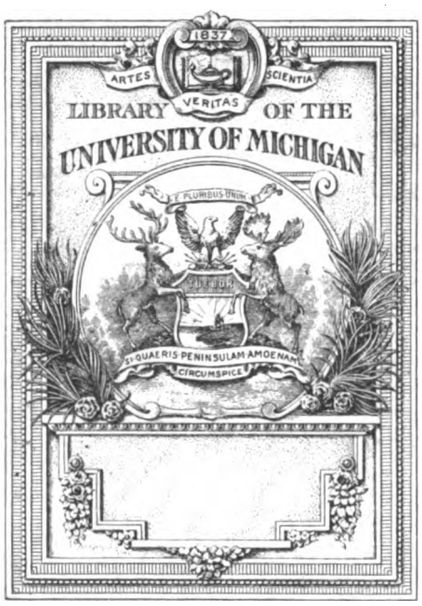

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VOLUME XXIX

JULY to DEC^R 1900

THE BUILDER

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AN : ILLUSTRATED : WEEKLY MAGAZINE : FOR : THE ARCHITECT : ENGINEER : ARCHÆOLOGIST : CONSTRUCTOR : SANITARY-REFORMER : & : ART-LOVER.

CONDUCTED BY

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FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

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THE BUILDER

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The Pavilions on the Banks of the Seine.

ONE of the most remarkable portions of the Paris Exhibition, both in a picturesque and architectural sense, consists in the series of pavilions representing different nations or different industries which are erected along the left bank of the Seine, extending from the Pont d'Iena to the Pont des Invalides. These represent a great variety of architectural taste and style, and when seen as a group from the river they produce a remarkable effect; there was nothing at all approaching it in the 1889 Exhibition. We have waited to give some detailed description and criticism of this group of structures until we could get some illustrations free from the accompaniments of scaffold-poles and building débris.

The actual "Rue des Nations," as it is called, the succession of pavilions each representing a particular nation, is nearly all comprised within the space between the Pont de l'Alma and the Pont des Invalides; but the buildings between the Pont d'Iena and the Pont de l'Alma, which represent different industries connected with marine service, have also their interest. Immediately above the Pont d'Iena (using the words "above" and "below" in reference to the direction of the flow of the river) the long white building of the French marine exhibits runs parallel with the quay; a design in which the architectural treatment is cleverly contrived so as to suggest ship forms and details, while keeping within the lines of architectural design. Inside this are one or two foreign structures of original design; the German marine building, with a kind of lighthouse in red and white concrete rising from one angle of it; and the small pavilion of the Peninsular and Oriental Company, with a centre cupola and small ones at the angles, and the walls decorated externally with a low-relief frieze of symbolical figures, slightly sketched but very artistic in feeling. A little further along is the huge iron domical pavilion of Messrs. Schneider & Co. with armoured turrets and guns projecting from it above, and intended apparently to be filled with models of battleships; but it is one of the most backward departments of the Exhibition, and at the time of our visit was closed to the public and in a state of confusion within. Next to this is the long building devoted to the "Hygiène des Armées de Terre et de Mer," also given a semi-marine character by the huge gilt rings which adorn the lower portion towards the river front; the upper portion is a quasi-Classic design with heavy and rapidly diminishing square pilasters. The building is broken near the centre of its length to give access to a light bridge or *passerelle* leading across the river and landing the visitor at the western end of the so-called reproduction of "Old Paris," for entrance to which an extra franc is charged, which it is not worth while to pay. "Vieux Paris" looks picturesque and effective from the river or from the opposite bank, but inside it is a poor piece of sham archæology not worth visiting, and is in fact a kind of bazaar. Returning to the left bank, we find beyond the "Hygiène" building the first of the national pavilions, that of Mexico, which has got separated from the remainder; there is nothing particularly Mexican in its appearance externally; the details are mainly Classic of an orthodox type; but internally the arrangement of the upper galleries is very effective; a range of small columns divides the gallery into compartments, the back of each of which forms a kind of apse against the outer wall. Past these buildings we come to the inclined plane and foot-bridge crossing the head of the Avenue Rapp, which, though a merely incidental and utilitarian feature of the Exhibition, is treated with the same originality of design which runs through everything here; the centre or level portion forming the bridge is flanked by two towers in open timber work, the angle uprights bent at the apex into a kind of terminal feature, which is gilt, and the timber tower crowned by a light openwork cupola of wrought iron, an ellipse with its longer axis vertical.

Just before crossing this picturesque bridge we should have noticed the French pavilion of the Post Office and Telegraph Service, a most characteristic erection of wood and plaster, the main surfaces of post-and-pan work painted a very light grey, and decorated at the windows with white turned shafts or balusters picked out with yellow;

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the plaster filling, painted cream tone, is modelled into a surface ornament. The destination of the pavilion is symbolised by two pretty life-size bas-relief figures of young girls, one on each side of the main entrance, sending off and receiving carrier pigeons. As a temporary building nothing could be more pleasing or in better taste than this pavilion. Crossing the bridge aforesaid, we come to the complete range of national pavilions, commencing with Servia, which affects a florid Byzantine character, with exterior arcades much decorated with colour, and an octagon dome over the centre, with smaller cupolas at the angles. In the Greek pavilion, next to this, the Classic memories of Greece are neglected in favour of her Byzantine period, and the pavilion takes a form recalling some of the Byzantine churches on Greek soil; a brick or apparently brick building with a stilted cupola covered with red tiles. Here, by way of contrast, we may cast an eye across the river and notice the "Palais de l'Economie Sociale," one of the best and most soberly designed of the French buildings; a long low parallelogram of white architecture, divided at the side into three bays by wide flat buttresses decorated with winged figures supporting a kind of open-work stele modelled on the face of the buttress; in each bay a double tier of three large square many-mullioned windows; the whole crowned by a heavy cornice.

Coming back to the "Rue des Nations" we find the Greek pavilion followed and oddly contrasted by that of Sweden (seen on the right-hand side of one of our litho-graph illustrations), an extraordinary and certainly original erection, executed in the semblance of dark red brick, though some of the proportions tell rather too plainly of the iron core within. On the inner side of the roadway, away from the river front, is the long pavilion of Roumania, very Oriental in appearance, characterised by stilted arches with Moorish geometric window tracery; the end elevation shows a lofty entrance portal flanked by columns with capitals defined by flat colour and gilding, and a projecting abacus over them; in the centre of the interior a dome rises from circular arches springing from columns of the same type. Returning to the outer or river range of buildings, we find next to Sweden the large and striking pavilion of the little principality of Monaco (see litho-graph), one of the smallest of States in this case rivalling the most important kingdoms in its outward show. The design seems to be a mingled reminiscence of the Italian villa style and the Palazzo Vecchio tower, or some analogous early Italian structure; the tower is given the appearance of granite, which harmonises ill with the delicate look of the colonnaded loggia round its lower stage. On the return side of the pavilion is a double-story loggia, seen in the illustration, the vault of the upper one covered with painted decoration; the whole has a most gay and brilliant effect.

With the Spanish pavilion (part of which is shown to the right of the German pavilion in one of our plates) we come back to academic architecture, a large and palatial-looking structure in Spanish Renaissance style, of no remarkable originality, but very dignified in effect; indeed it perhaps looks a little too monumental for a temporary erection; there is nothing in it that would be out of place in a permanent stone palace. The interior has a fine cortile and staircase, with a colonnaded gallery with bracket capitals on the upper story. The German pavilion which comes next (see illustration) has on the other hand completely the character of a temporary structure for festive purposes; in this respect it is no doubt exceedingly clever and original, but so obviously "made in Germany" as to provoke a smile—the detail is so exuberant, the armed figures over the river front entrance have so much of the "mailed fist" about them, and the painted figures all over the walls are so full of the peculiar swagger we find in German heraldic windows and illuminations. Inside, no pains have been spared with it; there are wall paintings everywhere; a sumptuous staircase, decorated halfway up with massive brass lamp-standards, and with a marble balustrade filled in with heavy gilt scroll-work. The wall decoration of the staircase is very good, but the mural pictures are terrible, especially the nude female figures of Teutonic robustness of proportion. In the west room on the first floor, however, there is a good stained-glass window, draped figures floating in a kind of sea of flowing foliage diaper. The contents of the pavilion, the exhibits that is to say, have been largely devoted to the illustration of books and library arrangements, appropriately enough for the country which has turned out the most laborious and learned scholars of the modern world.

Behind the Spanish and German pavilions, on the inside of the roadway, are the two small pavilions of Bulgaria and Finland, the former a piece of commonplace, the latter one of the most original and characteristic erections in the Exhibition, of which we regret that we have no illustration. The horse-shoe shaped doors with their carved ornaments, the curious angle pinnacles, supported on corbels like inverted pine-apples, and the small tower with its marked entasis, its gilt gablets and spirelet, and its carved stone bears at the base, combine to make one of the most curious little buildings ever seen, and which looks as if it came out of some other planet.

The pavilion of Norway, next to that of Germany, and shown in one of our illustrations, is a very pleasing quiet building based on familiar Norwegian types, of timber painted a dull red and set off with white window frames; the timber arcade over the river promenade is decorated with carved open-work panels in imitation of ancient Scandinavian work. Inside, everything is redolent of the sea and sailing—models of ships, nets festooned from the open timber roof, the newels of the stairs cleverly fashioned into a conventional suggestion of walrus heads; there is a scent of the sea throughout it. Belgium, which comes next (see illustration), makes an effective contrast, her pavilion taking the form of a Late Gothic Hôtel de Ville of a northern town, with a profusion of carved detail. The English pavilion, which comes next, was illustrated from the architect's drawing in our issue of March 25, 1899. The exterior has been rather over-praised, but the interior is admirably got up, and contains a great deal of excellent woodwork; the rooms are fitted up with the best possible taste, and, as we have before noted, the contents include a number of really valuable pictures. The building, as it forms the Prince of Wales's headquarters as President of the English Section, naturally partakes more of the character of a dwelling than the other pavilions. It appears to attract a great deal of interest, as at the time of our visit there was quite a stream of people, as many French as English, going through the rooms, which certainly show very satisfactory samples of English workmanship.

The pavilion of Hungary, which comes next on the river front, is an extraordinary medley, in the rear a mingling of Romanesque and *rococo* Renaissance, on the river front a Late Gothic design with a series of oriels in the upper portion, corbelled out from plain square massive buttresses below. Bosnia and Herzegovina are illustrated by a white building destitute of mouldings and with immense wooden eaves and wooden corbelled out bays with lattice-work balconies. Internally, oddly enough, the prevailing style of detail is Turkish rather than anything else. Austria comes next, with a bad piece of coarse Renaissance, with enormous mask keystones to the windows. Then comes the United States pavilion, a bold and dignified design to which we have devoted a separate illustration. In the centre of the great porch towards the river is a colossal equestrian statue of Washington. The spherical vault over the porch is decorated with a painting of a female figure flying in the clouds and wafting the United States flag. Behind this porch is the principal entrance, through an apse with a coffered semi-dome decorated in blue and gold, and with a good bas-relief of allegorical figures between the cornice and the top of the door. The American eagle, as will be seen in the illustration, perches not only on the top of the dome but on each of the four angle pavilions of the sub-structure. Internally the whole centre of the building is kept quite clear, and a series of galleries with ornamental iron railings run round it in successive stories, connecting with the rooms behind them. One or two of the metal grilles to the openings of the lift are excellent specimens of design, and the architectural details generally are designed with care and refinement. The fronts of the balconies are decorated with shields at regular intervals painted with the Stars and Stripes, and in the small dome which forms the upper portion of the ceiling the star-spangled banner again appears as if floating in the sky. "Something too much of this." One can understand the enthusiasm of a people for their own flag, but it should not be brandished too persistently; an old habit which it seems Americans have still not quite shaken off. The gilded quadriga at the top of the porch, it should be added, is a fine piece of work and looks very effective in its position.

On the inner side of the road, from the Belgian to the American pavilion, are a series of smaller pavilions of the smaller or less ambitious nations, which may be passed over lightly. The Luxembourg pavilion is a quiet building in bands of different coloured stone, with a touch of Francis I. style about it; Persia shows a flat treatment with pointed arches and much coloured tile decoration; Peru is the poorest of the show, a piece of common-place *rococo* — one might have thought the ancient history of the land could have furnished some other and more characteristic architectural suggestions; Portugal is chiefly interesting from its contents, which are very maritime, and show a number of

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large models of ships and boats with rigs of local character. Denmark shows the most interesting erection of this back row; a pretty half-timber building with triangular carved wood panels alternating with triangular white spaces; throughout there is a good though simple treatment of woodwork in excellent taste.

The two last of the larger pavilions on the river front are those of Turkey and Italy. Turkey shows a flat white building with pointed arches with light and dark voussoirs, a tower with a projecting cornice and a broad band of coloured tiles lower down. It is characteristic that even the external decoration of the building is extensively assisted by carpets and other textiles hung on the walls and piers around the main entrance. Inside, the place is a regular carpet-bazaar, with touts at every corner.

Italy has the largest pavilion of any nation, and has certainly gone into the show with great spirit. The building shows a centre cupola and four angle ones, all gilt, and on each principal face of the walls are great richly-traceried windows — late geometric design carried out with very thick and heavily-moulded tracery bars, which (whatever material they are really executed in) have a grand and monumental effect. Below the lower windows, in what may be called the nave portions of the building, are marble panels, and above the windows a mosaic frieze. The interior effect is nearly as rich as the exterior. Reminiscences of Venice, of the Florence Cathedral, and of the Certosa, seems to have mingled in the mind of the designer, but Venetian influence predominates. If the interior had been empty it would be more effective, but unfortunately this also is a mere bazaar, for the sale of Italian trinkets and bric à-brac. The building, however, is a spirited and ambitious effort, and makes a worthy close to what on the whole must be admitted to be a splendid piece of spectacular effect.

SCULPTURE AT THE ROYAL ACADEMY.

AS on some previous occasions in recent years, the art of sculpture greets us in advance of our entry into the Academy rooms, in the shape of Mr. Onslow Ford's large equestrian statue of the late Maharajah of Mysore, with its attendant figures, which stands in the entrance courtyard. As far as the sculpture is concerned this is a fine work; the principal group is dignified in effect; the seated figures at each side combine well with the central figure; and the miniature figures on the angle scrolls, whatever their signification, have a very pretty decorative effect. But the whole is spoiled by the pedestal, which is hard and rigid in its general design and bad in architectural detail. The shallow and widely-projecting cornice has a very weak effect, and, moreover, puts the whole thing out of scale; it is like the cornice of a classic building on a small scale, and in consequence the erection looks as if crushed by the statue. A pedestal is a pedestal, to be designed in relation to the scale of the whole monument; it is not a piece of architecture. Moreover, it is most important that its lines should have something of the curvature and flow of sculpturesque line, so as to harmonise with and lead up to the greater freedom of line of the sculpture. In this pedestal all the lines are hard and rigid, and the mouldings too small in scale for the situation, besides being poor in profile. We feel convinced that no architect had a hand in this design, and this is only another one of (unfortunately) many instances of the mistake which sculptors make in this country in attempting to design their own pedestals instead of putting them, as is universally done in France, into the hands of an architect who has had a special training in the matter both of scale in details and profile of mouldings.*

Inside the Academy walls we find the central position in the octagon hall occupied by another memorial work of Mr. Onslow Ford's, the seated statue of Professor Huxley, an exceedingly forcible work in regard to the head, and as to the rest, the sculptor has fortunately had the professorial gown to enable him to give breadth and sculpturesque treatment to the costume, and to escape the usual difficulty of modern costume. At the best, the production of full-size realistic portrait figures is but a poor employment for the art of sculpture, but this is one of the most satisfactory recent examples of it.

Among the ideal subjects which form the most fitting employment for sculpture, the best work in the octagon room, and one of the best of the year, is Mr. Colton's life-size alto-relief "The Crown of Love," which combines the three qualities of decorative line and composition, powerful modelling, and poetic suggestiveness; the face of the man is the weakest part of it, but this is not so perceptible in the profile view as seen in front. The modelling of the female figure rather suggests the influence of Stevens, but is none the worse for that. Mr. Wade's "Death" is also a work of poetic feeling, though weaker in design than the last-named; it represents Death as a winged youth who cuts the bands which attach a burden to the back of an aged man, and is welcomed with a look of thankfulness; not a commonplace reading of the subject certainly, but the head of the Death figure is weak and lacking in nobility. Miss Moore's very graceful fancy, "At the Gates of the Past," we noticed when it appeared here as a work in plaster; we are glad to welcome in its bronze edition, though still thinking the figure a little too serpentine in its curves. "The Kiss of Time," a group to form a fragment of a tomb, by Mr. Derwent Wood, is little more than a sketch, but a fine one, and worth working out more fully and on a life size scale. In regard to life-like action and power of modelling there is nothing in the exhibition superior to Mr. Swan's "Puma and Macaw"—perhaps nothing equal to it; Mr. Swan is the English Barye; though of course one cannot put animal sculpture on a level with human subjects, as a matter of intellectual interest.

In the lecture-room the most important work is Mr. Brock's very fine monument to Lord Leighton; it is called rather inaccurately "Tomb of Lord Leighton," which of course it is not, though adopting the old Renaissance sarcophagus form. The figure of Leighton, with beautifully modelled head and the drapery severely treated in nearly straight lines, reclines on the top of the sarcophagus, the convex under-side of which is decorated with conventional foliage carving after the Italian manner, but rather broader and freer in treatment than we usually find in Renaissance examples; below this is a square-lined plinth on which is relieved an inscription panel, and at the two ends are seated figures, the one symbolising Painting the other Sculpture; the latter bears a model of one of Leighton's sculptures, "The Sluggard." These figures are not great, not Michelangelesque, so to speak, but they are very graceful in line, and contrast well with the remainder of the monument, which is to be executed in marble and bronze for St. Paul's Cathedral. Did the sculptor design the architectural details? If so, he understands that part of the business better than most of his craft; there is nothing to complain of here, at all events.

We cannot find very much satisfaction from the other works in the centre of the floor. Mr. Walker's Adam and Eve—"And They Were Afraid"—is wanting in style and dignity of conception. Mr. Pomeroy's "The Spearman" is an original and very cleverly-modelled figure of a nude man, in a rather contorted attitude and with his feet close together, preparing to throw a spear; perhaps the point of the action is that he is in a position in which it is difficult to make a throw at all, but at all events there is a weak look about it, and it cannot be called an interesting work. Mr. Pegram's "Fortune" is a large female figure which does not impress one further than as being a fine healthy woman; there is no special character about the work. Mr. Gilbert's contribution is a baptismal memorial font, a bronze pedestal and cover with an alabaster bowl; the bronze work shows all that restless originality of form and detail which characterises Mr. Gilbert's metal work, but it is rather a question whether it is effective in proportion to its cleverness, and whether a little more classic restraint of line would not be an advantage. The alabaster bowl is modelled in a lumpy manner, as if the desire were to evade definite form and only give that general roughness of surface which the same sculptor set the example of in parts of his Shaftesbury fountain, and which has been largely imitated since; it is novel (or was when it was started), and produces an effect of freedom of handling, but is it not a question whether this kind of modelling can properly be called design? The small terminal figure of Christ at the top of the cover, gay with many-coloured enamels, has rather a gimcrack appearance. We cannot help wishing that Mr. Gilbert would let metal work rest for a while, and return to pure sculpture. He reminds us of his powers in this respect by a fine and characteristic head of a boy, a son of Mr. Val Prinsep's, which is exhibited in the same room.

Just behind Mr. Gilbert's font is one of the most original and satisfactory works in the Exhibition, Mr. Frampton's idea of Keats's snake-woman, "Lamia." This is one of those put-together busts in which ivory is used for the flesh portions and bronze for the rest; we do not like this kind of work as a rule in sculpture, but it seems rather to suit the weird character of the present subject. Mr. Frampton's Lamia has a small head with hair done up in nets so as to form an odd-looking knob on each

* We are glad to see that the art critic of the *Times*, in noticing this monument, has spoken strongly on this point, and on the necessity of employing an architect on the design of a pedestal. This is a new line for the *Times* to take; but better late than never.

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side of the head, which adds to its uncanny appearance; a very long neck is in keeping with the idea of the character; the decorative effect is heightened by some blue stones inlaid in the headdress and on the bosom of the dress. This is really an original conception. So, though in a less striking manner, is Mr. Drury's bronze bust "The Prophetess of Fate," a thin intellectual head of very marked character, with a far-off musing expression; her hands hold a glass sphere, in allusion no doubt to the old superstition (used by Rossetti in "Rose Mary") of a magic glass sphere in which future events could be seen.

It is strange what a change there is in the subjects ranged along the walls of the lecture-room, since the days of the dreary rows of busts which old exhibition-goers well remember. The smaller sculpture exhibits nowadays are full of new and original fancies, sometimes very interesting, apart from mere modelling. We have only space to mention, among these, Miss Steele's back for a silver hand-mirror; Mr. Lucchesi's bronze head, "A Sentinel," in a very picturesque helmet; the same sculptor's fine poetic figure "The Myrtle's Altar," which is here in bronze, we described fully when it was exhibited in plaster—no one should pass it over; Miss Steele's "Alms-dish" with angels in prayer modelled in relief around the rim; Mr. Fehr's powerful bust of William Morris; Mr. Onslow Ford's expressively-modelled head of Mr. Wolfram Onslow Ford; Mr. Fisher's table-centre, or whatever it is meant for, a boat-like silver dish decorated with enamel and with figures of Venus and a mermaid; and Mr. Reynold-Stephens's beautiful little statuette of "Guinevere and the nestling," one of the decorative order of statuettes, apparently bronze heightened with silver, and with the face and hands distinguished not by a different material, but a different surface-finish. The small hawks perched at equal intervals round the base on which the figure stands form a charming incident in this very pretty and fanciful bit of work.

NOTES.

An Amendment to the Housing Bill.

THE amendment which Lord Edward Fitzmaurice succeeded in inserting in the Housing of the Working Classes Bill in Committee this week is of the first importance in regard to rural districts. It empowers a County Council to take in hand the rehousing question, if it is not taken up by a District Council, provided a Parish Council desires them to do so. There is no doubt that on these questions the views of County Councils will be broader and more progressive than those of District Councils. A Parish Council is directly in touch with the locality, and if it will not move it is pretty obvious that the householders of the district do not care to exert themselves to improve their conditions. If, however, there is any desire so to do, it will usually be possible to set a Parish Council in motion, and through it bring the matter before a County Council. The point which we regret is that the matter is not left wholly to the Parish and the County. This was suggested in a recent article in this Journal. The entire elimination of the District Council would be advantageous, but we must be thankful for what we can get from Parliament, and the amendment in question is a distinct step in the right direction.

The Architects' Benevolent Society.

As the Architects' Benevolent Society has now been in existence for fifty years, the occasion has been marked by the issue of a circular letter to members of the architectural profession, signed jointly by the President of the Institute of Architects (who is *ex-officio* President of the Architects' Benevolent Society) and by Mr. Percivall Currey, the Hon. Secretary to the Society, urging on the profession the claims of the Society on their support. They regret that the letter has not produced at all the response they had hoped for. We may perhaps assist in drawing attention to the subject by publishing the following extracts from the letter referred to:—

"Roughly estimated, there are some 4,000 architects in active practice to whom the objects of the Society should directly appeal; out of this number there were last year only 298 on the Society's list of annual subscribers.

We trust that the circulation of this fact will bring home to our professional brethren who are not subscribers the inadequacy of the support accorded to the Society by the architectural profession at large. . . .

The arts of peace have their victims, not less deserving of sympathy and aid than the arts of war—and it is to such as these, the victims of poverty and old age, the victims of destitution through ill-health, or death of the bread-winner—the widows and orphans who have been left insufficiently provided for—it is to these that the Society has been quietly and effectively ministering for the last fifty years.

We earnestly hope, therefore, that you will show your appreciation of the work accomplished by the Society in the past by giving it your active and generous support now and in the future, for to whom shall members of our profession look when in distress if not to their more fortunate brethren?"

We do not quite understand the meaning of the reference to "four thousand architects in active practice" to whom the objects of the Society should appeal. If the circular is addressed to all the architects in the kingdom, there should be many more than four thousand; possibly four thousand is the estimated number of successful and prosperous architects, who may be supposed to have money to spare. However that may be, we recommend the appeal to the consideration of our professional readers.

American Engineers in London.

THE holding of the Annual Convention of the American Society of Civil Engineers (their thirty-second) in London is an interesting event both to English and American engineers. At the opening meeting on Monday, when the American visitors received a hearty welcome at the rooms of the Institution of Civil Engineers, the American President, Mr. Wallace, read an opening address in the course of which, after some picturesque references to Noah and other ancient constructors—Joseph, "who achieved success in connexion with grain warehouses and irrigation works," and Joshua, "who utilised his engineering talents in the overthrow of Jericho by means of the theory of rhythmic oscillations" (this is a sadly rationalistic age!)—he made some remarks as to the respective qualities or differences of American and English engineers. He said it was poor engineering to construct works so massive and with such a surplus of strength and solidity that the interest on the original amount invested far exceeded the cost of repairs, renewals, and interest on a differently designed work that would perform a similar service. In this he thought the engineers of the Old World could learn from those of the New. On the other hand, in the construction of works of a permanent nature, so as to reduce the cost of operation, maintenance, and renewal, the New World could learn from the Old. Is there not something more to be said than this? Have not American engineers, in books of their own, candidly admitted that the American practice was to build a railway as cheaply as possible at first, to see whether it would pay, before bringing it up to the best level of permanent construction? Have we not read only lately that the practice of American locomotive building is not to spend too much on excellence and finish of structure, because a new type will be wanted before the engine is worn out? Under such a theory it is not surprising that we hear of so many failures of American railway bridges, that the insurance offices will not take the lives of the travelling Post-Office officials, and that the breakdown of an engine from a heated bearing is a regular and recognised incident in American magazine stories. We prefer our own system of the best work everywhere on railways, and we hope the Americans will be converted to it. Mr. Wallace made a wise remark to the effect that it was not necessarily true that mathematical ability was a fundamental requisite to success in the engineering profession, "for it often happened that the person in whom it existed was deficient in other qualities." The successful engineer, besides being a mathematician, must, he said, have "the ability to observe natural phenomena correctly, and form a mental picture of things in their proper relations." A good example is the story of George Stephenson, when he was driven over a district for a new railway, and was warned that he must not judge of the streams by their then state—in winter they were wide and deep torrents—"Pooh!" he replied, "Don't tell me; didn't I see the bridges?"

Another Boiler Explosion.

THE Board of Trade Report on another boiler explosion has just been issued. The boiler was used for warming a Wesleyan Sunday school at Moseley, Birmingham, and consisted of twenty horizontal wrought-iron tubes 4 ft. 6 in. long and 3 in. in external diameter. These tubes were arranged in a circle so as to form a horizontal cylinder, and were divided into three groups (of seven, seven, and six tubes respectively); the heating-pipes were also in three sections, the first being connected with the flow from the No. 1 group in the boiler and with the return to the No. 2 group, the second with the flow from No. 2 and with the return to No. 3, and the third with the flow from No. 3 and with the return to No. 1. The water was thus designed to circulate throughout the boiler. A safety-appliance, consisting of a lead diaphragm and stopper, was fitted to *one* of the groups of pipes in the boiler, and a small fire was kept burning during the week in which the explosion occurred. The result of the inquiry showed that the fire was too small to maintain the circulation of the water, and that ice consequently formed in one or more of the heating-pipes at some distance from the boiler. Soon after the fire was made up on

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Saturday, February 10, 1900, the explosion occurred, wrecking the floor over the boiler and seriously injuring the attendant. One of the tubes forming the boiler had burst; this tube was not in the group to which the safety-appliance was attached. It is clear that the pressure throughout the apparatus must have been very unequal, otherwise the appliance would have given way. The circumstances attending this explosion are certainly curious, and the inquiry does not appear to have thrown much light on the matter.

Electricity Supply in Paris.

M. LAFFARGUE recently published a complete and interesting account of the electricity supply companies in Paris in *l'Industrie Électrique*. It seems that there is even greater variety of design in the Paris stations than in the London ones. Every company seems to generate and supply electricity by a different method and at a different pressure. Electric lighting on a commercial scale began in Paris about 1890. The companies obtained concessions, burdened, however, with various heavy charges and limited to only eighteen years. The city was divided roughly into sections, some of which overlap slightly, and only one company is at work in each. In addition there are a few small municipal stations supplying the Hotel de Ville, the markets, &c. The Compagnie Edison distributes at 120 volts on a three-wire system. They are at present building a large generating station at St. Denis, outside the city boundaries, and intend supplying their substations from it by means of high tension direct current at 2,200 volts. The Place Clichy distributes on a five-wire direct current system at 110 volts. It is very similar to that in use at Manchester. They are also building an outside station at Asnières, but will generate and transmit electric power in the form of three-phase alternating currents at a pressure of 5,000 volts. At the substations it will be converted into direct current by means of rotary converters. The Société d'Éclairage distributes on a two-wire direct current system. It has an outside station at St. Ouen, and uses both high-pressure continuous and two-phase alternating current to transmit the energy generated. Some of the dynamos of this company are driven by de Laval steam turbines. The Champs Elysées supplies single-phase alternating current by means of house transformers, and finds great difficulty in keeping up with the demand made on it. It will be seen that the Paris electricians are as far off "standardisation" as we are in this country. The figures given tempt one to conclude that it really does not matter very much what system you adopt in order to convert the energy in the coal into light, the final economies are much the same in all cases.

Lessons in Electrical Engineering.

WE may draw attention to the series of articles entitled "Lessons in Modern Electrical Engineering" which is commenced in our "Student's Column" this week. Ten years ago we devoted a series of articles, in the same part of the paper, to the principles and methods of electrical supply for lighting and power. But electricity is a new science which at present is constantly subject to improvements and new discoveries, and we believe that a series of articles bringing the subject up to the present date will be found exceedingly useful to architects, who have in these days to come into contact with electricity almost at every turn in their work.

Exhibition of Works in Wood.

THE Carpenters' Company announce an important exhibition of works in wood to be held in Carpenters' Hall in June next year. The works for which prizes are offered will include models of "ordinary roofs" (from the context this appears to mean roofs without principals), trussed roofs, bridges, centering, and shoring—all included under Division I. Division II. will include models of ornamental carpentry, combining architectural or picturesque effect with strength and economy of material. Division III. includes models or specimens of joinery of various specified types; Division IV., Cabinet-making; Division V., Carving; Division VI., Carving for competitors under eighteen years of age; Division VII., Carving for amateurs only. A special prize of 20*l.* will be offered for the best corner cupboard in hard wood. The Carpenters' Company will award a gold medal for the best exhibit in Divisions I. and II. irrespective of class; a gold medal for the best in Division III., and a gold medal for the best carving exhibited (if of sufficient merit), irrespective of Division and Class. There is also to be a Loan Exhibition of carving, old or historic furniture, architectural or founder's models, and any other objects illustrating the arts of joinery or carving. This promises, if adequately supported, to be a most interesting exhibition. Intending competitors can obtain all information from Mr. Stanton W. Preston, Carpenters' Hall, London Wall.

Clifford's Inn.

IN giving judgment recently in the suit of Smith *v.* Kerr, Mr. Justice Cozens-Hardy held that the conveyance of Clifford's Inn of the year 1618, under which alone the property is held, negatives the idea of private ownership, but proves a dedication to public or charitable purposes, and declared that so much of the property comprised in the deed as is now vested in the trustees is subject to a trust for charitable purposes, and cannot therefore be disposed of by the present sixteen members of the Inn for their own personal benefit. The indenture of feoffment made on March 29, 1618, between the Earl of Cumberland, Lord Clifford, Nicholas Sulyard, the Principal, and twelve members (described as "Rules") of the House, with others, conveyed the property in trust for 600*l.*, subject to a yearly rent of 4*l.* Clifford's Inn, a dependency of the Inner Temple, has its origin in the residence of the Barons de Clifford, ancestors of the Earls of Cumberland. On February 24, 3rd Edward II., the king granted, for one penny's service, to Robert, son of Roger, de Clifford,

"that messuage . . . next the Church of St. Dunstan-in-the-West . . . which was sometimes Malculines de Herley, and came to the hands of Edward I. by reason of certain debts which the said Malculines was bound . . . to our said father."

In 18th Edward III. Robert's widow leased the premises at 10*l.* per annum to some "*apprenticii de banco*," supposed by Dugdale to be lawyers belonging to the Common Pleas. Under the Act (1829) for rebuilding St. Dunstan Church a part of the Inn was taken for 5,000*l.*, the money being expended upon new buildings and the improvement of certain houses and chambers in the Inn. Over the passage leading to the hall, which retains some fine old coloured glass, are the initials and date "P.W.M., 1767." In the thoroughfare between the screens and the buttery, and elsewhere, may be seen the coat-arms of the house—checquy, or and azure, a féss gules besanté sable within a bordure of the third. Coke (1571) and Selden (1602) were admitted of the Inn. The hall, rebuilt in 1618, is chiefly notable as being the place wherein sat Sir Matthew Hall, Sir Orlando Bridgman, then Lord Chief Justice of the Common Pleas, and other judges, to adjudicate upon claims relating to property destroyed in the Great Fire.

The Ranger's House, Greenwich Park.

TWO years ago the gardens of the Ranger's House were added to Greenwich Park and opened to the public. The gardens are well timbered with tropical trees, and include some cedar trees on the lawns in front of the house. The London County Council lately agreed to an estimate of 5,000*l.* submitted by their Finance Committee for the purchase of the house, together with 2 acres of adjoining land, with a view to converting it into a shelter and refreshment house. The Ranger's House, fronting Chesterfield-walk, was, it seems, formerly known as Chesterfield, and afterwards as Brunswick, House, and was taken for the Princess Sophia of Gloucester, a niece of King George III., who in 1816 had been appointed Ranger of the Park, and resided there until her death on November 29, 1844. It is said that Frederick, Prince of Wales first met his bride, Augusta of Saxe-Gotha, upon the balcony. Queen Caroline, when Princess of Wales, lived, 1806-10, as Ranger of the Park, at the adjoining Montague House—pulled down in 1815—which, with Brunswick House and the house which was the early home of General Wolfe, had been built before 1694 by one Andrew Snape, according to the recital of a lease made of Brunswick House in that year to Nicholas Lock. The last-named house was taken in 1753 by Philip, fourth Earl of Chesterfield, who occupied it during many years as a country seat. In 1807, Augusta, Dowager Duchess of Brunswick, mother of the Princess Caroline, bought the remainder of the lease from General Hulse, son of Sir Edward Hulse, Bart.

The Academy Soirée.

THE Annual Soirée of the Royal Academy, which was held on Tuesday evening, seemed to be even more largely attended than usual, the staircase between 9.30 and 10.0 presenting the spectacle of a compact mass of people moving slowly up step by step. The guests were received by Sir E. Poynter at the entrance into the Octagon Hall. The band of the Royal Artillery gave a series of splendid performances in the lecture-room, and refreshments attained a higher standard than is usually found at "crushes" of this nature. No public body does this kind of thing in better style than the Royal Academy. Visitors find an additional interest in the fact that the *penetralia* of the Academy are thrown open, and they can inspect the council-room and library and the paintings and other works of art, often of special historical interest, contained in these and other rooms.

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LETTER FROM PARIS.

THE Committee of the fifth International Congress of Architects, to be held at Paris from July 29 to August 4, has decided that an exhibition of original drawings by architects shall be held at the Ecole des Beaux-Arts during the holding of the Congress. The Committee specially invites drawings likely to interest the general public, such as picturesque views and perspectives, drawings of façades and interiors, or old original drawings by nineteenth-century architects and earlier.

The Pope has, on the occasion of the unveiling of the now completed dome of the Sacré Cœur at Paris, honoured the architect of the building, M. Rauline, with the distinction of Commander of St. Gregory, and MM. Chaux and Morot, his collaborators, with the grade of Chevaliers of the same order.

The Académie des Beaux-Arts has awarded the Prix Lambert, of the value of 12,000 francs, to M. Charles Girault, the architect of the Petit Palais on the Champs Elysées. This prize is intended to honour the architect of the best artistic work erected in Paris, and the voting was unanimously in favour of the work of M. Girault.

The first official trial of the working of the new Metropolitan railway at Paris was made a few days ago on the portion of the line running from the Porte de Vincennes to the Bastille. The trial was reported as being perfectly satisfactory, various speeds up to 50 kilomètres per hour having been run with safety. The official inauguration will take place on July 14, when a much larger portion of the line will have been completed.

The third Congress of "Habitations à Bon Marché" held several interesting meetings in the Palais des Congrés at the Exhibition from June 18 to June 21. The meetings were presided over by M. Jules Siegfried, late Minister of Commerce and Industry, assisted by a large number of professional men and philanthropists. The various subjects discussed will be brought up again at the meetings of the International Congress of Architects to be opened at Paris on July 29 next. Visits were made to the branch of the Exhibition at Vincennes, where a number of various types of economical dwelling-houses are exhibited by the French and foreign sections.

The Report has now been sent in by the three experts commissioned to inquire into the cause of the fire at the Théâtre Français, but the Report concludes that it is impossible to determine the cause or causes of this fire. The experts have been unable to determine whether the fire was due to electricity or to malevolence, but they have put aside a certain number of suppositions first brought up, especially that attributing the fire to the bad state of the heating apparatus. They admit that the electric installation was in a bad state, but as there was no current at the time they cannot render electricity responsible. The Report, however, decides that the administration of the theatre deserves serious blame with regard to the general theatre-service and the following of the regulations. When the fire broke out there was no person in the building capable of dealing with a fire; the *concierge* of the theatre was alone present, and it was not in his duties to lower the iron curtain or work the hydrants; and it also stated that several of the iron doors were in a very unsatisfactory condition, that, in fact, the theatre was entirely unguarded and unprepared in case of an outbreak of fire.

The Exhibition may now be said to be quite complete as far as exhibitors and the public are concerned, and there is now no risk of visitors from a distance finding any buildings or exhibits incomplete. In the afternoon of each day the whole Exhibition is in full working order as regards machinery and exhibits, and in the evening the electric-lighting, which up to a few days ago was quite insufficient, renders the grounds interesting to walk through. The Palais de l'Electricité and the Château d'Eau are in full working order, and on several nights per week, when fully illuminated, are well worth seeing. Despite some trouble between the administration and the exhibitors, it has been decided to keep the buildings open and the exhibits uncovered until seven instead of six p.m. It may be interesting to know that the total amount of capital formed for the use of companies and syndicates working the forty-six unofficial important "attractions" or shows in the Exhibition grounds is 46½ million francs; some of these shows, which have been arranged in a very decorative and sometimes artistic manner as regards the buildings they occupy, are, however, not doing anything like the business necessary to pay. There are too many by far of these attractions, which profit the Exhibition only by the large sums which have been paid over for the grant of the ground occupied. The immense Globe Céleste appears at present to be the most unfortunate of these For some reason not yet clear it was officially closed to the public after the first reception on the opening day. The Globe and the building supporting it are certainly constructed on very bold lines, but are possibly as strong as any of the other show-buildings. It seems unfortunate that the lower portion of the building has been constructed of the same system of iron and cement as employed for the footbridge which gave way so disastrously a few weeks ago, and that the architect of this building was the architect of the bridge. But it is probable that after careful examination and testing any present doubt will be removed, and the interesting show opened duly to the public.

One of the latest official attractions is the Palais des Illusions, opened a few days ago. The architect, M. Hénard, the architect of the Palais de l'Electricité, has himself imagined this attraction, composed of a large octagonal room under the Palais de l'Electricité, decorated in a luxurious fashion by M. Almeros, sculptor, and covered with large mirrors on every surface. When the complete darkness of the room is dissipated by a multitude of various coloured electric lamps of changing colours the effect of colour-decoration and the impression of extended space is startling.

The Municipality of Paris has since the last few days been in possession of a new monumental work of great merit—the equestrian statue of Washington presented to Paris and to France by a committee of American ladies. On Thursday last week it was inaugurated at the Place d'Iena. It is considered in Paris to be a work reflecting great honour upon its sculptor, Mr. Daniel French. This inauguration will be soon followed by another, that of the monument to Pelletier and Caventon, who introduced the use of quinine in modern therapeutics. The monument, by M. Lormier, represents the two chemists standing side by side, each clad in the gown of the faculty. This solemn group, which is to be erected on the Boulevard St. Michel, will probably be rather a puzzle to the public, and certainly seems a little too important for the occasion. Its proper place would be in the Ecole de Pharmacie.

Unfortunately, "statue-mania" is on the increase in Paris, and there will presently be no more room left for monuments. Already the basin surrounded with flowers in the Place St. Augustin has disappeared to make way for the erection of the equestrian statue of Jeanne d'Arc by M. Dubois; in the Place Malesherbes a similar bit of garden ornament, arranged by the late M. Alphand, has been displaced to make room for the monument to Dumas *fils;* and in the Place de la Madeleine it is proposed to erect a statue to Jules Simon (who formerly lived there) in place of one of the graceful white marble fountains erected in 1869 from the designs of Davioud. These posthumous honours are beginning to be regarded by the public with some consternation.

The last vestiges of Falguière's colossal model of the statue of Liberty, which was felt to be undecorative and out of place, have been removed from the Panthéon, and it is now proposed to decorate this portion of the interior with tapestries, until some work of art is produced which seems worthy to occupy the situation. The friezes by Puvis du Chavannes, which form the finish of his great painting here, are now completed. His pupils, under the able direction of M. Cazin, have scrupulously copied the cartoons left by the great artist as far as complete, and M. Cazin is himself putting the last touches to them. The cartoons themselves will be preserved in the Louvre.

Notwithstanding the promises of the Direction des Beaux Arts it is evident that the Théâtre Français will not be ready before the end of the year. The provisional decoration of the new auditorium has been entrusted to M. Jambon, who will have among other things to produce a new ceiling painting to replace that by Mazerolle. M. Guillaume Dubufe's ceiling in the foyer has not been injured by the fire, but the framing of the ceiling, composed of gilt medallions, has been a good deal injured, and a new decorative design will have to be carried out for this portion.

M. Pascal, architect to the National Library, has made a restoration of the celebrated Cabinet des Médailles of Louis XV., and intends to collect here all the documents, furniture, and objects of art belonging to the State, which formerly made the contents of the "Cabinet du Roy," and of which several of the pieces of furniture are at present on view in the Centennial Exhibition. The walls of this apartment will be decorated with paintings by masters of the eighteenth century which are now scattered in various apartments in the portion of the Library towards the Rue Richelieu.

M. Trouillebert, a talented painter and a pupil of Corot, has just died, in his seventieth year. He was the author of many landscapes in a style very nearly approaching those of his celebrated master. Twenty years ago he became rather celebrated in consequence of a singular incident, which served to shake rather roughly the pretended infallibility of art-critics and experts. Alexandre Dumas had bought for 12,000 francs a picture by Corot, of which he was very proud, and which was admired by artists and amateurs. One day Trouillebert, happening to see this picture, recognised it as a work painted by himself under the title "Fontaine des Gabourets," and sold at the time for 100 francs to a picture-dealer. He brought an action, gained it, and obtained the right to inscribe his name on the picture, which, being proved not to be by Corot, immediately lost its market value; but the incident gained Trouillebert a tardy recognition and reputation which but for this he would probably never have obtained.

We have to record also the death, at the age of twenty-eight, of the painter Maurice Vezoux, pupil of MM. Bonnat and Albert Maignan. He exhibited in the Salon of 1899 a picture entitled "Fontaine de Juilly" which gained him an honourable mention.

COMPETITION FOR THE NEW DOCK OFFICES, LIVERPOOL.

THE competition instituted by the Mersey Docks and Harbour Board for their new offices has been confined to Liverpool architects, but merits full notice on account of the importance of the scheme. The site is now occupied by the almost useless George's Dock. This it is proposed to fill up, and part of it is being sold to the Corporation of Liverpool, while the remainder — nearly three acres — will be used for the new offices and for street improvements adjoining them. Brunswick-street will be continued across the side of the dock and will form an almost direct approach to the landing-stage. The north-west frontage of the offices will abut on this street. Mann Island curves around the south-east, south, and south-west frontages; and a new street will be formed along the north-east side. The old George's Baths, which lie between the south-west front of the proposed building and the river, will probably be pulled down, as well as other old buildings which lie along the riverward side of Mann Island. If the ground is thus cleared, the new offices will be a conspicuous feature in the view from the river, and in any case they will be the first buildings seen by the persons coming from the landing-stage.

One would have thought that a competition for a building on such a site and estimated to cost over a quarter of a million would have been thrown open to all the architects of the country. It appears, however, that the members of the Mersey Docks and Harbour Board thought differently, and their decision has at any rate prevented a great number of architects from wasting time on the matter. Copies of the instructions were sent, we believe, to thirteen firms, and ten designs were sent in response to the invitation. According to an evidently inspired article in the *Liverpool Courier* of Saturday last, "a special committee of the Dock Board, assisted by their architectural adviser, Mr. A. Waterhouse, R.A.," awarded the premiums; but, it is added, "the board have reserved to themselves full power of proceeding with any of the premiated designs or with none of them;" and again, "no decision has yet been taken as to the adoption of any of the designs for the actual building."

The three premiated designs are exhibited

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in the News Room at the Exchange. Whether they comply with the instructions issued to architects or not, we are unable to say, as in the absence of the manager-secretary of the board we could not obtain a copy of these instructions. Perhaps the result would have been the same if he had been in attendance, as we were informed that no copies of the instructions had yet been given to outsiders, as they contained much information of a character not usually contained in competition-instructions.

The first premium of 300*l.* has been awarded to the design by Messrs. Briggs & Wolstenholme, of 3, Lord-street, and Messrs. F. B. Hobbs & Arnold Thornely, of 14, Castle-street. Two points about this design strike the observer very forcibly; the first is the simplicity of the plan, and the second the architectural character of the exterior. It may be safely said, however, that if Messrs. Norman Shaw and Francis Doyle had not designed the offices now being built for the Royal Insurance Company in Liverpool, Messrs. Briggs, Wolstenholme, Hobbs & Thornely's design for the Dock offices would not have been what it is. The resemblance is as striking as that between Lockwood & Mawson's design for the Bradford Town Hall and Wm. Burges's design for the Law Courts in the Strand, and that is saying a great deal.

The planning of this design is in nearly every respect better than in the other premiated designs. Part of the site near the river is utilised as a garden, and the building itself is an almost exact square, but with a large part of the south corner cut off at an angle of 45 deg. The two complete sides are each about 260 ft. long. The length of the splayed side is approximately equal to that of each of the adjacent truncated sides. The view from the river will embrace these three sides, and this fact has evidently influenced the planning to a very considerable extent.

The offices are grouped around a large court, which, like the outline of the plan, is pentagonal, three of the angles being right angles and two measuring 135 deg. This court is divided into three long corridors, &c. The principal entrance is in the centre of the splayed side, and from this a wide entrance hall leads to the "central hall" in the centre of the square, and from the central hall two other corridors lead to entrances in the middle of the frontages to Brunswick-street and the new street. The corridors are all at right angles to the fronts from which they are entered, and form a sort of Isle-of-Man arms (or legs) in the plan. The principal staircase is in the middle of the wide corridor between the entrance hall and central hall, and the lavatories, urinals, and water-closets are grouped in two of the three angles formed by the meeting of the three corridors. This arrangement is repeated on all the upper floors, and lends itself admirably to the separation of the different departments and to quick approach to each. It has also the most important advantage of doing away with corridors around the circuit of the building, and this allows the offices to be lit both from the external faces of the building and from the inner courts.

According to the report which accompanied this design, and which appeared in the *Liverpool Courier* last Saturday, the instructions suggested that the building should have six floors in addition to the basement, but the architects claim that they have provided all the accommodation specified, together with a sufficient amount of extra accommodation for future use, on five floors, and they have therefore omitted the sixth story.

The foundations will be taken down to the rock, the depth of which, according to the third premiated design, varies from about 30 ft. to 45 ft. below the level of the basement floor. The cost of the foundations is estimated at only 15,000*l.*, and the superstructure, at 13½d. per cubic ft. works out to 244,080*l.*

As we have already said, the style of architecture may be fitly described as Norman-Shaw-and-Doylesque. The ground and first stories are built with bands of rusticated masonry, most of the lower windows having semi-circular heads with heavy projecting voussoirs, while those on the first floor are of two lights with square heads and rusticated columns. A moulded string-course surrounds the building above these windows. The second and third stories are grouped together, and have Ionic columns, rusticated in the lower parts, and crowned with the main cornice, in which the inevitable modillions are the most conspicuous feature. Large segmental pediments occur on all the principal fronts above the cornice. On the splayed side there is a bald attic story, but on the other sides are balustrades and dormers. At each angle of the splay there is an octagonal tower, of similar design to the rest of the building, on the ground and first floors, but different above and somewhat unfortunately breaking the continuity of the building. Above the attic each tower is changed to a circular plan by means of eight pairs of coupled columns, above which rises a dome, and this is crowned by a cupola.

The planning of this design is excellent, and the architectural character is also of a high order, although the rustication of the columns —a mode of ornamentation known by the irreverent as piled-up cheeses and tea-chests— is carried to excess. The sheet of details drawn to ¼-in. scale shows good work, and the perspective, a wash-drawing in Indian ink, admirably illustrates the design.

Messrs. Woolfall & Eccles, 60, Castle-street, have gained the second premium (200*l.*) with a design which, while possessing some good features, is decidedly inferior to that placed first. As in the latter, an entrance is shown in the middle of the splayed side, but it is only the "official entrance." A range of offices is planned fronting the new street on the north-east side of the site, and beyond these, in Brunswick-street and Mann Island, are the two principal entrances, connected by a corridor running straight across the building and parallel with the new street. In the middle the corridor is widened to form an oval hall, around which is the principal staircase. From this hall, and at right angles to the main corridor, a smaller corridor leads to the south-west part of the building, cutting the central court into two parts. On either side of this smaller corridor is a group of conveniences. This arrangement is varied on the third and higher floors, corridors being introduced forming a circuit around the building; some of these are long, narrow, and dark. In the first premiated design the angle formed by the south-west and north-west fronts is a right angle, which is an improvement on the acute angle shown in the other designs.

The authors of this design have a great fondness for small areas for light and air. On the ground floor are two large courts, as already mentioned; on the first floor these are supplemented by two areas about 20 ft. by 39 ft. and one 5 ft. by 10 ft. 6 in. (and 70 ft. high!); on the next floor two more are shown, 20 ft. by 18 ft. 6 in.; on the third floor some of these are enlarged, and two others are added measuring 38 ft. by 12 ft.

The architectural character is marred by lack of proportion. The Corinthian Order is adopted on the principal fronts, and runs through the first, second, and third stories; beside the smaller rusticated "Tuscan" columns of the fourth and fifth stories, the Corinthian Order looks coarse, while these by contrast have a weak and "finicking" appearance. If the main cornice had been surmounted by a single attic story of simple design, the composition would have been much more effective. The ground story and basement are rusticated. A lofty tower is shown above the official entrance in the middle of the splayed side, and is not without merit. Above the cornice of the Corinthian Order, for a height equal to about twice its breadth, it is quite plain except for the clock-faces. Groups of sculpture at the four angles mask the conversion into an octagon, and the four principal faces of the octagonal story have each two Ionic columns with segmental pediment, on the top of which stands an urn. Behind the urns, curves and scrolls lead up to a pedestal, on which stand four Atlantes bearing a sphere.

The third premium has been awarded to Mr. James H. Cook, of the firm of Messrs. Thos. Cook & Sons, 12, St. George's-crescent. In this the "Rates Dues and Post Entry" department occupies the centre of the building on the ground floor, practically the whole of the site on this and the basement floors being covered by the buildings. This arrangement affords a good position for an important department and allows ready access to it, but involves an immense amount of waste space in the basement, and also renders the location of the conveniences a difficult matter. One group of conveniences is placed to one side of the central offices, and above it are five more stories of conveniences, with the kitchen (of all rooms!) on the top. The remaining conveniences, five stories high, are boldly placed as the central feature (about 76 ft. wide) of the north-east front. Such a waste of good light and frontage for offices is not commendable.

The external design is French Renaissance in character with high-pitched Mansard roofs, the detail being of a rather coarse type, but the composition hangs well together. The principal entrance is in the middle of the splayed front, a loggia being formed with piers and three semi-circular arches. At each side of this central feature there is a projecting pavilion, and beyond these, at the extremities of the splayed side, are circular towers, octagonal in the upper parts, and crowned with domes. A lofty flèche rises from the roof over the principal entrance bay.

Of the three designs exhibited, we certainly think that the best has been placed first, and as this is certainly a good and economical design, it may have been the best submitted; but whether the second and third premiated designs are worthy of the honours they have gained is a point that the public of Liverpool, as well as architects generally, and the competing architects in particular, would like to have had an opportunity of considering. A competition of this importance ought not to be settled in "huggermugger," like the burial of Polonius, but openly. We are not even told that the assessor's decision has been adopted by the Board; it is simply said that he "assisted" them. His report, we are informed, will not be published, and the rejected designs will not be exhibited side by side with those accepted. It is surprising that a public body of the status of the Mersey Docks and Harbour Board should have conducted a competition in this manner. The assessor's decision ought to have been announced, and every design ought to have been exhibited together with the report accompanying it. Surely, if Mr. Waterhouse had exerted his influence, he could have induced the Board to agree to such an exhibition, which is not only an act of courtesy to the competitors, but a sign that the promoters of the competition have nothing to fear from publicity.

THE ARCHITECTURAL ASSOCIATION

THIRTY-FIRST ANNUAL EXCURSION.

ARRANGEMENTS for the annual excursion of the Architectural Association, from Monday, July 23, to Saturday, July 28, are practically complete. The headquarters will be at Bury St. Edmunds, and accommodation has been secured at the "Angel Hotel," opposite the gateway into the abbey grounds.

According to *Architectural Association Notes*, "the last excursion to Bury was in 1884, but the coming one will not be exactly on the lines of that year, as the Committee feel it is only right to select buildings that will, as far as possible, illustrate the prevailing phase of thought and design, but amongst places to be visited we may enumerate the following:—

Pakenham New or Dower House, a quaint Dutch gabled building.

Ixworth, a late church.

Bardwell Hall, a Tudor grange.

Stowlangtoft, a very fine late church with some Jacobean almhouses near, and a fine eighteenth century house in the neighbourhood.

Moyns Park, a large Elizabethan mansion.

Clare, a very fine church in a small town, full of good domestic work.

Mildenhall, a small market town with interesting houses and a splendid late church.

Icklingham, a decayed and rare article, an unrestored church.

West Stow, a quaint decaying gatehouse and cloister.

Hengrave Hall and Church, of which we need only say that everybody should see them.

Space is, however, limited, and we can hardly do more than mention names of fame—such as Long Melford, Kentwell, Lavenham, Hawstead, Coldham, and Rushbrooke."

PRIZE DESIGN FOR MIDDLE-CLASS VILLAS.—At an Eisteddfod, held recently at West Kirby, Mr. Edward Brain was awarded the gold medal and certificate for his design for a pair of semi-detached middle-class residences, cost not exceeding 400*l.* each. The adjudicators were Messrs. H. W. Keef and E. Ware, both of Liverpool. Mr. Brain was for some time engaged as an assistant in the office of Messrs. Grayson & Ould, of 31, James-street. In addition to the above award, Mr. Brain has received an offer of a commission from the chairman to execute his design at West Kirby.—*Liverpool Post.*

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THE BRITISH INSTITUTE OF CERTIFIED CARPENTERS.

THE dinner, which was postponed owing to the death of the late President, Professor Banister Fletcher, took place in the Carpenters' Hall on Saturday, June 30, when upwards of ninety members sat down in the Grand Hall. Professor T. Roger Smith, President, occupied the chair, and in giving the toast of the British Institute of Certified Carpenters said that one great feature of an association of this kind was the advantage of having papers, connected with the trade, read at the meetings and discussed by the members, which produced far more impression than merely reading them at home. By careful observation in travelling at home or abroad, they would be able to impart knowledge to others who had not that advantage. Visiting works of interest was also a great feature: methods of construction could be seen; numerous ideas of architects could be obtained; old work or buildings could be compared with new; and in many ways knowledge would be gained by the members.

Mr. Phillips Fletcher, in reply, said, being a carpenter himself, having served his time at the bench, he considered that all architects should work at a trade, whether it was that of a mason or carpenter; they would be more in touch with the methods adopted by workmen.

Mr. J. D. Macnair, Hon. Treasurer, gave the toast of the "Worshipful Company of Carpenters," and said it was a great honour to the members of the Institute to be able to have the use of the rooms in the Hall and the valuable books in the Library. The Company of Carpenters had most generously supported the Institute in every way.

A member having proposed the health of the President, and thanked him in the name of the Institute for the honour he had done them in accepting the office of President,

The President, in the course of his reply, said he was glad to see that the certificate of the Company was being carried to all parts of the world, and those who held it were all practical craftsmen; this would show everywhere that the Carpenters' Company was fostering and upholding the ancient craft.

Professor Henry Adams responded for the Honorary Fellows, and said it would give him pleasure to read a paper on some future occasion.

Mr. Phillip, of Norwich, responded for the toast of "The Provincial and Colonial Members," proposed by Mr. J. Classon Preston. A programme of vocal and instrumental music by the members brought the evening to a close.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend the Poplar District Board 20,000*l.* for electric lighting purposes; the Strand District Board 1,500*l.* for the purchase of motor-vans; the Battersea Vestry 5,147*l.* for street-lighting purposes; the Islington Vestry 6,606*l.* for electric lighting purposes; and the Guardians of Holborn Union 4,490*l.* for works at Mitcham Schools and for drainage works at the infirmary.

Contracts—Retention Money.—The General Purposes Committee brought up the following report:—

"We have had under consideration a memorandum from the Joint Committee on Coroners' Courts and Mortuaries, on the subject of making less stringent standing order No. 195, relating to retention moneys under contracts. The Housing Committee have also made a representation on the subject. Standing order No. 195, we may remind the Council, provides that instead of requiring contractors to furnish securities for the due performance of their contracts, percentages of the amounts of the contracts according to a certain schedule are to be retained by the Council. This schedule, which is somewhat complex, is set out in the standing orders, and it will be seen that the percentage ranges from 20 per cent. in the case of a contract to the amount of 2,000*l.*, to 4 per cent. in the case of a contract to the amount of 500,000*l.* When this percentage of work has been carried out, payment may be made to the extent of 90 per cent. upon the value of the work beyond that percentage, and when half the amount of the contract has been executed payment for all further work is to be made in full. On the completion of the work 50 per cent. of the retention money is to be paid to the contractor, a further 25 per cent. is paid three months, and the final payment six months (or such other period as may be specified in the contract) after the completion of the work. It is urged that the amount of the retention money under this system is more stringent than is necessary to afford the Council reasonable protection, and that in consequence the cost of the Council's work is possibly enhanced; and, after careful consideration, and having had before us reports by the Architect, Engineer, and Solicitor on the subject, we make the following proposals:—

(a) Percentage to be Retained.

We think that instead of the existing complex schedule of percentages, it should be provided that in the case of contracts under 100,000*l.*, payments should be made at the rate of 80 per cent. of the value of the permanent work executed, until the amount due in respect of the contract and remaining unpaid (*i.e.*, the amount of the retention money) is equal to 10 per cent. of the amount of the contract price, after which the full value of the further work certified by the superintending officer should be paid. This proposal, it seems to us, would be advantageous both to the Council and contractors, inasmuch as a simple method of calculation would be substituted for the present scale, which is very confusing; and contractors would be helped in the earlier stages of their work at a time when some of them might, perhaps, require most assistance.

In the case of contracts of 100,000*l.* and upwards, however, the amount of the retention money would be rather larger under the proposed conditions than under those at present in force; and we think, therefore, that in these cases, which seldom arise, special arrangements should be made, and that the proposed scale should not apply.

(b) Duration of Period Between Certificates.

We think it would be convenient if a rule were laid down governing these points, and we suggest that certificates should be given by the superintending officer not oftener than once a month.

(c) Money to be Retained During Period of Maintenance.

We think the present system might be simplified as regards this point by providing that one-half of the retention money shall be paid on completion of the work, and the balance at the expiration of the period of maintenance.

(d) Provision to Meet the Contingency of the Bankruptcy of the Contractor.

The solicitor has suggested that a clause to the effect that all materials and plant of the contractor when brought on the ground should at once become the Council's property, such a clause having generally, when properly framed, been found effectual in the event of bankruptcy. We think the solicitor should be instructed to insert in contracts a clause of the nature he suggests.

We recommend—

(*a*) That the following be a standing order of the Council in place of standing order 195—

In the case of contracts not exceeding 100,000*l.*, instead of requiring the contractors to furnish sureties for the due performance of their contracts, payments shall be made at the rate of 80 per cent. of the value of permanent work executed until the amount due in respect of the contract and remaining unpaid shall be equal to 10 per cent. of the amount of the contract price; after which the full value of the further work certified by the superintending officer shall be paid. In the case of contracts of 100,000*l.* and upwards special arrangements shall be made.

Certificates shall be given by the superintending officer not oftener than once a month.

One-half of the retention money shall be paid on completion of the work, and the balance at the expiration of the period of maintenance.

(*b*) That the solicitor be instructed to insert in the Council's contracts a clause to the effect that all materials and plant of the contractors, when brought on the ground, shall at once become the Council's property."

Recommendation *a* having been agreed to,

Mr. Ward, on *b*, said that some words should be added to the effect that the plant and materials remain the property of the Council only until the end of the contract, and that some plant may be removed from time to time on the order of the surveying officer.

The Chairman of the Committee then agreed to take back recommendation *b*.

Municipal Trading.—The same Committee reported as follows, the recommendation being agreed to:—

"We have had under consideration a letter from the Chairman of the Joint Committee on Municipal Trading, asking if the Council proposes to give any evidence before that Committee. It is somewhat doubtful as to the extent to which the Council's work can be considered as coming within the definition of municipal trading. We think, however, that perhaps two sections of the Council's work—viz., (1) the management of tramways and (2) the provision of artizans' dwellings, might come within the scope of the Joint Committee's inquiry, and in connexion with which evidence might be given on behalf of the Council. We have accordingly given instructions for a reply to that effect to be sent to the Chairman of the Joint Committee. We recommend that the course taken be approved."

Asylums.—The Asylums Committee reported that some of their members had privately visited Continental and American asylums, and had obtained much information as to the systems prevailing abroad for the treatment and housing of lunatics. Before reporting upon any proposals as to fresh accommodation, however, the Committee thought an official deputation should visit the American and Canadian asylums, in reference to a resolution adopted by the Council some time ago. It was proposed that the deputation should comprise three members of the Committee, together with the assistant-clerk of the Committee, the asylums' engineer, and one of the medical superintendents. They would probably be absent from England about six weeks, at an estimated cost of something under 1,000*l.*

Mr. Benn moved to refer the recommendation back, on the ground that information and experience to be placed at the Council's service by members of the Council should be collected at their own expense.

Sir A. Arnold seconded the amendment.

After discussion the Council divided, when the voting was equal—52 for the amendment and 52 against. The Chairman then gave a casting vote for the amendment.

Upon the amendment being put as a substantive motion,

Mr. Beachcroft moved to add the following words:—

"That it be an instruction to the Committee that, having regard to the scientific nature of the investigation proposed by the Asylums Committee with regard to asylums for the insane in America and on the Continent, the Council is of opinion that the investigation is one that should be entrusted to one or more experts, and accordingly authorises and instructs the Committee to arrange accordingly with regard to the proposed visit."

Dr. Longstaff seconded the amendment, which was rejected by a show of hands.

The Council then divided on Mr. Benn's amendment as a substantive motion — for referring back, 50; against, 54.

The amendment was consequently defeated.

Mr. Benn inquired what was now the position of the matter.

The Chairman: As the Council have now refused both to accept the Report and to refer it back to the Committee, the result is that nothing has been done. The Committee can bring the matter up again if they like.

Tramway Purchase.—The meeting having been made special, the Council adopted proposals of the Highways Committee for the compulsory purchase of the undertakings of the London, Deptford, and Greenwich Tramways Company and of the South London Tramways Company.

Improvements.—The annual list of county improvements proposed by the Improvements Committee included the widening of Mansell-street, Whitechapel, at an estimated cost of 102,000*l.*, the widening of Central-street, St. Luke's, at an estimated cost of 81,250*l.*, and the widening of Brixton-road, between Cranmer-road and Prima-road, at an estimated cost of 10,800*l.* The Committee recommended that application should be made to Parliament for the necessary powers, and that the creation of new interests meanwhile in the property proposed to be acquired should be prohibited by a clause in the Bill. In the case of the Mansell-street improvement it was estimated that the property would cost 75,100*l.*, the works 8,500*l.*, and the rehousing of persons displaced 7,500*l.* With regard to the St. Luke's improvement, 70,750*l.* was put down for the property and 7,000*l.* for works, and in the Brixton-road case the figures were respectively 4,000*l.* for property and 6,800*l.* for works. The Report was adopted.

Tenders.—The Main Drainage Committee recommended, and it was agreed, that the expenditure of 155*l.* be sanctioned for the supply and fixing of new steam-piping and stop-valve at the Abbey Mills pumping-station, and that the offer of Messrs. Stannahs & Knights, Limited, be accepted.

The Inebriates Acts Committee reported that they had received the following tenders for works at Brickhouse Farm, and that they had decided to accept Mr. Wallace's tender:—Robert Wallace, 520*l.*; Potter Bros., 560*l.*; Pink & Moon, 590*l.*; T. Wickens, 598*l.* 10*s.*; F. C. Hyde, 700*l.*

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Salaries of Sanitary Inspectors.—The Public Health Committee reported as follows, the recommendation being agreed to :—

"We report, for the information of the Council, that the Local Government Board have sanctioned the appointment of the following Sanitary Inspectors :—Mr. T. Mitchell, Paddington, at a salary of 100*l.* per annum ; Mr. J. W. Cowling, Islington, at a salary of 160*l.* per annum ; Mr. C. H. Johnston, St. Pancras, at a salary of 120*l.* per annum, rising by 10*l.* annually to 150*l.* We consider that the salary of 100*l.* per annum proposed to be paid to Mr. Mitchell by the Vestry of Paddington is inadequate, having regard to the nature and responsibility of the work which devolves upon Sanitary Inspectors under various Acts of Parliament, and, as the Council has to pay one-half of the salaries of such inspectors, we think it may properly express an opinion to the Local Government Board on the subject. We accordingly recommend that a letter be addressed to the Local Government Board expressing the Council's opinion that the salary of 100*l.* per annum proposed to be paid to Mr. T. Mitchell, a Sanitary Inspector appointed by the Paddington Vestry, is inadequate, and stating that the Council hopes that the Board will not in future sanction the appointments of Sanitary Inspectors unless adequate salaries are paid."

Applications under the Metropolis Management and Building Acts Amendment Act, 1878.—The following applications were agreed to on certain conditions :—A side-show in Picturesque England at the London Exhibitions (Mr. A. O. Collard). Screens to be erected in the Queen's Palace at the London Exhibitions (Mr. A. O. Collard). Arrangements in regard to the Lyric Theatre, Shaftesbury-avenue (Messrs. J. G. W. Buckle and A. B. Jackson). Alteration to the roof over the gallery at the Royal Agricultural Hall, Islington (Mr. R. Venner).

Holborn to the Strand Street—Architectural Features.—The Improvements Committee reported as follows :—

"The Council on April 10, 1900, decided to invite eight architects to submit designs on certain specified conditions for the elevations of the buildings proposed to be erected fronting on the Strand and on the crescent road to be formed between Wellington-street and Clement's Inn. The Council further resolved to invite the Royal Institute of British Architects to nominate four of the eight architects in question, and authorised the Improvements Committee to take all necessary steps to give effect to the decision. We at once placed ourselves in communication with the Royal Institute, and at the same time proceeded to consider the qualifications of a large number of architects with a view to nominating four on behalf of the Council. The four who were at first selected by us were the following, placed in alphabetical order :—Messrs. T. G. Jackson, R.A., Mervyn Macartney, E. W. Mountford, and Ernest Runtz. Mr. Jackson informed us that with his present engagements it was not possible for him to accept the nomination, and he added that he deprecated any attempt to treat the Strand frontage on one general design. We accordingly then nominated Mr. Leonard Stokes. He and the other three architects accepted the invitation and the four architects nominated by the Council are, therefore, Messrs. Macartney, Mountford, Runtz, and Stokes. The Royal Institute of British Architects nominated the following in alphabetical order :—Messrs. Reginald Blomfield, Thomas W. Collcutt, Ernest George and R. Norman Shaw, R.A. The Royal Institute, however, in submitting these names, stated that the fact of their so doing must not be regarded as signifying their approval of the conditions upon which the Council had decided to invite designs, and they renewed the suggestion upon which the Improvements Committee had previously reported fully to the Council—namely, that the authors of the approved elevations should themselves carry out their designs. We communicated with the four architects nominated by the Institute, with the result that the invitations were accepted by Mr. Reginald Blomfield and Mr. Ernest George. Mr. Collcutt informed us that as he could not agree to the condition that the Council would not be under the obligation to employ any of the selected architects to carry out their designs, he must decline the invitation, and Mr. Norman Shaw expressed his regret at being unable to accept the invitation, as he no longer practised as an architect, and had given up active work some three years ago. We informed the Royal Institute of the replies received from the architects nominated by them, and we invited them to nominate two other architects to fill the places of Mr. Collcutt and Mr. Norman Shaw. The Institute, however, informed us that they still disagreed with the conditions made by the Council upon which the designs were to be invited, and that while these conditions were not amended they regretted that they were unable to make further nominations. When the Council on April 10, decided to invite designs, we reported so fully upon the conditions, and also upon the amendments suggested by the Royal Institute, that we do not see our way to advise the Council to make any further modifications. This being so, we have proceeded to select two other architects to fill the places of Mr. Collcutt and Mr. Norman Shaw. We at first nominated Mr. William Flockhart and Mr. William Young. Mr. Flockhart has accepted the invitation, but Mr. Young has expressed his regret at being unable to do so. We then invited Mr. Aston Webb, A.R.A., but he, too, has declined the invitation. We have accordingly nominated Mr. Henry T. Hare, and he has accepted the invitation. . . .We may add that we have adopted a suggestion made by several of the architects, namely, that the time for sending in the designs should be extended to September 17 next. . . . We have also arranged that the design of each architect shall not be signed but shall be accompanied by a sealed envelope containing the name of the architect submitting the design. . . . ."

Workmen's Trains.

Mr. Dew moved:—

"That it be referred to the Housing of the Working Classes Committee to consider and report what amendments could be introduced into the Government Bill amending the Housing of the Working Classes Act, 1890, in order to obtain additional facilities for workmen on the lines run by the several railway companies having termini in the Metropolis, and as to the advisability of the Government being approached in the matter."

Mr. Taylor seconded the motion.

Mr. Lawson moved an amendment that it should be referred to the Parliamentary Committee to report whether any amendment of the law was necessary.

Mr. Beachcroft seconded the amendment, which was accepted by Mr. Dew, and adopted by the Council.

The Council soon after adjourned.

CIVIL AND MECHANICAL ENGINEERS.

THE annual dinner of the Society of Civil and Mechanical Engineers was held on Thursday evening last week at the Frascati Restaurant, Oxford-street, W. Mr. B. Baines Dadley, the President, took the chair, and among those present were the Rev. Thornes Roberts, Col. W. W. Knollys, Professor Ayrton, Professor Sharp, Mr. M. Ende, Mr. E. Terry, Mr. W. N. Twelvetrees, Mr. Holroyd Smith, Mr. E. H. G. Brewster, and Mr. A. S. E. Ackermann (Hon. Secretary).

The Queen and the other members of the Royal Family having been honoured,

Mr. E. Terry proposed "The Army, Navy, and Reserve Forces." In the course of his remarks, he said he thought water-tube boilers might very well be used in torpedo boats. They had been used for some time by the Messageries Maritimes Company with success.

Colonel Knollys responded.

Mr. Holroyd Smith proposed "the Society of Civil and Mechanical Engineers." The present membership, he said, was 114, and he hoped that within a short time that number would be increased to 150. He desired to warn them against dealing with generalities in the papers read at their meetings. Some of the largest societies had fallen into this error, and dealt with first principles and how to carry them into effect instead of dealing with problems. He had heard some of the papers by members of the Society, and he had found that they had not fallen into this error, but had dealt with precise details. He had been struck by the great utility of civil and mechanical engineering in time of war.

Mr. E. H. G. Brewster, in reply, remarked that the Society was established in 1859, and among its first vice-presidents was Mr. Yarrow, the great torpedo-boat builder. The Society had shown good reasons for its existence, and it was useful in very many ways. As an instance of this a young member, associated with the development of some engineering ideas, was diffident in communicating his thoughts to a larger society, but in this he felt absolute freedom. The same remark applied to papers, several of which had been very much sought after. The Society had many traditions, and one was that they originated the idea of visits to engineering works.

Mr. W. N. Twelvetrees proposed "The Kindred Societies." This was, he said, a very wide phrase. There was a Society of Engineers in South Africa, and he had recently had a report of their proceedings. They were naturally not in sympathy with trade unions, which were not intended for the improvement of any mechanical art, but for class purposes.

Professor Ayrton, in reply, said that the name of the kindred societies was legion. The Institute of Electrical Engineers had developed very much during the past few years. The previous day a new electrical railway was inspected, which was the first fully-sized electrical railway in this country ; and another advance was shown by the decisions which had that day been given by a Committee of the House of Commons which had been receiving evidence on Electrical Powers Distribution Bill, under which it was proposed to distribute electrical energy over 3,000 square miles of our country. This scheme would work enormous commercial changes. Twenty-one years ago he lectured at Sheffield on electricity as a motive power, and he recollected a man saying that no electrical machine could possibly be made which he could not stop. In 1857 Robert Stevenson said that electricity as a motive power was entirely out of the question ; but only two or three weeks ago the directors of the District Railway endeavoured to stop an electrical train on the new Central Railway by a powerful locomotive pulling in the opposite direction, but without success—the electric train pulling the locomotive along. We were still somewhat behind in electrical matters, and he strongly advocated the motive power being placed under the carriages, and so doing away with the distinct electrical locomotive.

Mr. Haussen proposed "The President," who replied ; and Professor Sharp gave "The Officers of the Society." This was acknowledged by Mr. Ackermann.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS.—In response to an invitation, the architects and surveyors of Sheffield visited York on Saturday last week. The visitors were joined on arrival by members of the council of the local society, who conducted them to the gardens of the Yorkshire Philosophical Society. The Church of the Holy Trinity, Micklegate, was seen, and some of the features of the original Priory Church were outlined. A view of the fine old mansion by Carr, known as Micklegate House, was obtained in passing ; also the stained glass in the churches of St. John and All Saints, North-street. Prior to lunch, which was served at the Clarence Hotel, an opportunity was afforded for sketching in the Museum Grounds the remains of St. Leonard's Hospital, St. Mary's Abbey, and the multangular tower which marks one of the angles of the Roman Wall. The chief feature of the day's programme was an inspection of the Minster. The visitors were there met by Mr. Green, the clerk of works, and under his guidance ascended the scaffolding surrounding the north-western tower, and saw the restoration work now being carried out by Mr. G. F. Bodley, R.A. Bootham Bar was next visited, and, after viewing the Guildhall, St. William's College, and the exterior of the Treasurer's House, the party were entertained to tea at the Clarence Hotel.—*Sheffield Telegraph.*

DEVON AND EXETER ARCHITECTURAL SOCIETY.—The members of this society made an excursion to Ottery St. Mary on Saturday last week. A visit was first made to Cadhay House, over which they were courteously shown by Mrs. Collin. This is an old mansion, with an inner quadrangle or court with flint and sandstone in alternate squares, resembling the work so frequently to be seen in the churches of East Anglia. The court-yard is entered from four doors, over which are effigies of Henry VIII. and his children, Elizabeth, Mary, and Edward VI. The party then proceeded to Ottery Church, where the Rev. F. B. Dickinson read a paper upon the architectural history of the church. He showed by diagrams its gradual development under Bishops Branscombe and Grandisson, and explained the disposition, so far as known, of the college buildings founded by the latter prelate after purchasing the manor from the Dean and Chapter of Rouen. The addition of the Dorset aisle, with its fan vaulting, was explained partly from the fact that only the nave and north transcept were assigned as a parish church, the remainder of the building being occupied by the college.

THE CENTRAL LONDON RAILWAY.—The Safety Tread Syndicate ask us to mention that their treads have been used on the steps of all stations on the line.

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APPLICATIONS UNDER THE LONDON BUILDING ACT.

At the meeting of the London County Council on Tuesday, the following applications under the London Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated :—

Lines of Frontage.

Brixton.—Houses with bay-windows on the south side of Holland-street, Clapham-road, between Hackford-road and Liberty-street (Mr. J. Fasnacht for Captain T. T. Jennings, R.N.).—Consent.

Kensington, South.—A lodge-building on the fore-court of Messrs. Barker's furniture depository on the south side of Pembroke-road, Kensington (Mr. P. E. Pilditch for Messrs. G. Barker & Co., Limited).—Consent.

Hammersmith. — Buildings with oriel-windows upon a site on the west side of Queen-street, Hammersmith, at the corner of Sussex-place (Mr. A. Blackford for Mr. W. Moss).—Refused.

Lewisham.—That Mr. P. A. Robson be informed that his application, on behalf of the Rev. E. C. B. Philpott and the Building Committee of St. Andrew's Church, for the consent of the Council to the erection of a porch in front of a church-hall on the south side of Sandhurst-road, Hither Green, at the corner of Ardgowan-road, having been further considered, the Council sees no reason to depart from the decision not to grant the application.—Agreed.

Projections.

City of London.—An iron and glass shelter at the entrance to the Holborn Viaduct Hotel, Holborn Viaduct (Messrs. Spiers & Pond, Limited).—Refused.

Dulwich.—Barge-boards and open timber-framed porches to five houses on the south side of Half Moon-lane, and twelve houses on the west side of Burbage-road, Dulwich (Mr. J. W. Brooker for Mr. G. A. Young).—Refused.

Strand.—An iron and glass shelter at the entrance to the grill-room at the eastern end of Princes Restaurant, Piccadilly (Messrs. J. T. Wimperis & Arber for the Princes Hall Restaurant, Limited).—Refused.

Westminster.†— An iron and glass shelter at the entrance to the Hotel Belgravia, Nos. 72 and 74, Victoria-street, Westminster (Mr. G. A. Hall for the proprietors of the Belgravia Hotels, Limited).—Refused.

City of London.†—A projecting stone and granite portico or of an iron and glass pent at the main entrance of De Keyser's Royal Hotel, Victoria-embankment, City (Mr. E. A. Gruning for De Keyser's Royal Hotel, Limited).—Refused.

Width of Way.

Bow and Bromley.—A building on the west side of Fawe-street, Bromley-by-Bow (Mr. Max Clarke for Spratt's Patent, Limited).—Consent.

Width of Way and Projections.

Strand.—Two glass reflectors at the School Board Offices, abutting upon Tweezer's-alley, Milford-lane, Strand (Mr. T. J. Bailey for the School Board for London).—Consent.

Projections and Space at Rear.

St. Pancras, East.—The erection on the site of No. 69, Euston-square, and Nos. 172 and 174, Euston-road, St. Pancras, of a fire-brigade station with a projecting five-story bay-window and a hose-hoist, and with an irregular space at the rear (Mr. O. Fleming for the Fire Brigade Committee of the Council).—Consent.

Width of Way and Construction of Building.

Poplar.—An iron shed in a yard on the south side of West Ferry-road, Isle of Dogs, and the retention of the existing boundary-wall at less than the prescribed distance from the centre of Deptford Ferry-road (the Guelph Patent Cask Company, Limited).—Consent.

Means of Escape from Top of High Buildings.

Holborn.—Means of escape in case of fire proposed to be provided in pursuance of Section 63 of the London Building Act, 1894, on the top story of a proposed building on the site of Nos. 120, 122, and 124, Southampton-row, Holborn (Mr. P. E. Pilditch for Mr. F. Parker).—Refused.

Buildings for the Supply of Electricity.

Kensington, North.—Additions, consisting of an electric-motor generator-room and a one-story office and lobby, to the generating station and works at Victoria-gardens, Notting-hill, Kensington, abutting on Bulmer-place (Mr. J. Slater for the Notting Hill Electric Light Company).—Consent.

Lambeth, North.—Two brick and iron motor-rooms and two iron cooling-towers over the engine-room at the electricity generating-station, No. 85, Commercial-road, Lambeth (Mr. W. B. Pinhey for the Charing Cross and Strand Electricity Supply Corporation).—Consent.

Space at Rear.

Hammersmith.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of residential flats on the west side of Queen-street, Hammersmith, at the corner of Sussex-place, with an irregular space at the rear, and a portion of the buildings to extend above the diagonal line directed by the said Section 41 of the Act to be drawn (Mr. A. Blackford for Mr. W. Moss).—Refused.

The recommendations marked † are contrary to the views of the Local Authorities.

Books.

Practical Building Construction. By JOHN PARNELL ALLEN. Third Edition. Crosby Lockwood & Son. Price 7s. 6d.

THIS is a work intended for students in every trade concerned in building construction, and designed especially for those who are preparing for the examinations of the Science and Art Department. In a note to the third edition it is stated that the author has taken the opportunity, as new editions were called for, of revising the whole and inserting a few additional illustrations, with the necessary explanatory text.

As giving an all-round view of the principal points in building construction the book seems calculated to be very useful to students—indeed, the fact that it has reached a third edition shows that it has been found useful. The author confines himself to a simple exposition of the necessary and every-day requirements of building construction, described without superfluous words, and illustrated by plainly-drawn diagrams to a fairly large scale, so as to be easily comprehensible.

It would form a useful book of reference as to building materials and processes for general readers, as well as for those who are going into building trades. Country house-owners who have not a professional builder at hand, and people going abroad into regions where they may have to do or to direct house-building work for themselves, might find such a book very useful as a kind of *vade mecum*.

The Chemistry of Fire and Fire Prevention. A Hand-book for Insurance Surveyors, Works Managers, and all interested in Fire Risks and their Diminution. By HERBERT INGLE, F.I.C., F.C.S., and HARRY INGLE, Ph.D. (Munich), B.Sc. (Victoria). London : E. & F. N. Spon, Limited. 1900.

Two courses of lectures were delivered by one of the authors to an audience of gentlemen connected with the fire insurance profession, and the present work is mainly founded upon those lectures. The book is simply and lucidly written, and the greater portion of it can be readily understood even by those who have no knowledge of chemistry.

The properties and characteristics of the common fuels and illuminants, of oils and gases, of paints and varnishes, and of the inflammable materials used in the textile and other industries are briefly described. The few pages devoted to acetylene and calcium carbide are exceedingly good ; they clearly indicate the risks attendant upon the use of acetylene, without adopting that ludicrously alarmist tone which has been evoked in a section of the popular Press by certain doleful epistles from the pen of the amateur mechanic.

The notes upon electric lighting and its fire risks should also prove serviceable.

We cordially recommend the book to architects and builders as well as to insurance surveyors and others interested in fire prevention.

Society of Engineers. Transactions for 1899 and General Index, 1857 to 1899. London : E. & F. N. Spon, Limited.

IN addition to matter of particular interest to members, the last published volume of "Transactions of the Society of Engineers" contains several contributions which ought to be generally useful, and some of them deal with subjects coming directly within the province of our readers. An account of engineering field-work in Burmah makes clear the difficult conditions under which such operations are conducted in Eastern countries, where thick jungles, the peculiarities of native labour, and the risks of malaria and other diseases are often inevitable, though undesired, accompaniments. The problem of "Foreshore Protection," with some reference to what is very generally termed the Case system of groyning, forms the subject of a paper which is worthy of perusal. Photographic surveying and the water supply to country mansions and estates are discussed in other communications, and accompanied by some interesting illustrations.

The Sanitary Inspector's Hand-book. By ALBERT TAYLOR, Associate San.Inst., Chief Sanitary Inspector to the Vestry of St. George, Hanover-square, London. Second Edition. With Illustrations. London : H. K. Lewis.

WE know no better hand-book for the sanitary inspector than this. Every part of the sanitary inspector's work is referred to, and full instructions are given as to the forms of notices and methods of keeping books, as well as to the practical details of inspection. New appliances have, of course, been invented since the book was written rather more than two years ago, but the most important of these will, no doubt, be mentioned in the next edition. The calculations for water supply (p. 166) are misleading, as they are based on the average rainfall without allowance for evaporation, percolation, &c. We are glad to find that Mr. Taylor is of the opinion that the smoke nuisance is not abated because "the smoke producer may be found represented on every Town or District Council." If the public generally could be educated to endorse this view, it would not be long before the duties of smoke inspection were placed in the hands of County Councils or some other body of men who would deal with offenders without fear or favour.

Railway Rates Standard Timber Measurer (British Customs Regulations), with Complete Sets of Tables of Solid Contents. By E. A. P. BURT, Chief Measurer at the Surrey Commercial Docks. Third Edition. London : William Rider & Son, Limited, 164, Aldersgate-street, E.C.

THE position of the author is a sufficient guarantee as to his fitness for writing a book such as this. Of course, in a work so largely composed of tables there will be a good deal of matter that has already been published, but on the other hand the author has added others, *e.g.*, "Tables of Actual Solid Measure by H.M. Customs ¼-Girt System." In most trades there are variations in systems of measurement ; these are generally confined to questions of theory, but in this particular trade the variations are frequently questions of quantity ; as, for instance, the difference between Hoppus' system and that in the tables above mentioned. The former has been recognised as the standard authority (as the author mentions in the preface) for more than a hundred years, and will for most purposes maintain that position.

We agree with the author that there should be some recognised rule applicable to all ports. This would tend to reduce the number of disputes that must arise under the present arrangement when the judge has only the "local custom" as a basis of decision, which must press very hardly upon those from another port where another "local custom" prevails.

The work is thoroughly practical, and contains examples of measuring timber of every variety and form, although the illustrations are somewhat roughly produced. This does not detract from its value to any extent. At the same time if the notes on the sketches had been more carefully written they would have been more easily read. In one or two instances these are by no means clear ; but on the whole we can thoroughly recommend the work.

The Elementary Principles of Electric Lighting. By ALAN A. CAMPBELL SWINTON, M. Inst. C.E. Fourth Edition. London : Crosby Lockwood & Son. 1900.

THE object of this work, which has now reached its fourth edition, is to give the elementary principles of electric lighting in as concise and simple a form as possible. Mr. Campbell Swinton quotes the saying of Voltaire that the fault of most books is their

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being too long. This accusation cannot be made against the present work. It will be useful to those who wish to obtain a bird's-eye view of the whole subject in a few minutes. The information given is thoroughly trustworthy.

The Consumers' Hand-book of the Law relating to Gas, Water, and Electric Lighting. By LAWRENCE DUCKWORTH BARNSLEY. London: Effingham Wilson. 1900. 102 pp. 1s. 6d. net.

This is a useful and rather unusual little book, and will be found of service to the London householder and builder. For example, a person who may be about to take a house would like to know the charges of the water companies. He will find them stated in this book. The danger of these books is that in order to be succinct they have to omit some details. In reading them this should be remembered; but if it is they will be found of practical value—as this which is now before us certainly is.

Table of Feu-duties or Ground Annuals. By CHARLES DAVIDSON, F.S.I. Paisley: Alexander Gardner.

As these tables are by a Scotch architect they are naturally published under the Scotch title "Feu-duties," but as we take it that this is merely the equivalent of the English "ground rents," the table is just as applicable under the one name as the other.

The object of the table, which is folded in a stiff cover, is to simplify land valuations by giving in one column a list of values from 1s. to 20s. per pole, with corresponding values for a yard and an acre, and four other columns giving the value as capitalised for twenty, twenty-five, thirty, and thirty-two years; or otherwise, at 3, 4, 3½, and 3¾ per cent. The table seems likely to be very useful in simplifying calculations of the value of land.

BOOKS RECEIVED.

THE LAW OF LANDLORD AND TENANT. By Sydney Wright. (Sweet & Maxwell.)

COMPETITIONS.

INFIRMARY AND PAVILIONS FOR IMBECILES, LEICESTER.—The successful architects in this competition are: Messrs. Giles, Gough, & Trollope, 28, Craven-street, Charing Cross, London, W.C. (1st Premiated Design); Messrs. Blackwell & Thompson, Halford Chambers, Leicester (2nd); and Mr. Arthur Harrison, Queen Chambers, Colmore-row, Birmingham, and Mr. Alfred C. Gaunawary, City Chambers, New-street, Birmingham, joint authors (3rd).

POLICE BUILDINGS, KIRKCALDY.—The 1st Premiated Design in this competition is that sent in by Messrs. J. N. Scott & A. Lorne Campbell, 44, Queen-street, Edinburgh; the 2nd is by Mr. Alexander Cullen, Hamilton; and the 3rd by Messrs. Williamson & Inglis, Kirkcaldy.

BANISTER FLETCHER BURSARY.—Mr. Banister F. Fletcher has founded, in memory of his father, the late Professor Banister Fletcher, a bursary of the value of twenty-five guineas a year, in connection with the Architectural Association, and which, we presume, will be known by the title we have given it above—the Banister Fletcher Bursary. This bursary is founded for the promotion of the study of London architecture of the last two centuries since the Fire, and for the preservation of records of buildings likely to be destroyed. It will be awarded to any member of the profession (including non-members of the Architectural Association), without limit of age, who shall submit the best selection of measured drawings not necessarily prepared for the purpose of this bursary, together with a short descriptive report of the buildings to which they refer, and accompanied by three testimonials. The drawings, report, and testimonials must be delivered addressed to the Hon. Secretaries of the Architectural Association, 56, Great Marlborough-street, W., before 1 p.m. on Saturday, July 28, 1900. No award will be made if the drawings are not of sufficient merit. The successful candidate will be required to prepare a set of accurate measured drawings of some one of the buildings of the present list selected to be selected for study. He will be at liberty to suggest his own subject, under the sanction of the Prizes Sub-Committee, with whom the decision as to the building to be studied in each year will rest.

TRADE CATALOGUES.

MESSRS. B. FINCH & Co. send us a special catalogue of their sanitary appliances for hospitals and asylums. One of the most important of these is the fixed sputum-pan for receiving, disinfecting, and removing to the sewer, by an automatic flush, the sputa of phthisical patients. Pedal-action wash-basins and sinks are shown, for surgeons' use, to prevent the communication of diseases during operations; a slop-sink with a flushing rim and cistern; a hospital-lavatory, made in strong porcelain and built into the wall; a large hospital-sink, enamelled white inside and green outside, carried on bearers 2 in. from the wall to allow of the service-pipes being cleaned and painted; baths, stationary and portable; a safety hospital bath-valve to prevent scalding, the valves rendering it impossible to draw hot water without first turning on the cold; and other appliances, all designed in the best and most effective manner for the purpose, and clear of the useless and unnecessary "ornament" by which sanitary ware is often spoiled.

Messrs. T. & R. Boote (Burslem) send us their catalogue of glazed and decorated tiles, hearths, &c., which forms an admirable specimen of chromo-lithograph printing, and shows a great variety of colours; we fear the majority of the designs are too naturalistic for our taste, but we presume there is a demand for this type of decorative tile, and it must be supplied. The mosaic hearths A1 and B1, on plate 2, show an effective and rich arrangement of colour in a manner perfectly suited to the material.

The Columbian Fireproofing Company send a special catalogue illustrating their "No. 3 floor"; the principle of these floors we have already mentioned and illustrated. The special floor here shown is a concrete strengthened by ribbed steel bars suspended in stirrups to the upper flange of the girders. Several full-size sections, showing the combination of light ribbed joists with concrete, are given. Without affirming that the theory as to the action of steel bars in combination with concrete is correct, we feel great confidence in these floors in a practical sense, as combining lightness and strength.

The Fairbanks Company send a pamphlet containing views of high buildings in New York in which their valves have been used, which is not much to the point except as a form of advertisement; but a description and sections of their globe and gate valves are given; the special quality of the former is that they are provided with vulcanised asbestos discrings, composed of fibre of asbestos, to which is added a waterproof vulcanised material making a packing which it is claimed will not crack or flake off. A similar material is used for the seal-rings in the gate valve. There is also a section of an asbestos-packed iron cock, specially intended for boiler service.

The Portable Building Company (Manchester) send us their catalogue of "portable and permanent artistic wood and iron buildings"; we fear we should demur to the third adjective; the buildings would be more satisfactory if they showed less effort to be "artistic," but they will be useful and convenient in many situations; they are made either with wood and iron or wood and tiles. The catalogue includes also stable-fittings, poultry-houses, conservatories, heating-boilers, sheep-netting, materials for iron roofing, &c.

The Portland Cement Company (Rugby) send us what is in reality a short pamphlet on Portland cement and concrete, with views of their works and a list of buildings to which they have supplied cement. A report is added of the result of a test of concrete flooring, made with their cement, at Manchester, two years ago. The concrete was 7 in. thick, composed of 4 parts of screened breeze to 1 part of cement. A load of 3½ cwts. per square foot caused a deflection in this floor of ⅝ in. On its removal the floor returned to its original level.

The "Shannon" Company send a sheet of illustrations of their office-desks of various patterns, many of which seem most convenient for their purpose, and they have the merit of being plain and unpretending in design and finish. The "Victoria Desk," a folding-table for use in schools or school-rooms, is also illustrated.

ADDITIONS TO ST. COLUMBA'S CHURCH, KNOCK, IRELAND.—This Church, after undergoing extension, was re-opened on the 23rd ult. The extension has cost about 1,300*l.* The building contract was entrusted to Messrs. Courtenay & Co., while Mr. P. Close acted as architect.

Correspondence.

To the Editor of THE BUILDER.

RE DISTRICT COUNCILS.

SIR,—In your issue of June 30, Mr. W. M. Fawcett, Vice-President, is reported as having suggested, speaking of Local Authorities, that they should have power to relax their requirements so long as the spirit of the by-laws is adhered to.

It is the general experience of provincial architects we have lately been in touch with that Rural District Boards treat the profession with very scant courtesy, and that their by-laws are often more drastic than those in use in Urban Councils, the one principally causing friction being that for air space at the rear of buildings.

We enclose copies of the same by-law as read by Urban and Rural Authorities; from these you will see that in the crowded town you are allowed to erect your closets and ash-pits upon this open area, yet in the rural district this area must be left free, with the result that you are compelled to reduce your building area on the same sized plot of land. Surely it is time for some Court of Appeal to be established, more especially when one takes into consideration from whence rural councillors are drawn.

As a specimen we enclose you three cases. One of these you kindly inserted in your paper at the time of the action; the third we are now preparing to contest. It is very unjust, however, to clients that they should be put to the expense of a legal action to expose such palpably absurd readings of a by-law. ATHRON & BECK.

Doncaster.

*** The following are the urban and rural by-laws referred to in our correspondents' letter:—

Urban District Council.

"Open Space in Rear of Building.

56. Every person who shall erect a new domestic building shall provide in the rear of such building an open space exclusively belonging to such building, and of an aggregate extent of not less than 150 square feet, and free from any erection thereon above the level of the ground (*except a water-closet or privy, and an ashpit*)."

Rural District Council.

"Open Space at Rear of New Buildings.

61. Every person who shall erect a new domestic building shall provide in the rear of such building an open space exclusively belonging to such building, and of an aggregate extent of not less than 150 square feet, *and free from any erection thereon above the level of the ground.*

He shall cause such open space to extend, laterally, throughout the entire width of such building, and he shall cause the distance across such open space from every part of such building to the boundary of any lands or premises immediately opposite or adjoining the site of such building to be not less in any case than 15 ft.

If the height of such building be 25 ft., he shall cause such distance to be 20 ft. at the least.

If the height of such building be 35 ft. or exceed 35 ft., he shall cause such distance to be 25 ft. at the least."

In one of the cases illustrated in the tracings sent to us by Messrs. Athron & Beck, the new building is apparently entirely surrounded by open space in the shape of gardens and fields. The excuse for applying the by-law in this case, however, may lie in the argument that the adjoining land may eventually be built on, and that the present new building must contribute its proportion of open space. In the third case referred to the action of the authorities is a mere piece of "red-tape" legislation. The building-owner can evade the application of the by-law by letting part of an old building stand, behind the new one, which it was intended to pull down; thus the authorities will have no claim as to the portion covered by the old building; but the result will be to render the site less light and less sanitary in every sense.—ED.

MELLOR *v.* BRITTON.

SIR,—With reference to your report of this action in last week's issue of your paper, I see it stated that the plaintiff had been employed to prepare plans and take out quantities.

I write to say that the plans and elevations were prepared by me and the buildings erected under my superintendence. PAUL HOFFMANN.

RE MR. BLOMFIELD'S PAPER AT THE CONGRESS.

SIR,—Allow me to correct a slight error in the report of this discussion; on p. 639, central column, about half-way down, read "that flaming portent *Pugin*," instead of "Burges."

The descriptive term (borrowed from Carlyle) is applicable to the former rather than to the latter, whose ardent enthusiasm for Gothic art was more genial in character. BERESFORD PITE.

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Illustrations.

DUNSTABLE PRIORY.*

THE foundation of the monastery at Dunstable, Bedfordshire, was due to Henry I., and the charter is said to have been granted soon after 1131. The forest on the site was cleared, and a Royal palace was built, which afterwards, with the town, became the property of the Priory. Among subsequent Royal visitors were King Stephen in 1137; John in 1215; Henry III. in 1247, 1265, and 1267; Edward I. in 1275 and 1276; Edward III. and his Queen, 1341; and Henry VI. in 1457. The Priory was dissolved in 1534, and the site was granted in 1553 to Sir Leonard Chamberlayne. The church was destroyed with the exception of the nave, which became the parish church, and the monastic buildings were likewise pulled down.

Apart from the architectural evidence afforded by what now remains, the only record of the buildings is in the "Annales de Dunstaplia." The chronicle of works connected with the church and monastery extends only from 1207 to 1324, and, in proportion to other matters referred to, the details regarding the buildings are meagre. The following are, however, the chief references made, and two or three throw some light on the progress and alteration of the buildings.

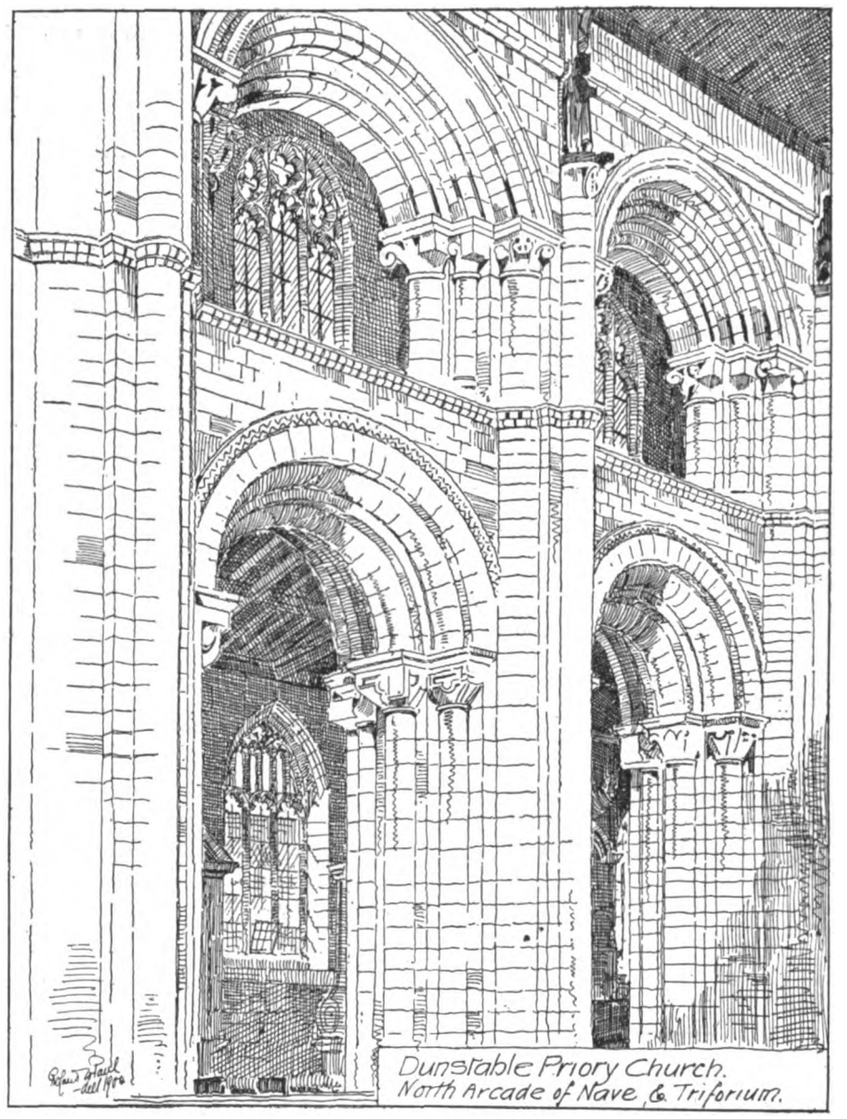
In 1207 four altars were dedicated, namely, to St. Mary, St. Frehemond, St. Nicholas, and St. James. In 1212 there is a note of miracles performed at the shrine of St. Frehemond, and in the following year, on the feast of St. Luke, the church was dedicated by Hugh, second Bishop of Lincoln, in the presence of a large number of barons, abbots, priors, and the nobility. At the same time the relics of many saints, obtained through the prior from his friends, were placed at the high altar. In 1220 Robert, Bishop of Lismore, on the day preceding that of St. Alphage the Martyr, dedicated the altar of the Holy Cross in honour of All Angels, and the altar of the parish in honour of St. John Baptist. In 1222, "in the month of June, there fell the roof of the presbytery of Dunstaple, which, before the following autumn, had been repaired; and in the month of December there fell two towers in front of the church of Dunstable, of which the one fell on the prior's hall and destroyed the greater part of it; the other fell upon the church and ruined the place on which it fell." There is a reference to the chapel in the infirmary in 1228, the foundation of the Chapel of St. Mary in the "cemetery of the canons" in the same year, and the dedication of the altar of St. Mary by Hugh, Bishop of Ely, and Thomas, Bishop of Norwich, in 1231. In 1250 the inner gate within the court was built, and ten loads of lead were placed on the "Refectorium." The building of a new rere-dortor ("privatum dormitorium") for fear of the ruins of the old dortor is dated 1251, and in 1252 a new house for the carpenter and wheelwright was made in the court. In 1254 the great stable was built, but it fell and was repaired in 1258. In 1273 the roof ("cumulus") of the church of Dunstable was restored at the expense of the parishioners from the altar at the cross as far as the west door towards the north ("versus le north"). A certain Henry Chadde bore the chief expense. New bells were given in 1277, a new body to the bake-house and brewhouse wall was built in 1282, and a clock placed over the "pulpitum" in 1283. In 1289 the parishioners finished the pinnacles on the north front of the church and restored the stone roof, then in a ruinous state, of the north porch, half of all the expense being borne by John Durant. In 1293 the great cross and many of the other saints' effigies were repaired, and during the Plague the parishioners gave a new bell, and the prior covered the belfry with lead. In 1324 the Lady Chapel was rebuilt, as the old one founded by Prior Richard had become ruinous; the first stone was laid on the morrow of St. Barnabus.

The failure of the buildings, and the constant repairs that were necessary, were probably due not only to bad building, but also to the lack of durability in the Totternhoe stone, which, possibly with flint, would seem to have been the chief material employed for the walls and dressings.

The Norman church, when perfect, was cruciform, and in addition to the two western towers, which fell in 1222, there was probably a central tower at the "cross." The transepts were probably aisleless, with eastern chapels, and the presbytery either apsidal or square-ended. The church was far enough advanced for four altars to be dedicated in 1207, although the dedication of the whole did not take place until 1213. The altar of St. Mary (1207) might refer to a Norman Lady Chapel, but it was rebuilt first of all in 1228, dedicated in 1231, and again rebuilt in 1324. The reference to its standing in the canons' cemetery probably points to its position east of the presbytery. In dealing, therefore, with the portion now destroyed, east of the nave, it is evident that up to the first quarter of the fourteenth century considerable alterations had been made to the church, including the revaulting or reroofing of the presbytery. Further alterations, no doubt, were made at a later date, and the large pier with vaulting column attached, now standing outside the present east wall, was probably built to strengthen the northern arcade in the bay (now destroyed) of the nave next the "crossing," owing to the failure of the central tower. In Grose's "Antiquities of England," plate ii., two piers are shown against the east wall, and are referred to as "two of the vast pillars which supported" the central tower.

In Lyson's* plan the northern arcade is shown with later masonry attached on its east face, but nothing is shown on the south. At the present time the southern one still exists, and is shown on the ground-plan. On its east face are the remains of the jamb and cill of a window with a groove for glass, but it may quite possibly have been unglazed, and the space within the later arch filled with tracery to give additional strength, and at the same time to admit light. The nave was, therefore, certainly eight bays in length instead of seven as at present. At the first bay west of the "crossing" stands the "pulpitum," of Early Perpendicular date, pierced by two doorways (that on the north being larger than that on the south), and having on its west face the remains of two canopied niches still retaining considerable traces of colour. These flanked the central altar. The whole of the site of the church and monastery never seems to have been built upon, and it is not difficult to trace in the uneven ground the extent of the church eastward, and the site of the cloister and its surrounding buildings. Careful excavation would probably reveal the entire planning of the monastery, and would possibly result in very interesting discoveries. One of the chief points of attraction seems to have been the shrine of St. Frehemond, and bearing in mind the possibilities of the Totternhoe stone, the elaborate work even now remaining on the west front, and the remains of the two gorgeous shrines at the not far distant abbey at St. Alban's, the detail of it, if found, would be almost certainly of extreme beauty and value.

Seven out of the eight bays of the nave are now standing, and form, with their aisles, the parish church of Dunstable. From the references already given to the parish altar and the work done by the parishioners, it seems probable that the parish altar was in the north aisle. The south aisle, being next the monastic buildings, retained its Norman work and dimensions. The north aisle was apparently rebuilt in Perpendicular times, and to give greater width the vaulting shafts attached to the main piers were removed in four instances. The three eastern bays of the south aisle are shown in Lyson's plan as being in existence with their vaulting, and the north aisle, "of later date" (Perpendicular, as shown by contemporary and earlier engravings), terminating at the sixth bay of the nave eastward. A good



Dunstable Priory Church.
North Arcade of Nave & Triforium.

* The series of the "Abbeys of Great Britain" is continued this month with illustrations of Dunstable. For the list of Abbeys which have appeared, and for future arrangements, see front page of our issue for June 16.

* Lyson's "Magna Britannica."

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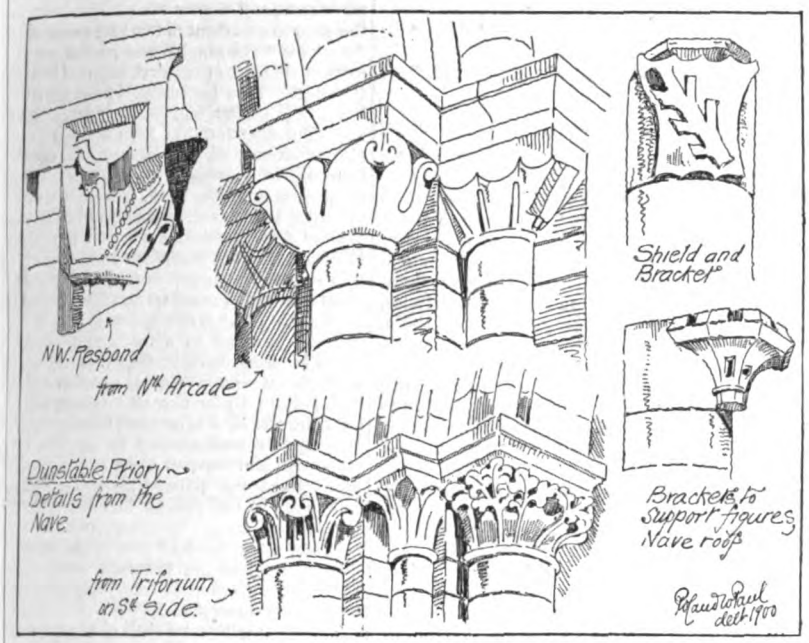

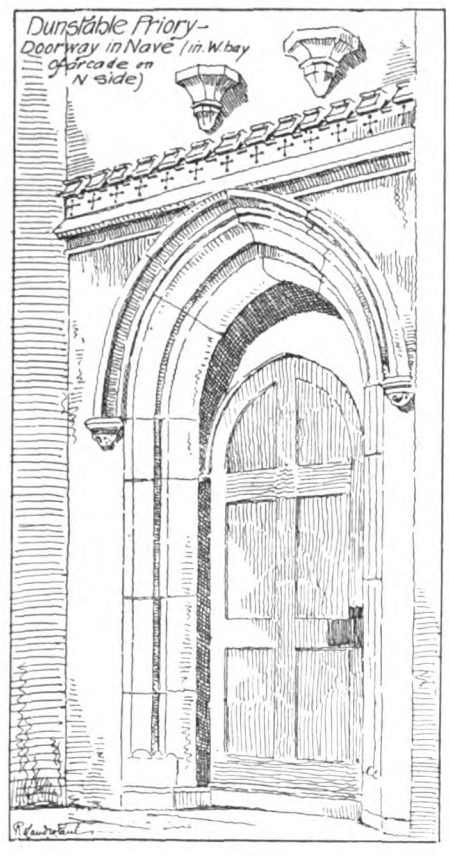

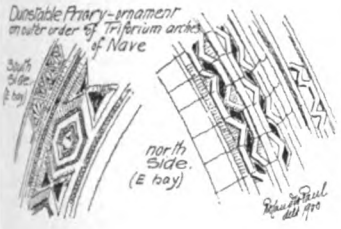

deal of restoration was done in 1876 under the late Mr. E. Somers Clarke; the south aisle was completed to the west end, the north aisle seems to have been practically rebuilt, the glazing removed from the east window (of four lights), and a vestry built eastward of it, in line with the "pulpitum" wall. The windows in the clearstory (or, more properly speaking, the triforium) seem to have been considerably restored, if not rebuilt, on the old lines (see section in Lyson's "Magna Britannica"), and the parish altar placed against the west front of the "pulpitum," approached by three steps. The fifteenth-century screen of five bays, formerly supporting a gallery at the west end, has been removed eastward, and stands between the second pair of piers west of the "pulpitum."

The general design of the nave arcade is shown in the accompanying sketch. It is evidently of two dates, the main arcade having caps of one or other of the "cushion" form, and simple and bold arch moulds, whereas the triforium over has more elaborate mouldings, and carving of a distinctly transitional character in the caps supporting the single arches in each bay. (Some of these are illustrated.) The eastern bays of the triforium over the "pulpitum" have the outer order richly moulded with Chevron ornament, much resembling the work at "Joseph's" Chapel in Glastonbury Abbey. There was doubtless a clearstory, not necessarily of great height, over the triforium, but the roof seems to have been renewed in the 15th century, and the vaulting columns capped by stone brackets of later date to support the wooden figures and the timber roof. On the column between the fourth and fifth bays the brackets on either side have shields charged with a bend *raguly*, or ragged staff, possibly a record of the family or benefactor for this portion of the work. The roof is now new, but the figures on the brackets have been retained.

The west front is shown in the large illustration, and its picturesque effect is largely due to the fall of the Norman towers already referred to. All that remains visible of the Norman front are the great west doorway of four orders, and a portion of the wall arcading on its north side. The doorway itself has been much mutilated by time and wanton destruction and stone throwing. The general design may be well compared with the west and south doorways at Malmesbury Abbey,* and also with the doorways on either side of the chapel of St. Joseph at Glastonbury Abbey. The outer and two inner of the four orders of the arch have been carved with a series of oval medallions formed by an interlacing moulding or band, the outer having alternately angels, and conventional ornament, and the two inner apparently groups of figures illustrating Scriptural subjects.

The remaining order (the second from the outside) has a series of heads with foliage issuing from the top and mouth, probably a development of the earlier "beak head." The caps of the supporting columns (two columns only remain on the south side) have mostly figure subjects, although one or two have conventional foliage.† The tympanum of the doorway, if there was one, has been replaced by a fifteenth-century doorway with three canopies over it. North of this doorway is a small portion of the Norman wall arcading, of almost identical design with the work formerly in the "slype" on the south side of the transept at St. Alban's Abbey (now destroyed—the arcading is built into the south transept wall).

The fall of the N.W. tower, which took place in December, 1222, evidently destroyed the N.W. angle of the Norman front almost entirely. There is no record of the towers ever having been rebuilt, and the probability is that the front, as reconstructed, was designed more as a screen for statuary, resembling the west front at Salisbury. Two large lancets were placed over the great doorway in the centre, with a richly carved and cusped arch between them. To the north were three rows of arcading. The upper range appears to have been an arcade pure and simple, standing on columns with carved caps. The second range, on a level with the lancet cills, had a passage behind it, and the cusps of the arches were also richly carved with Early English foliage. Some of the caps are carved, others appear to have been moulded only. The lowest range of seven arches was for figures, and the brackets remain. Statuary was also introduced on the niches on the sides and fronts of the N.W. angle buttress, and a portion of one statue remains in the front at the lower level. The small Norman door at the end of the north aisle—if one existed—was replaced by a very beautiful Early English doorway of six orders, with most delicate mouldings, and elaborate dog-tooth and other ornament. The Norman arcading was partly removed, and the circular enclosing arch converted into a pointed one, the wall on either side of she doorway above the springing being richly diapered. There are two large stones on either side, and near the bases on the north side a number of glazed tiles have apparently been embedded. No doubt the original front was, when complete, finished with a gable, but after the destruction of the clearstory and the substitution of a wooden roof the front was finished with an embattled parapet.

The Early English work seems to include the turret now forming the lower part of the staircase turret of the later tower, and is no doubt part of the turret which formed the feature at the angle of the front as rebuilt.

The present tower is of Perpendicular date of flint and stone, of similar design to the towers in the neighbourhood, and to that at the west end of Luton parish church. The building of this tower seems to have weakened the Norman work, for the western bay of the nave arcade on the north side is filled by later masonry and a perpendicular doorway, with two brackets over (see illustration), and of the same date as the present west doorway, probably inserted to strengthen the larger Norman arch at the same time. The bay of the aisle, under the tower, was also arched over and at a later date separated from the rest of the church. In this masonry is a stone bearing the date 1670, which may probably denote the approximate date at which it was built. On the west wall of the ringing chamber of the tower can still be seen the weathering of the aisle roof, additional evidence in support of the theory that until the Perpendicular date, there was no tower at the west-end built after the fall of the Norman one.

There are a long list of monuments (mostly of late date) and brasses given in notes on the church in the 4th vol. of "Bibliotheca

* See *Builder*, March 2, 1895

† A careful drawing of this door, and part of the front, by Mr. Worthington G. Smith, was given in the *Builder* July 20, 1889.

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Topographica Britannica," and the choir stalls are said to have been in existence, with a screen and balusters over them, and dividing the stalls from the aisles. The balusters are now placed on a modern screen at the east end of the nave on the north side, dividing it from the modern vestry. Of the monuments, two brasses remain in the floor of the south aisle, where shown on the plan; the other monuments are of late date, mostly mural.

Westward of the church are the two archways of the gateway and a fragment of wall and plinth on either side, and in the High-street, incorporated in a house of late date, is a vaulted room of several bays with cellarage of thirteenth century date. It is now a house attached to the straw-plaiting factory of Messrs. Munt & Brown.

PAVILIONS AT THE PARIS EXHIBITION.

THESE illustrations show several of the principal pavilions forming what is called the "Rue des Nations" at the Paris Exhibition, each being erected by a particular Government as the visible representation of its participation in the Exhibition. They are all referred to and described in the first article in this issue.

BUILDING TRADES' GIFT TO THE NATION:

HOMES FOR DISABLED SOLDIERS.

WE are asked to announce the following further contributions to this fund:—

Messrs. Alfred Walker & Son (Leeds) (per Mr. W. C. Ellisdon).—Concrete steps for one staircase.

The East Acton Brick and Estates Company, Limited.—20,000 red facing bricks.

Subscriptions.

	£	s.	d.
Mr. Joseph Richardson & Workmen (Leeds) ..	10	4	0
Messrs. Eastwood, Sivington, & Co. (per Mr. Robert Neill)	5	5	0
Messrs. Swain & Selley (Tooting)	5	5	0
Messrs. Tealby & Co. (Hull) (per Mr. Robert Neill)	5	0	0
Workmen of Messrs. Nash & Hull	3	12	0
Workmen of Messrs. Swain & Selley	3	6	6
Messrs. B. Hutchinson & Co. and Workmen (Leeds)	2	15	0
Employees of Messrs. Sharpe, Jones & Co. (Parkstone)	2	2	0
Workmen of Mr. W. R. Thompson (Dewsbury)	2	1	0
Workmen of Messrs. Craven & Umpleby (Leeds)	1	13	0
Workmen of Messrs. T. Rider & Son (per Mr. J. Hibble)	1	1	9
Workmen of Mr. E. Scott	1	1	0
Workmen of Mr. John Stewart (Peckham)	0	13	0
Mr. Albert Dickenson (Leeds)	0	10	0

At a combined meeting of the Executive and Stewards, held last week at the offices of the British Fire Prevention Committee (Mr. Edwin O. Sachs presiding), it was announced that the contributions in kind and money had reached 22,500*l.*, which sum included over 1,100*l.* in sixpenses and shillings given by the artisans and the labourers in the trades concerned.

The first four homes with two service blocks, and the church, are in hand, and the work will be pushed on with the utmost speed so that some of the blocks may be ready for men discharged this winter as invalids from the Transvaal War. A vote of thanks was unanimously passed to Messrs. Geo. Trollope & Sons, who are attending to the execution of the work. It was announced that a light railway had been completed between Bisley Camp station and the site, thanks to facilities afforded by the National Rifle Association, and a vote of thanks was passed to the Association for its assistance in the matter. It was also announced that various electrical engineers and manufacturers, headed by Professor Perry, Professor Kennedy, and Sir W. H. Preece, were arranging, under the auspices of this gift, to present the necessary electric light installation at the homes, whilst the furnishing trades were attending to their equipment. Votes of thanks were passed to the committee which had been formed to take charge of the electrical work, as well as to Mr. Waring for the arrangements he has made regarding the furnishing of the buildings.

In order properly to complete the building scheme, however, at least another 5,000*l.* will be required, and it is hoped that those directly and indirectly connected with the building trades, willing to assist, will communicate with the Executive at No. 1, Waterloo-place, Pall-mall.

[The above was unavoidably postponed from last week, owing to the pressure on our space in consequence of the Architectural Congress.]

The Student's Column.

LESSONS IN MODERN ELECTRICAL ENGINEERING.

INTRODUCTION. PROGRESS SINCE 1890. RECENT LEGISLATION. FACTS TO BE REMEMBERED.

SINCE "Electricity, Magnetism, and Electricity Supply" appeared in these columns in 1890, great and rapid progress has been made in the practical applications of electricity. But although there is now a great deal to add to these articles, there is very little, if anything, to alter in them. The principles on which the scientific development of the industry would take place are there laid down, and the changes made in electrical practice are mainly due to the more thorough grasp that the present-day electrician has of these principles. We may mention, for example, the raising of the voltage of supply, the introduction of a sliding scale, and the addition of a day load, by encouraging consumers to use electricity for power purposes and for heating and cooking.

So far as electric lighting is concerned, no very great improvements have been introduced during the last ten years. The glow-lamp of to-day is very similar to the glow-lamp of 1890. There have been rumours of great improvements, and experimental lamps have been constructed which seem to promise great developments in the immediate future, but the public is still waiting. In arc-lamp lighting the most notable change is the introduction of the enclosed arc-lamp, which has had a phenomenal success. The main points in its favour are the quality of the light it gives and the little attention it requires. Its efficiency, however, is not so high as that of the open arc.

In the conversion of heat into electrical energy the old method of using boilers, engines, and dynamos is still practically the only one used. Inventors have been busy over carbon cells and thermopiles, and some startling results have been obtained, but none of them have managed to do it cheaply enough. The price of electricity has been lowered, but this is due mainly to the more skilful management of supply-stations, their greater output and petty economies effected by the altered methods of supply.

Numerous methods of wiring buildings for the electric light have been recently introduced, and some of these methods have already rivalled "wood-casing" in public favour. Electricians recognise that what is wanted at the present day in order to make the electric light really popular is a cheap and efficient method of wiring houses. The method adopted by the National Electric Wiring Company is a step in this direction, but the principle of the so-called "free wiring" is not one that commends itself to many people in this country.

Electric traction during the last ten years has made very rapid progress. The capital now invested in electric traction plant in this country considerably exceeds the capital invested in electric lighting, and, judging by the progress that this method of traction has made in America and the Continent, it is safe to prophesy that within the next ten years there will be a general adoption of electricity for traction purposes. In 1890 electricians were puzzling over the unexpected phenomena which occurred at Deptford when the 2,500-volt alternators were switched on to the step-up transformers connected to the trunk mains to London, and many thought that 10,000 volts was too high for practical work. To-day, however, there are many stations in operation at much higher pressures than this. For example, 2,000 h.-p. is being transmitted at a pressure of 33,000 volts from the San Bernardino Mountains in South California to Los Angeles, a distance of eighty miles. The "harnessing" of Niagara, first suggested some twenty years ago by Lord Kelvin, has become an accomplished fact. Numerous factories have been built in the neighbourhood for the manufacture of the products of the electric furnace, such as aluminium, carborundum, and calcium carbide. Some of these factories are supplied with more than 10,000 h.-p. from the power-station at the Falls.

The most notable advances made since 1890 have been the discovery of photography by X-rays and the discovery of wireless telegraphy. Professor Röntgen discovered his system of photography when experimenting with well-known apparatus developed by generations of physicists, and Signor Marconi found that by the simple expedient of two long vertical wires "wireless" telegraphy was possible over far greater distances than electricians had believed possible. It is interesting to note that in the latter half of the nineteenth century no great scientific discovery has been made by the exclusive labours of any one man. The exploration of the various fields of research is now conducted in an organised manner by workers all over the world, and publications such as *Science Abstracts* enable everyone to profit by the discoveries of his fellow-workers.

No account of recent developments would be complete which made no mention of polyphase working. In 1890 this system of working was simply regarded as a mathematical exercise in alternating current theory. In 1900 it is quite as extensively used as any other method, and, judging by the new stations being built all over the world, it is certainly the most popular. It is equally well adapted for supplying light or power, and hence it is the system generally adopted in the power-transmission schemes which are at the present time so prominently before the public. Electrical power promises to play an important part in the industrial development of the twentieth century, and a knowledge of what is being done in this field is of great importance.

In what follows we shall give a rapid sketch of a few of the main features and an elementary discussion of some of the principal problems of modern electrical engineering. In some of the lessons we shall assume a general knowledge of elementary mathematics on the part of the reader, as there are a few simple formulæ giving the exact laws of the working of certain electrical apparatus which are far more instructive than pages of general description. We shall also, when possible, give numerical examples, as nothing encourages the student more than the knowledge that he can work out calculations for himself. Even in elementary practical theory, however, there are many parts that are not yet sufficiently advanced to crystallise into accurate formulæ. In these cases, no calculations will be given.

It will be useful, before proceeding further, to state the law that governs electric lighting in this country. This was laid down by two Acts of Parliament known as the Electric Lighting Acts of 1882 and 1888. They give the procedure which persons desirous of supplying electricity must follow, and define their rights and obligations after obtaining Parliamentary powers. By the Act of 1882 the Board of Trade was empowered to lay down regulations from time to time, so as to secure the public safety. In 1896 a new code of regulations was issued by the Board of Trade. It was divided into two parts, entitled respectively: (1) For securing the safety of the public, and (2) for ensuring a proper and sufficient supply of electric energy. The main points in these regulations were fixing the maximum pressure of supply at 250 volts, giving a superior limit to the permissible leakage, and insisting that the pressure of supply must not differ from the declared constant pressure by more than 4 per cent. They also insist that all street boxes must be regularly inspected for the presence of gas. The London County Council issued in 1892 regulations for theatre lighting and by-laws relating to overhead wires.

At an international congress of electricians attending the Chicago Exhibition in August, 1893, the delegates carried a resolution to adopt certain electrical units as their standards. A year later these standards were adopted by this country. The standard resistance and the instruments to measure currents and pressures in terms of the standard units are deposited at the Board of Trade Standardising Laboratory. These standards were made as nearly as possible equal to the international standards, and in their use the limits of accuracy obtainable are the one-hundredth part of 1 per cent. for resistance and the one-tenth part of 1 per cent. for current and pressure. The unit of electric resistance is now, therefore, the ohm, and is the resistance of a certain coil of wire kept by the Board of Trade. It is sometimes called the international ohm, or the Board of Trade ohm, to distinguish it from the legal ohm (1884), and the British Association ohm (1865).

1 ohm = 1·0028 legal ohm = 1·0136 B. A. unit.

In what follows, when we talk of ohms, amperes, and volts, we shall mean the international units, which are now the legal units in this country. As continual reference will be made to horse-power, Board of Trade units,

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&c., a short *résumé* of the principal definitions will be useful.

As is well known, the unit adopted to measure the power of a prime mover is the horse-power. An engine of 1 h.-p. is one that can perform 33,000 ft. lbs. of work per minute. *i.e.*, one that can raise 33,000 lbs. 1 ft. high in one minute. The electrical unit of power is the watt, which is the power of a machine which can work at the rate of 44¼ ft. lbs. of work per minute. In practice a larger unit, called a kilowatt, is used. The numerical relations between these units are as follows, and ought to be remembered :—

1 kilowatt = 1,000 watts = 1·34 h.-p.
1 h.-p. = 746 watts.

The unit chosen to measure electrical energy by is the work done by a thousand watts in an hour, and this quantity of work is called a Board of Trade unit.

A Board of Trade unit = 1,000 watt-hours.
= 1·34 horse-power hours.

Hence, if an electrical company charge 5d. per unit, you can get 1·34 horse power for one hour or 2·68 horse power for half an hour for 5d.

If we have C amperes of electric current flowing in a circuit, the pressure at the terminals of which is E volts, then, from the definitions of these quantities, it follows that the power being expended in the circuit is EC watts, and this equals $\frac{EC}{1,000}$ kilowatts or $\frac{EC}{746}$ horse power.

For example, if the output of a dynamo is 1,000 amperes at 100 volts, then the power given to the external circuit is $\frac{100 \cdot 1,000}{1,000}$, *i.e.*, 100 kilowatts, or 134 horse power. If the mechanical efficiency of the dynamo were 80 per cent., then the power that the engine would need to exert in order to drive it at this load would be $\frac{100}{80}$ of 134 horse power, *i.e.*, 167·5 horse power.

The cycle of operations gone through before the heat developed by the combustion of the coal in the furnaces of the boilers is converted into light and heat in the consumers' houses may be described as follows :—The heat developed by the combustion keeps the water in the boiler at a temperature which is considerably above boiling point, and hence the steam is at a high temperature and pressure. The steam passes through the steam pipe to the cylinders of the engine, and after expanding there, doing work as it expands, it escapes at a much lower temperature and pressure into the condenser. The heat in a pound of steam as it leaves the cylinder is considerably less than the heat in it when it left the boiler, the loss of heat being nearly the equivalent of the work done on the piston face. The engine is employed to turn the armature of a dynamo. The resistance this armature offers to rotation is due to the electric currents passing through it and developed in it by the rapidity with which it is made to rotate in a strong magnetic field. Now the greater part of the work done by the currents in an electric circuit is in passing through the portions of the circuit of greatest resistance. In a network of wires, joined to a central station, the filaments of the glow lamps are the parts of the circuit of highest resistance, and hence nearly all the work done by the electric currents is expended at these points.

GENERAL BUILDING NEWS.

WESLEYAN CHAPEL, SEATON BURN, NORTHUMBERLAND.—A new Wesleyan chapel was opened at Seaton Burn on the 16th ult. The building is of stone with rock facings, and was designed by Mr. Mould, of Newcastle. Mr. Amos Gray, of Wideopen, was the builder.

ALTERATIONS AT KEIGHLEY PARISH CHURCH, YORKSHIRE.—After being closed several weeks for renovation and alterations, Keighley Parish Church has just been reopened. The chief alteration has been the construction of a west entrance through the base of the tower, forming a tiled porch 15 ft. by 14 ft. From the south aisle a new doorway will give the choir access to the large vestry, and some of the smaller pews near have been removed, and other necessary changes made. Messrs. Powell Bros., Leeds, carried out the decorations. Messrs. Hainey, architects, Keighley, have supervised the work which, including a renovation of the organ by Messrs. Laycock & Conacher, Cross-hills, has involved the outlay of 1,400*l.* to 1,500*l.*

CHURCH OF ST. ANNES, LANCASHIRE.—The Bishop of Manchester visited St. Annes-on-the-Sea on the 22nd ult. for the purpose of consecrating St. Thomas's Church. The Church consists of a chancel and nave, with an organ-chamber on the north side. As at present built, it is 102 ft. long (the chancel taking up about 34 ft.), and when completed two more bays will be added to the west end, which is now of a temporary character. Seating accommodation is provided for about 600 persons, and this will eventually be increased to 800 sittings. The exterior and interior are faced with Accrington brick, with stone dressings. The stone used in the outside walls is from Darley Dale, and in the interior Runcorn flecked stone is employed. The choir-stalls, the Communion table, and the pulpit are of oak, carved ; while the other woodwork, including the seats in the nave, is unvarnished pitch-pine. The floor of the chancel is laid with encaustic tiles, and the flooring of the nave is formed of solid wood blocks. The windows are filled with stone tracery, and the interior roof is of pitchpine. There is vestry accommodation, and a temporary porch, with baptistry, has been provided at the west end. The church will be lighted throughout by electricity. The cost up to the present has been about 6,000*l.*, the uncompleted portion of the scheme including a tower and porch at the west end, in addition to the extra bays already referred to. The architects are Messrs. Austin & Paley, of Lancaster, and the contractors Messrs. Smith Brothers, Burnley, and Messrs. Hatch & Sons, Lancaster.

NEW CHURCH OF ST. ANDREW, MALMESBURY PARK, BOURNEMOUTH.—The new Church of St. Andrew, in the district of Malmesbury Park, Bournemouth, was opened recently. The foundation stone of the church was laid in October last. The nave is planned with north and south aisles, each with its separate porch, which also communicates with the rest of the building. Central, with the nave at its western end, is the baptistry, flanked at its angles with buttresses. The nave is 80 ft. in length by 25 ft. in width, and is separated from the aisles by four arches, which carry the clearstory, and is spanned throughout its length by an open timber roof. The aisles at their narrowest point are 11 ft. wide, and broaden out at their eastern end to a width of 18 ft. The walls are of Purbeck stone, with Bath stone finishings. The roof is of red tiles. Seating accommodation, exclusive of clergy and choir, is provided for a congregation of 600. The architects are Messrs. Chatwin, Birmingham, and S. Tugwell, Bournemouth. The builders of the nave and aisles are Messrs. Collins & Godfrey, of Tewkesbury, whose contract price for the work was 4,651*l.*

WESLEYAN CHAPEL, ST. HELENS, LANCASHIRE.—The new Wesleyan chapel which has been erected in Park-road, St. Helens, on the site of the old meeting-house, was opened on the 21st ult. The new building is 70 ft. long by 42 ft., and provides accommodation for 400 worshippers, besides two vestries and a choir and rostrum. It is built of Ruabon bricks, in the late Gothic style, from the plans of Mr. F. S. Biram. The total cost was over 1,800*l.*

CHURCH, ROTHERHAM.—Eastwood View, a part of the parish of Eastwood, Rotherham, is to be provided with a mission church, and on the 21st inst. the foundation stone was laid. The total cost is estimated at 1,350*l.* The church, which is to be known as that of the Holy Saviour, will consist of a nave 70 ft. long and 27 ft. wide, chancel 21 ft. long and 18 ft. wide, with vestry, recess for small organ, and two porches. The accommodation is for 300 persons. Local pressed bricks, with St. Bee's stone dressings, will be used. Internally the walls will be plastered, and the woodwork stained and varnished. Mr. J. E. Knight, of Rotherham, is the architect ; Mr. Richard Snell, of Rotherham, the contractor ; and Messrs. Wright Bros., of Attercliffe, the heating engineers.

METHODIST CHURCH, WHITEHEAD, BELFAST.—On the 23rd ult., the new Methodist Church at Whitehead was opened. The new church, which is in connexion with the Carrickfergus circuit, and will afford accommodation for a congregation of over three hundred persons, is 55 ft. by 25 ft. Adjoining the church are a church parlour and caretaker's apartments. The building operations have been carried out by Mr. David Barbour, contractor, Whitehead, from the plans of Mr. H. Sykes, Belfast.

PRESBYTERIAN CHURCH, CUSHENDALL, CO. ANTRIM.—The new Presbyterian Church at Cushendall was opened on the 17th ult. Mr. William J. Fennell was the architect.

WELLWOOD CHURCH, GLASGOW.—This church, at the corner of Yarrow Gardens and Carlton-terrace, North Kelvinside, was opened on the 24th ult. The building will ultimately be the hall of the larger church, a site for which has been reserved by its side. Mr. Alex. Petrie, of Glasgow, is the architect, and the principal contractors were :—Mason work, Mr. Gordon ; joiners, Messrs. James Herbertson & Son ; electric lighting, Messrs. John Findlay & Co. ; and plastering, Messrs. Struthers & Sons, all of Glasgow.

PRIMITIVE METHODIST CHURCH, CULLERCOATS, NORTHUMBERLAND.—The new Primitive Methodist church at Cullercoats was opened on the 27th ult. It adjoins the church which was built in 1869, and will afford sitting accommodation for about 600 people. The main entrance is in John-street, and leads into a vestibule. From there, inner lobbies communicate with the ground floor, and there is a staircase to the gallery. The organ and choir are placed behind the rostrum. Behind the organ chamber there are a minister's vestry and a large room. Boyle's patent inlet tubes and air pump ventilators have been placed on the roof, and the heating will be by hot-water pipes. The building measures 67 ft. by 44 ft., and is constructed of stone, with flag blockers at front gable. It was designed by Mr. Geo. Race, architect, of Westgate, and Messrs. Bolam, of Birtley, were the contractors. The cost was about 3,000*l.*

PRIMITIVE METHODIST CHAPEL, NORTON SUB-COURSE, NORFOLK.—The foundation stone of a Primitive Methodist chapel at Norton Subcourse was laid recently. Messrs. Kerridge & Sons, of Wisbech, are the architects, and Mr. W. Wynes, of Thurlton, the builder.

PRESBYTERIAN CHURCH, FELIXSTOWE.—A new Presbyterian Church has just been erected on the Orwell-road, Felixstowe. The architect was Mr. Geo. F. Leighton, of Ipswich and Felixstowe. The style is Early English, and the church is built in Kentish rag, with Monk's Park bathstone. The roof is covered with red Broseley tiles. The principal entrance is from the Orwell-road, fronting which is a porch, with stone columns, above which is a large window, with an arch in continuation of the stonework of the porchway. From the porch is an entrance on either side. The building is 70 ft. by 38 ft., and it consists of a nave, chancel end, and transepts on either side, with open timbered hammer-beam roofing, one span, with arches separating the nave from the chancel and the transepts. At the south end is a gallery, divided from the nave by a semi-circular arch. The pulpit, which is of oak, stands in the centre of the chancel arch, its base being formed by three white stone steps up into the choir. The benching throughout is in oak, and the flooring of wood blocks of pitch pine, laid by Ebner's, of London. The heating is by the low pressure hot-water system, combined with which is a scheme for warming fresh air. The building is lighted by electricity, the installation having been carried out by Messrs. Tamplin & Makoviski, of London. The heating has been provided by Messrs. Kite & Co., of London. Seating accommodation is provided for about 500 persons. The total cost of the building will be about 4,000*l.* The contractor was Mr. F. Thurman, Walton, the masonry work being by Mr. Thos. Strong, Felixstowe.

WESLEYAN CHURCH, BOLE HILLS, SHEFFIELD.—The new Wesleyan Church at the corner of Quarry-lane, Crookes, and Western-road, was opened on the 28th ult. The building, which is entered by a large central doorway with side wing porches, has seating accommodation for about 300 persons. There is an apsidal arrangement at the end for the choir and communion, an organ chamber being also provided at the side. The total inside length is 74 ft. The floor of the chancel is laid with polished oak and teak blocks, and the pulpit, choir stalls, communion table, &c., are of oak. The chancel windows are of stained glass. The schoolroom, which will accommodate over 300 children, is parallel with the church. Between the church and the school is a connecting corridor and a range of vestries. Kitchen, store, and lavatory accommodation has been provided. Externally the walls are faced with Bole Hill stone, the dressed stone being from Matlock. The main front of the church has a low porch with wide arched doorway, and above, in the main gable, is a composite window of five lights, with tracery in the upper part enclosed within a deeply moulded arch. On either side are square turrets, the gable having carved shields and conventional foliage in the apex. The other windows of the church and of the end of the school are also traceried. The roofing is covered with red tiles. The whole of the buildings and fittings have been carried out from the designs and under the supervision of the architect, Mr. W. J. Hall, of Sheffield, the general contractors being Messrs. D. O'Neill & Son, with the following sub-contractors :—Joiners, Messrs. Dawson & Jones ; tiler, Mr. Lockwood ; plasterers, Messrs. Hudson & Dore ; plumbers, &c., Messrs. Corrie & Sons ; and painter, Mr. Topham. Mr. Frank Tory executed the carving, and Messrs. C. Pearce & Son the warming apparatus. The font is of beaten copper, and was made by Mr. G. Halliday.

CHURCH EXTENSION, WHITLEY, NORTHUMBERLAND.—Trinity Wesleyan Church, Whitley, is being enlarged. The scheme includes the erection of a new Sunday school, vestries, and class rooms, and the addition of a chancel to the church, and will cost about 2,600*l.* Messrs. T. A. Page & Son, of South Shields, are the architects, and the contractor is Mr. J. L. Miller, of Tynemouth.

PRIMITIVE METHODIST CHAPEL, NORMANBY, MIDDLESBROUGH.—On the 30th ult. the memorial stones of a Primitive Methodist chapel were laid at Normanby. Mr. Robert Moore, of Middlesbrough, is the architect, and Mr. Wm. Douglas, of Normanby, the contractor. The cost will be about 800*l.*

CHURCH, BEXHILL. — The new Church of St. Stephen's, Woodsgate Park, Bexhill, was consecrated on the 21st ult. The building will seat 600 persons, and is of red brick with dressings of Bath stone, with a tiled roof and spire. The length is 125 ft. and the width 60 ft. at the nave, and 85 ft. at the transepts. The height of the tower is 70 ft., the battlements being 33 ft. Mr. H. Ward, of Hastings, was the architect, and Mr. H. E. Crutten-den, of the same town, was the builder. The cost was about 8,000*l.*

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CONGREGATIONAL CHURCH, NOTTINGHAM.—The foundation stones of the new Queen's Walk Congregational Church were laid on the 28th ult. Mr. C. Nelson Holloway, the architect, stated that it was determined, if possible, to utilise the old foundations for the new structure. The organ chamber, however, was to be placed at the back of the church and was a new building entirely. The exterior of the church will be in the Perpendicular style, the front to Queen's Walk and side of lobby to be built of Bullwell stone rock with dressings of Hollington stone. The sides of the church will be faced with pressed bricks, and the roof will be of American sea-green slates. Accommodation will be provided for about 500 people, and the church has been so designed that an end gallery can be added in the future. Internally, the church has a length of 79 ft. and a breadth of over 43 ft. The roof, an open timber one, is 47 ft. up to the apex from the floor of the church. The seating will be of Californian pine. The contract amounts to *2,614l.*

WESLEYAN CHAPEL, AMESBURY, WILTSHIRE.—The new chapel which replaces the old Wesleyan chapel destroyed by fire, was opened on the 20th ult. The building is of red brick with stone dressings, and will seat 300 persons. The architect was Mr. J. Gunton, of London, the contractors having been Messrs. Wort & Way, of Salisbury.

SCHOOL EXTENSION, LLANDAFF.—During the last few months Howell's Glamorgan County School for Girls, Llandaff, has been enlarged; *5,287l.* has been expended upon extensions. The additions are an upper and lower hall, music-rooms, mistress's-rooms, which form a new south wing; increased cloak-room and bedroom accommodation in the east wing, improved accommodation in the west wing, a revision of the heating and hot-water system in the west wing. There is an outdoor bicycle house. The upper hall in the south wing will seat about 450 people, and is fitted up with a platform. Mr. G. E. Halliday was the architect, and Mr. C. C. Dunn was the contractor.

SCHOOLS, CHORLTON-CUM-HARDY, LANCASHIRE.—In connexion with the provision of new elementary schools at Chorlton-cum-Hardy, the architects, Messrs. Potts, Son, & Hennings, Manchester, have submitted plans of the schools, which are to be built on the site presented by Earl Egerton, near the new St. Clement's Church at Chorlton. Provision is made for 600 scholars. The proposed building is two stories high; on each floor there will be a schoolroom and class-rooms to accommodate 300 children, separated by glazed screen. The basement will be used for manual exercises. The total cost is to be *5,000l.*, but only the first story is to be erected at present, the structure having a flat roof to facilitate the additions in future.

NEW BLUE SCHOOL FOR GIRLS, WELLS.—These new buildings in Portway, Wells, were opened on Saturday last week. The buildings comprise a schoolroom, 33 ft. by 24 ft., accommodating 170 scholars; two class-rooms, 20 ft. by 16 ft. each, accommodating thirty scholars; a cookery school, 30 ft. by 23 ft., with scullery, larder, &c., attached. Adjoining the main entrance are a cloak-room and lavatory. The schools are built of local conglomerate stone, with Doulting stone dressings, and the roofs are covered with Broseley tiles. The cost of the building, exclusive of site, is about *3,000l.* Mr. H. Dare Bryan, of Bristol, was the architect; Mr. Charles Browne was clerk of the works.

BATHS, CHESTER.—The foundation stone was laid on the 28th ult. of the new baths to be erected in Union-street, opposite the Grosvenor Park. The architects are Messrs. Douglas & Fordham, and the builder is Mr. W. W. Freeman. The buildings will be of red bricks, with stone dressings, and will cost *11,600l.* There will be two swimming-baths and the usual slipper-baths, &c.

INFIRMARY, NEWCASTLE.—The foundation stone of the new Infirmary buildings, Newcastle-on-Tyne, was laid by the Prince of Wales on the 20th ult. There had been much discussion as to the suitability or unsuitability of the old site, and the late Mr. John Hall, shipowner, came forward with an offer of *100,000l.* if the building were associated with his gift and put on an open site on the Moor or Leazes. The latter site was obtained. A general view of the new buildings shows the central part in a very dominating light, this effect being obtained by placing the servants' bedrooms on the upper floors of the administrative block. This block will be the centre of several groups of buildings, and access will be given to it through a porch of sufficient size to permit a carriage to stand under cover. The service wing will be placed centrally between the main corridor of the infirmary and the administrative block. The main administrative staircase is arranged around the central hall, and immediately in front of this, in the centre of the main elevation, the board-room is situated, a balcony projecting over the door. The out-patients' department will be close to St. Thomas-street, and will be accessible to patients directly they enter the hospital grounds. There will be four large consulting-rooms and four small ones. The operation-room has been placed so as to be convenient for all the consulting-rooms, but especially those on the surgical side. The ophthalmic room will have an uninterrupted range of 24 ft. The entrance lodge and the hall can be used as a tea and coffee bar for out-patients, and the bar removed when the hall is used for meetings. The dispensary will be fitted with dispensing counters for male and female patients, and also a serving counter for house medicines. In the operating theatre, which will be on the ground level, it is proposed to put a gallery all round, 7 ft. from the floor. Under this room, accessible from the basement corridor, and easily accessible from the students' rooms, will be the lecture theatre, with seating accommodation for rather more than 100 students. The nurses' home is to be on the highest level of the site, at the extreme west end of the infirmary main corridor, and facing the entrance to the Leazes Park. On the ground floor there will be eight bedrooms for nurses, on the first floor twenty-six, on the second floor twenty-six, and on the third floor twenty—a total of eighty—as well as six bedrooms for housemaids. The chapel has been arranged to the north of the main infirmary corridor, and west of the central ward staircase, and comprises a nave, side aisle, small chancel, and organ chamber, as well as a room for robing. The accommodation is for 142. The accident and reception wards are arranged so as to be entirely away from the public gaze. There will be eight ward pavilions. These are not less than 80 ft. apart, and are two stories high, axially placed due north and south. The large ward pavilions will all be very similar, and are designed for twenty-four beds each. Each ward will be 102 ft. long, 27 ft. wide, 13 ft. high, and will contain twenty-four beds. The children's wards will be 24 ft. wide. Two rooms for photography have been placed on the ground floor near the operating theatre. The architects are Messrs. H. P. Adams, London, and W. Lister Newcombe, Newcastle, whose design was selected in competition. Mr. Pringle is the contractor.

INFIRMARY, NORWICH.—The Prince and Princess of Wales opened, a few days ago, the new Jenny Lind Infirmary in Unthank-road, Norwich. The building has been erected on a site given by the late Mr. J. J. Colman, in memory of his deceased wife. The buildings face the south. The main drive, straight to the principal entrance, is in a line with the corner of Mile End-road. The administrative block stands in the centre: it is of red brick with Bath stone dressings, the centre well advanced, and the roof line broken up by gables and low pediments. From this a corridor leads on either side to the wings, which radiate in such a way as practically to shut in the whole front from the northern and eastern winds. The wards are in a plainer style than the centre block, and finished with semi-circular ends. In the administrative block the ground floor is taken up with the board-room, the matron's-room, the dining-room, and an apartment for visitors. Over these are the bedrooms of matron and nurses, each of whom has a separate apartment, and also recreation-rooms. In the rear are the domestic offices, kitchen, scullery, &c., and above them the servants' dormitories. The entrance for patients is on the right of the administrative block, with receiving-room and bath-room, while from the doctor's apartment there is connexion with the isolation block in the rear of the main building. From the corridor before mentioned access is gained to the operating theatre, adjacent to which are the anæsthetic room and a lavatory. In each ward there is accommodation for eighteen beds. Attached is a smaller ward, which may be used for private patients if required. At the outer ends of the wards are rooms, almost semi-circular in plan, where convalescent patients can pass the day, and from which, through moveable casements, access may be gained to an asphalted verandah, and so to the hospital grounds. The wards are built on arches. The floor is of Ebner's mosaic, laid on 6 in. of cement concrete over iron girders. The corridor, which extends the whole length of the building, has a glazed brick dado. Mr. Edward Boardman was the architect for the new buildings, and the contractor Mr. T. H. Yelf.

EXTENSIONS, SHAFTESBURY WORKMEN'S INSTITUTE, ST. PHILIP'S, BRISTOL.—On the 19th ult. the new buildings erected in connexion with the Shaftesbury Workmen's Institute and Public Hall, Kingsland-road, St. Philip's, were opened. The extensions provide two club-rooms for youths and a skittle-alley; on the first floor are club-rooms for girls, committee-rooms, and an extension of the large hall, increasing the accommodation by nearly 200 seats. This extension is provided with rolling shutters, so that the original building and the new portion can be used either separately or together. On the second floor are class-rooms and caretaker's rooms. Mr. Frank W. Wills was the architect of the new structure, which was erected under his supervision by Mr. George Humphreys. The plumbing and gasfitting were carried out by Mr. G. F. Tuckey, and the heating apparatus was fixed by Messrs. Crispin & Sons. Mr. Turner was the clerk of works.

STEAM LAUNDRY, BLAIRGOWRIE, PERTH.—Steam laundry premises have been erected at the corner of Emma-street and Atholl-street, Blairgowrie. Externally the building is 72 ft. in length by 44 ft. in breadth. It is divided into a washing house and a finishing room, each 48 ft. by 20 ft. 6 in. The rest of the building consists of offices, packing-room, store-room, &c. The contractors were:—Mason, Bailie Hill; joiner, Mr. W. T. Robertson; plumber, Mr. G. P. Kidd; slater, Mr. R. T. Craigie; iron-work, Messrs. J. S. Fraser & Son; painter, Mr. J. Smith—all of Blairgowrie; plaster and cement work, Mr. W. Sidie, Alyth. The machinery and fittings were supplied and fitted by Messrs. T. Bradford & Co., Manchester: and all the operations were carried out under the supervision of Mr. L. Falconer, from plans supplied by Messrs. L. & J. Falconer, architects, Blairgowrie and Fort-William.

PUBLIC HALL AND PAVILION, WALTON-ON-THE-NAZE.—The foundation stone of Walton's new public hall was laid on the 20th ult., when the opening took place of the new pavilion on the recently-completed pier. The public hall, which is being erected under the auspices of the Walton-on-Naze Public Buildings Company, Limited, is situated in High-street. The ground floor comprises offices on each side of the principal entrance, and the corner office will be occupied as a bank and manager's house. Adjoining it will be three shops. In the rear is the public hall, which building will accommodate over 500 persons. There is a stage, with dressing-rooms, &c. The first floor consists of a suite of offices, next the main street, with a stone staircase, and a public room, which could be adapted as a gallery. The main façade is treated in the Classic style, the facings being of red brick, with dressings of Bath stone. Mr. A. Migotti, London, is the architect, the contractor being Mr. E. West, of Chelmsford.

NEW PHYSICAL LABORATORY, OWENS COLLEGE, MANCHESTER.—The new physical laboratory at the Owens College, Manchester, has been designed by Mr. J. W. Beaumont, architect, of Manchester, and has cost about *23,000l.*; another *10,000l.* will be spent in equipment. Attached to the physical laboratory there is an electro-technical laboratory, which will form a memorial of the late Dr. John Hopkinson. The laboratories occupy a prominent position in Coupland-street, and are connected with the college by an underground passage. Red brick and white stone are the materials that have been used in the construction, on a site measuring about 100 ft. by 60 ft. There are about forty rooms. Besides those intended in the first place for ordinary teaching, elementary and advanced, there are others for special research and for electro-chemical work. Glazed bricks have been used in nearly all the rooms for the walls. Appliances are provided for filtration of the air. At the top of the building there is an observatory fitted with a 10-in. telescope. The building will be supplied throughout with compressed air up to four atmospheres, and with steam for experimental purposes. The electric light will be used throughout the buildings. There is also an electric lift. Provision has been made for a photographic laboratory and for a large Rowland's grating, used for spectroscopic investigation.

RAILWAY WORKS, NOTTINGHAM.—Important building works are being carried out on the premises of the Midland Railway Company in Nottingham as a preliminary to the reconstruction of their passenger station. A commencement has not, however, yet been made with the demolition of property on the particular parts to be utilised for the extensions, and before this can be done elsewhere than in Queen's-road new buildings have to be erected. A new electric lighting station, which is to take the place of the one on the north side of the railway bridge in Carrington-street, is in course of erection at the north end of the cattle docks. This building, which is 137 ft. long and 37 ft. wide, comprises boiler houses, 36 ft. by 38 ft.; accumulating house, 13 ft. 7 in. by 25 ft. 6 in.; hydraulic fitting shop, 33 ft. by 16 ft. 4½ in.; hydraulic stores, 14 ft. 6 in. by 14 ft. 6 in.; electric stores, 12 ft. by 12 ft.; electric light fitting shop, 12 ft. by 12 ft.; and battery-room, 32 ft. by 32 ft. The progress of the work at the commencement was hampered considerably by the large quantity of water met with while the foundations were being put in. It is a plain red brick building with occasional rows of black bricks; the inner walls are of chocolate and white glazed bricks, with ornamental bands. The chimney, octagonal in shape, is to be built to a height of 140 ft. from the railway level. It goes down to a depth of 19 ft. from the surface. At the foundation it is 28 ft. across, with footings 22 ft. by 22 ft. In view of the old tank house on the west side of the fitters' shop coming down to make room for an additional workshop to run parallel with the present building, a new one has been built in close proximity to the north line. It is 75 ft. long and 21 ft. wide, and is practically completed so far as the brickwork is concerned. The iron girders are fixed ready for the tank, under which a corrugated iron roof is to be erected. The contractor is Mr. Dickinson, of Derby. Mr. Rhodes is the clerk of the works.—*Nottingham Express.*

CHILDREN'S ASYLUM, BALDOVAN, FORFARSHIRE.—The foundation stone of the new asylum for imbecile children at Baldovan was laid on the 13th ult. Mr. J. T. Maclaren is the architect.

TRAMCAR SHED, MANCHESTER.—On the 12th ult. the foundation stone was laid of the first of several car-sheds which the Manchester Corporation are about to erect for the accommodation of the electric tramcars. The building is on the north side of Queen's-road, Cheetham. The architect is Mr. J. Gibbons.

HALL, LARBERT, STIRLING.—The foundation stone of the new hall which Major Dobbie, of Messrs. Dobbie, Forbes, & Co., ironfounders, has presented to Larbert and Stenhousemuir, was laid

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on the 23rd ult. The hall will cost 10,000*l.*, and is being built from plans prepared by Mr. William Black, Falkirk, on a site situated on the public road between Larbert and Stenhousemuir. The large hall will accommodate 1,000 persons, and a smaller one will hold 180 persons. There will also be a kitchen.

ALTERATIONS TO ST. JAMES'S HALL, PLYMOUTH.—St. James's Hall, Plymouth, has just been re-opened after alterations to the interior. A staircase leads to a grand foyer, and from this the main body of the hall is reached, within being the staircase leading to the balcony. There is seating accommodation for about a thousand. The stage and accessories are constructed only for concerts. The main entrance-hall is on one level, 86 ft. long by 44 ft. wide. The ceiling is decorated with Lincrusta Walton, and the walls are hung with cream and gold designs. The back of the stage has been newly built, windows and dressing-rooms have been added, beside two additional exits. The flooring is of pitch pine, the landing mosaic, with concrete underneath. At the basement there are a bar and cloak-room accommodation. The premises will be illuminated with electric light supplied by the Corporation. Mr. B. Priestley Shires was the architect.

LIFTING A ROOF.—The *Hampshire Independent* of June 30 gives an interesting account of the operation of lifting the roof of the Southampton Central District Schools. Thirty-five jacks were worked by the same number of men, who at the signal from the foreman took a quarter turn. This was continued until the roofing was raised 6 in., when it was wedged up. The screws were then eased, and placed in position for a subsequent lift. The total height the roof has been raised is 12 ft. When at that height, the roof was tied down in order to prevent any cross movement by the action of the wind. The total weight of the roof is calculated at 120 tons, but we gather from the account that it was raised in sections. The extra accommodation gained is ten additional class-rooms and one additional school-room: with this increased accommodation 760 more scholars can be provided for in the school. Had a new building been erected the cost would not have been under 11,000*l.*, whereas now the total cost is estimated at 9,000*l.* In addition to the class-rooms there are more cloak-rooms, also additional sanitary conveniences. The architect to the School Board, Mr. J. H. Blizzard, estimated that the cost of raising the roof in this way was much less than that of taking it down and reconstructing it. The builders are Messrs. H. Stevens & Co.; the clerk of works is Mr. S. Jurd, and the architect states it is through the valuable services rendered by Mr. Jurd that the work has been carried out so successfully.

BANDSTAND, THE PANTILES, TUNBRIDGE WELLS.—A bandstand is to be erected on the Pantiles, from a design by Mr. G. Featherstone.

SANITARY AND ENGINEERING NEWS.

THE NEW HIGH LEVEL RAILWAY BRIDGE OVER THE TYNE.—Before the close of the present year it is expected that a commencement will have been made with the North-Eastern Railway Company's new high level bridge across the Tyne. Mr. C. A. Harrison, engineer to the North-Eastern Railway Company, is the designer of the bridge. It will run from the west end of the Central Railway Station along the present lines across the Forth Banks bridge through a part of the Forth goods yard, and then curve southward through a corner of the Forth Goods Station, proceeding south across the Close, and then straight across the river Tyne. The bridge will be approached by 40 ft. ashlar stone arches, though at the Close these may be altered to four arches of 60 ft. instead of six of 40 ft. It will cross the river in two spans resting upon a central pier, which will be of granite. The central pier will be in line with the corresponding pier of the Redheugh Bridge, and the structure is to be placed about 780 ft. east of the bridge named. Recent work in connexion with the rebuilding of the Redheugh Bridge has resulted in the discovery of a shale foundation at between 60 ft. and 70 ft. below the bed of the river, and it is thought probable that a similar foundation will be found when the railway bridge is proceeded with. Cylinders will be sunk and on these the piers will be built. There are five latticed steel girders, each weighing 300 tons. They will be 27 ft. in depth, and in width 4 ft. 6 in. The bridge will have a width of 48 ft. 6 in. from the centre of one parapet to the centre of the opposite parapet. Each of the two spans of the bridge will be 300 ft. in length and the total length 675 ft. At the Gateshead side of the river the bridge approach will curve to the south-west, joining the Team Valley or main line about 100 yds. east of the Redheugh Bridge. From the Central Railway Station to the point where the new line joins the Team Valley line will be a distance of about 3,000 ft. Provision is also made for a loop to the new line at Gateshead from the east, as well as from the Team Valley.

PROPOSED WATER SUPPLY SCHEME FOR PYTCHLEY, NORTHAMPTONSHIRE.—A Local Government Board inquiry was held at Pytchley, on the 22nd ult., by Mr. H. B. Boulnois, inspector, relative to the application of the Kettering Rural District Council for sanction to borrow a sum of 1,200*l.* for the purposes of providing a water supply for the parish of Pytchley. Mr. H. Norwood, surveyor to the Rural District Council, explained the scheme.

NEW HIGH LEVEL SEWER, ABERDEEN.—In order to prevent flooding in the lower part of Ferryhill district, the Corporation's Sewerage Committee have resolved to go on at once with a section of the new high level sewer, and have accepted the tender of Mr. Peter Tawse, contractor, to construct the works for the sum of 14,374*l.* to the satisfaction of Mr. William Dyack, M.I.C.E., Borough Surveyor, who prepared the plans and specifications.

CULVERT, LEIGH, SOMERSETSHIRE.—The key-stone of the culvert which will take the water from the proposed Leigh reservoir into the filters at Luxhay, in connexion with the Taunton waterworks, was laid on the 20th ult. The reservoir will have a capacity of 120 million gallons and a depth of 65 ft. The cost of the undertaking, including the land, will be about 30,000*l.* The work is being carried out by the Corporation's workmen under the direction of Mr. F. W. Roberts, the engineer, and Mr. H. T. Coles, the waterworks manager.

BORING FOR WATER, GAINSBOROUGH.—This boring, which has been carried out by Messrs. E. Timmins & Sons, of Runcorn, under the supervision of Mr. Percy Griffith as engineer, has now been successfully carried to the base of the sandstone beds, which were met with at a depth of a little short of 1,500 ft. below the surface, or about 50 ft. below the contract depth. The water supply from this boring has been analysed and proved to be of a very high quality, and similar in every respect to that which has already been obtained from the first boring sunk some years ago. From the level to which the water rises in the new boring it is evident that there is a plentiful supply available sufficient for the requirements of the town for many years to come. Application has already been made to the Local Government Board for sanction to a loan of 8,400*l.* to cover the cost of the pumping machinery and buildings which are now being designed by the engineer, but in order to admit of the very latest improvements in pumping machinery being adopted competitive designs will be invited from contractors. The circumstances prevailing at Gainsborough being peculiarly favourable, it is proposed to give special attention to the American system, recently introduced into this country, of lifting the water from the boring by means of compressed air.

FOREIGN.

FRANCE.—The demolition of the ancient prison called the "Grande Roquette" has been commenced. A whole new building quarter will before long arise on the site.——The Municipality of Vichy has voted a sum of 4,366,000 frs. for important street improvements.——A new post-office is to be built at Angoulême.——There is talk (we regret to hear) of erecting on the heights of Montmartre a tower to be higher than the Eiffel Tower, to be reached by a tunnel, and to carry an acetylene lamp of great power. M. Sebillot is the author of the scheme, which is estimated to cost 3,000,000 frs. The effect of such an erection on the great church at Montmartre will be deplorable.——The Act for the canal from the Marne to the Saône has been passed in the French Chamber. The cost of the work will be 21,000,000 frs., and it is to be completed in six years.——The principal marine painters of France have formed a Society under the presidency of M. Tattegrain. It is to be hoped this may lead to an improvement in French sea-painting.——In the course of this month the new postage stamps, designed by MM. Olivier Merson, Joseph Blanc, and Monchon, will be put into circulation.——The colonnaded porticoes from the ancient Abbey of St. Germain des Près have been put up, under the direction of the "Service des Promenades" of Paris, in the small square of St. Germain des Près. They are supposed to have been the work of Pierre de Montereau, the architect of the Sainte Chapelle.——The Paris Municipality has decided to pull down the ancient buildings of the Hôtel Dieu in such a manner as to ensure the opening out of the site of the Church of St. Julien le Pauvre, which it is proposed to make into a museum, as an annexe of the Carnavalet museum.——The death is announced of M. Schuler, architect, of Nancy, at the age of forty-eight.——We have also to record the death of M. Paul Biva, a landscape painter of talent and also a painter of flower subjects. Among his best works may be named "Matin à Villeneuve l'Etang," and "Un Bouquet de Rose," exhibited in the 1893 Salon. This year he sent to the Salon a charming picture under the title "Floraison du Matin," as well as several water-colours.

GERMANY.—It has at length been decided to erect the buildings to form the German Naval Museum in connexion with the Berlin University. A committee has been formed for the purpose, consisting of Baron von Richtofen, of the Berlin University; Professor von Hall, of the Naval Office; and Professor von Drijalsky, the scientific leader of the projected German Antartic expedition.

INDIA.—The budget estimates for works to be carried out in Burma during the next twelve months include the provision of an efficient water supply for the Rangoon cantonment, and the drainage of Fort Dufferin, at Mandalay.——The recent earthquake at Darjeeling has led to the execution of much engineering work, principally of a protective character, the hill-sides having to be extensively drained.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. F. Adams Smith, architect, has removed his offices from 28, Finsbury-circus to 35, New Broad-street, E.C.——Mr. G. A. Sexton, architect and surveyor, has removed his offices from 123, High-road, Kilburn, to Bank Chambers, 42, High-street, Kilburn, N.W.

LABOUR MARKET IN THE COLONIES.—The July circular of the Emigrants' Information Office states that in New South Wales there is occasional demand for a few blacksmiths and carpenters. In Victoria the Government is about to establish a Department of Labour. There is a good demand, which is likely to continue, for a limited number of thoroughly skilled plumbers on the Melbourne drainage works; otherwise there is not much improvement either in Melbourne or throughout the Colony in the general demand for labour. In South Australia there is practically no demand for more mechanics in the towns. In Queensland there is a moderate demand, in the south, for mechanics, such as carpenters, stonemasons, and bricklayers. In Western Australia the demand for mechanics is not great, and the supply of men in the building and other trades is sufficient. In Tasmania the best opening is for skilled miners and mechanics on the west coast. In New Zealand the building and engineering trades are almost everywhere busy. Persons are warned against going to South Africa in search of work so long as the war lasts. There are large numbers of persons there at the present time who are out of employment.

REMODELLING HULL STREETS.—A special meeting of the Hull City Improvement Committee was held on the 25th ult. The Mayor (Councillor W. Alfred Gelder), who presided, submitted further proposals for the improvement of the streets of Hull, which, with those already sanctioned, involve almost the rebuilding of the city. The Mayor said they had already reached a point when it had become imperative that they should consider further city improvements. In his proposals he had endeavoured to benefit every district. They included:—1. The widening of Beverley-road, to enable them to lay a double line of trams. 2. The widening of Lowgate from the Town Hall to Whitefriargate, part of the property for which had already been secured. 3. The formation of a street connecting Clarence-street with Davison-lane, thus making a direct tram route from Whitefriargate Bridge across by the Town Hall, over Drypool Bridge to the Holderness-road. The last-mentioned street would become a great leading thoroughfare, connecting East with West Hull, and extending in length between five and six miles. Other schemes embraced a short street through from Smeaton-street to Charles-street, the widening of Hedon-road, and sundry improvements at Marfleet in anticipation of the Joint Dock development. He also suggested that some communication should be made between Adelaide-street and Coltman-street if the owners of property were prepared to sell at a reasonable price, but, as this was a more expensive matter than the others, it would depend upon the way in which the Corporation were received whether this scheme would be carried forward or not. In these street improvements there were no serious vested interests nor licensed properties to contend with; while to delay meant adding considerably to the cost. The Corporation need not by this Bill be committed to any one of the schemes; but if they were met in a fair and reasonable manner by the owners these improvements would take place.—After some discussion the Committee unanimously accepted the schemes brought forward by the Mayor, and resolved to recommend them to the Council for adoption.

BRIXTON PRISON.—A sum of about 58,000*l.* will be spent upon new works at Brixton Prison in adapting it for purposes of a gaol for the county of Middlesex in the place of Newgate. The governor's house and some of the old blocks on the military side will, we understand, be rebuilt, together with the Roman Catholic chapel and the hospital ward and cells. Provision will be made for male prisoners who are under remand or under trial at the Central Criminal Court, and for execution of sentence upon those who are condemned to capital punishment. The prison was built in 1820-1 as a house of correction for the county of Surrey, and was fitted with a treadwheel—the first of its kind. The original plan comprised ten wards and ten day-rooms for convicts of both sexes. The buildings were subsequently enlarged for the reception of soldiers sentenced to imprisonment.

THE REBUILDING OF AYR TOWN HALL.—A poll was taken in Ayr recently in connexion with the question of whether or not the new Town Hall should be built on the plan by Mr. J. K. Hunter out of the rates. There were six polling places, and there are about 4,690 voters on the roll. Only 1,020 voted, and in all the wards there was a majority against building the hall out of the rates, the aggregate number of votes against being 456.

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MEMORIAL WINDOWS, ST. AUGUSTINE'S CHURCH, WRANGTHORN, LEEDS.—Two memorial windows have just been placed in the south transept of Wrangthorn Church. The subjects are "Christ Blessing Little Children" and "The Sermon on the Mount." The work was executed by Messrs. Powell Brothers, of Leeds.

PORTMAN CHAPEL.—We hear that it is proposed to remove Portman Chapel, in Baker-street, one of the last of the old proprietary chapels of its kind in London, and that Lord Portman has offered to sell the site to the congregation for 8,000*l.*, and to contribute 3,000*l.* towards the endowment of a new district church.

LONDON COUNTY COUNCIL CENTRAL SCHOOL OF ARTS AND CRAFTS.—The annual exhibition of students' work at this institution will be opened free to the public on Monday next, July 9, remaining open daily throughout the week, between the hours of 12 (noon) and 8.30 p.m. The school, established by the Technical Education Board of the London County Council four years ago, is situated at 316, Regent-street, opposite the Polytechnic. The work done by students includes bookbinding, silversmiths', goldsmiths' and jewellers' work, chasing and engraving, enamelling, stained glass, ornamental lead work, stone work (by architects), woodcuts in colour (by a method based on Japanese practice), embroidery, wood-carving and gilding (applied mainly to picture frames), lithography, writing and illumination, also modelling and designs for various processes.

LEEDS INSANITARY AREAS.—The question of dealing with the insanitary area in Leeds on a larger scale is now under consideration. The Corporation have already acquired the whole of the scheduled property in the York-street insanitary area, and it is now proposed to complete the scheme of which it forms a part. This instalment covers by far the larger part of the original plan. The York-street area embraces 25 acres; the area now intended to be dealt with comprises nearly 60 acres It adjoins the York-street area and extends in a northerly direction almost up to the "Hope Inn" in North-street, extending eastwards nearly as far as Burmantofts-street, and westwards to the neighbourhood of the "Harewood Arms." This area includes some small properties not shown originally, but now required to give completeness to the scheme. The proposal has been formulated by the Insanitary Area Sub-Committee.

APPROACHING HEALTH CONGRESS IN ABERDEEN.—Under the auspices of the British Institute of Public Health a congress will be held in Aberdeen, from August 2 to 7 next inclusive, under the general presidency of the Earl of Aberdeen. Upwards of 700 delegates will be present, and papers on architectural, engineering, and sanitary and hygienic questions, so far as relating to public health, will be submitted and discussed. There will also be excursions to Balmoral, &c.

GIFT OF ART COLLECTION TO ABERDEEN.—On the death, recently, of Mrs. Macdonald, of Kepplestone, her trustees intimated to Aberdeen Town Council that they were prepared to hand over to the Corporation the art-treasures bequeathed by her husband, the late Mr. Alexander Macdonald, granite merchant, to the Corporation. Mr. Macdonald was a liberal patron of art, and a valuable part of the gift is a collection of portraits of eminent artists painted by themselves while guests of Mr. Macdonald. The trustees also expressed their readiness to sell the house and about 8 or 9 acres of ground to the town, and intimated that a gift of 2,000*l.* would be handed over towards the purchase price. The Finance Committee of the Town Council, however, do not think Kepplestone House the best situation for the collection, which will no doubt be placed in the Art Gallery, School Hill, in the centre of the city, as originally intended by the donor. At the same time the Committee are not indisposed to acquire the ground, to which would be added part of the lands of Seafield, already the property of the Corporation, for the purpose of forming a public park.

THE IRISH GOLD ORNAMENTS, BRITISH MUSEUM.—In connexion with the question of restoring to Ireland certain gold ornaments now in the British Museum, about which some question has been raised in Parliament, the following resolution was unanimously passed at the ordinary meeting of the Society of Antiquaries at Burlington House on the 21st ult.:—"That the Society of Antiquaries of London, which takes a keen interest in all matters connected with the archæology of these islands, views with marked dissatisfaction the proposal to remove from the British Museum certain gold ornaments lately acquired from Ireland. The Society is of opinion that the cause of archæology will be best served by the retention of these interesting objects in the central museum of the Empire, where they are accessible to a greater number of students than would be the case elsewhere; while, as remains of the art of the Ancient Britons, and having only an accidental connexion with Ireland, these relics could be placed nowhere more appropriately than in the British Museum."

BUILDERS AND MUNICIPAL TRADING.—A meeting of the Executive of the Midland Federation of Master Builders and Employers in the building trade was held on the 26th ult. in Birmingham, for the purpose of considering what action should be taken to place before the Joint Committee of the Houses of Parliament appointed to consider and report as to the principles which should govern powers given to municipal and other local authorities for industrial enterprise information and evidence against such bodies undertaking work which should legitimately belong to builders and contractors. Mr. James Wright (Nottingham) presided. On the motion of County Alderman Bowen (Birmingham), seconded by Mr. J. Herbert (Wolverhampton), representatives were appointed on a Committee of the National Association of Master Builders for the purpose of selecting witnesses to give evidence before the Parliamentary Committee especially with reference to the interests of builders and contractors in the provinces.—On the proposition of the Chairman, seconded by Mr. James V. Porter (Derby), the following resolution was unanimously carried:—"That this meeting of the Midland Federation of Building Trades Employers, whilst recognising the wisdom of Parliament giving full powers to municipal and other local governing bodies to conduct the public affairs within the area of their jurisdiction for the benefit of the ratepayers, emphatically objects to powers being given by Bills and provisional orders enabling Local Authorities to undertake trading such as would seriously affect the legitimate interests and rights of builders and contractors in the country, believing that the same would not only be detrimental to a large and important section of the rate paying community, but would lead to waste of public money and other abuses." The Chairman and Mr. John J. Moffatt (Birmingham) were elected to represent the Federation on the Committee of the National Association.

REFUSE DESTRUCTOR AND ELECTRIC LIGHTING SCHEME, SOUTHPORT.—On the 28th ult. Colonel A. J. Hepper, R.E., attended at the Southport Town Hall to inquire on behalf of the Local Government Board into an application by the Town Council for power to borrow 13,000*l.* for the purpose of providing a refuse destructor on the gasworks estate, and also 9,200*l.* for the purposes of electric light. The application in regard to the destructor was first taken. It was stated that there were 20,000 tons of dry ashpit refuse to be disposed of annually, and great difficulty had been experienced in getting rid of it. It was proposed to put in one of Horsfall's six-cell destructors, which, with forced draught and 1-in. water pressure, would dispose of sixty tons per day. The site was part of the gas estate, and it was proposed to utilise the heat for purposes connected with the estate. Evidence was given by the Borough Surveyor, Mr. R. P. Hirst, and the Electrical Engineer, Mr. C. D. Taite.

THE SANITARY INSTITUTE.—At an examination in practical sanitary science, held in Edinburgh on June 8 and 9, one candidate presented himself, Mr. Marmaduke T. Wilson, to whom a certificate was granted.

CARDIFF NEW TOWN HALL.—A meeting of the Cardiff Town Hall Committee was held at the Town Hall on Monday. The Town Clerk explained that the meeting had been called with a view of inserting in the contracts the names of two gentlemen to be nominated by that Committee to settle any disputes that may arise in reference to the Town Hall and Law Courts contracts. The following gentlemen were appointed:—Mr. E. A. Gruning, Old Broad-street; and Mr. H. T. Steward (Hunt & Steward), Parliament-street.

CAPITAL AND LABOUR.

BRISTOL BUILDING TRADE WAGES.—For some time negotiations have been proceeding between the Bristol Master Builders' Association and the carpenters, joiners, masons, bricklayers, plumbers, painters, and labourers with respect to a demand for increased wages. An agreement has been made to sign revised rules, and the masters have conceded an advance of wages. The new rules are signed by the President of the Association (Mr. George Humphreys) and the Secretary (Mr. H. J. Spear); by Messrs. H. Brabham and J. C. Fox (labourers); E. H. Jarvis and Jno. Hocking (carpenters and joiners); E. Jolly and C. Creame (plumbers); B. Llewellyn Hardwicke and Walter Wilkins (masons); and F. F. Clothier and T. W. Davis (painters).

ARBROATH MASONS' WAGES.—A meeting of the Arbroath operative masons was held recently, when the question of the current year's rate of wages came up for consideration. A month ago this matter was before the operative masons, but it was adjourned. At the meeting, a proposal was submitted from the masters offering to continue the present rate of wages, namely, 8½d. per hour. The condition attached was that the masters will not sign the annual by-law for the year. An alternative was also submitted to the effect that if the men would consent to the reduction of ½d. per hour the masters would sign the by-law. Failing the acceptance of these proposals, the masters suggested that arbitration should be agreed to. The proposal has been considered by the men, and it was agreed to accept the ½d. per hour reduction, so that the by-laws would be signed by the masters. Therefore the wages for the operative masons are now 8d. per hour.

PERTH JOINERS' DISPUTE.—On the 29th ult. a mass meeting of the Perth operative joiners was held in the Foresters' Hall, when the situation in regard to the proposed reduction of the wages by the masters was discussed at some length. The men gave way in regard to one or two points in the by-laws, and the masters stated that as trade had become somewhat brisker since April they had decided not to reduce the wages, so that the men will continue work at the old rate of remuneration. The present agreement holds good till April, 1901.

PAISLEY MASONS' DISPUTE.—As a result of a compromise between the operative and master masons of Paisley, the threatened strike has been averted The masters have withdrawn their proposed reduction of the men's wages from 9½d. to 8½., and the men have withdrawn their restrictions holding the masters to employ only six apprentices each.

LEGAL.

APPEAL UNDER THE WORKMEN'S COMPENSATION ACT.

THE case of W. Pattison & Sons (applicants) *v.* Trees Stevenson (respondent) came before the Court of Appeal composed of Lords Justices A. L. Smith, Vaughan Williams, and Romer on the 30th ult. on the appeal of the masters from the decision of the County Court judge of Marylebone.

Mr. Ruegg, Q.C. (with him Mr. Duckworth) said the question to be decided raised an important one from the masters' point of view, and turned upon Clause 13 of the 1st Schedule to the Act, by which the master could apply to have the weekly payments which he had been ordered to make to a workman for compensation reviewed, so that they could be capitalised for a lump sum. The facts were these. The man injured was a builder's foreman, and in December, 1898, while in the employment of the applicants, met with a serious injury—fracture of the ankle. The liability of the masters was admitted, and by agreement, without any interference by the court, the employers paid him 1*l.* a week, which was the maximum sum which could be awarded under the Act. That payment continued for over a year, and by that time, in the opinion of the employers, the man had to a great extent recovered. The man, however, suffered some permanent injury, there being a slight shortening of one leg, which prevented him from doing certain kinds of work. In these circumstances the employers made the present application to the County Court judge for a lump sum to be fixed as compensation, they contending that the man injured was capable of doing some kind of work. The County Court judge asked how much it would cost to buy the man an annuity of 1*l.* a week, and he was told 750*l.* The County Court judge said he should deduct something because there might be a chance of the man being able in the future to do some kind of work, and fixed the amount of compensation at the lump sum of 600*l.* The applicants now appealed from this award, contending that the learned County Court judge had assessed the damages on a wrong principle, and had not taken into account the chance of the man being able in the future to do the same kind of work as heretofore.

Mr. Lewis Thomas opposed the appeal, and said the man's wages before the accident were 2*l.* 12s. a week.

In the result their Lordships held there was no point of law involved in the application, and dismissed the appeal with costs.

ARCHITECT'S ACTION FOR FEES.

THE case of Phipps & Jackson *v.* Brownrigg came before Mr. Justice Ridley in the Queen's Bench Division on the 2nd inst.—an action by the plaintiffs, Mrs. Phipps, executrix of Mr. C. J. Phipps, and Mr. Arthur Blomfield Jackson, who had carried on partnership with Mr. Phipps, against the late Sir Henry Brownrigg, who had died since the action was commenced, for 520*l.* for work and labour done incidental to the preparation of plans and drawings for a proposed theatre in Norris-street, Haymarket, and alternatively for damages in consequence of the defendant's failure to get the plans approved of by the London County Council. The plaintiffs' case was that in December, 1896, C. J. Phipps & Co. were instructed to prepare the plans for the construction of the theatre at a cost not exceeding 20,000*l.*, they to be paid the usual fees, subject to the plans being approved by the London County Council. The plans were prepared, but after the Theatres Committee of the Council had approved of them an objection was raised in the Council on the ground that the street was not widened, and in the result a previous approval of the site was rescinded. The plaintiffs' contention was that the failure to pass the plans was due to the neglect of the defendant to provide a proper site on which the building could be carried out, though the plans themselves were strictly in accordance with the Council's regulations.

For the defendant it was contended that the approval of the plans was inseparable from that of the area on which they were to be carried out, and that as the site had not been approved, it could not be said that the plans had been approved. Further, that, owing to the objection to the site, the plans

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themselves, though approved of by the Theatres Committee, had not in fact been approved of by the County Council.

Mr. Justice Ridley, in giving judgment, said that the action of the County Council in rescinding their approval of the site had prevented the question of the approval of the plans coming before the Council. He therefore reluctantly gave judgment for the defendant, but without costs. His Lordship expressed the opinion that some satisfaction should have been given.

Mr. Tindal Atkinson, Q.C., and Mr. Emanuel represented the plaintiffs, and Mr. Lawson Walton and Mr. Cranstoun the defendant.

EMPLOYERS' LIABILITY ACT.

TRESTLES AS A SAFE AND PROPER SCAFFOLD.

At Marylebone County Court on Monday, before Judge Stonor and a jury, R. J. Trenear, a carpenter, living at Paddington, sought to recover damages under the Employers' Liability Act from Messrs. Martin Wells & Co., builders, Auckland-street, Vauxhall, S.W., the claim being on account of personal injuries said to have been sustained by the plaintiff through negligence for which the defendants were responsible.

Mr. Chester Jones was counsel for the plaintiff, and Mr. H. M. Giveen, counsel, defended.

Mr. Chester Jones said that on November 22 last the plaintiff was engaged by the defendants upon building works at the new Bedford Hotel, Russell-square, W. Plaintiff was instructed by the deputy-foreman, Cripps, to fix a portion of the roof ridge. The man asked for some kind of a scaffold to be erected from the upper floor, but was only supplied with a pair of trestles. Upon these trestles the plaintiff was standing fixing the first two rafters to the ridge, while a labourer, standing upon the top of some "sheer-legs," supported the other end of the ridge. Suddenly the ridge fell, knocking the plaintiff on to the floor beneath. He sustained injuries to his head, and broke one of his ribs and injured several others. For eleven weeks he was unable to do any work, but during this time the defendants paid him half his usual wages. The special damages, subject to the defendants' liability, were agreed upon at 15*l*.

The plaintiff bore out his counsel's opening statement. He added that when the trestles were brought to him instead of boards, with which to put up a small scaffold, he said to the deputy-foreman, "I don't think that will be quite safe for the job," but the foreman replied, "Oh, that's all right," and held the trestles a few minutes for him.

Cross-examined: It was true that two or three days after the accident he wrote to the defendants as follows:—"I was unfortunate to meet with an accident. . . . I shall be extremely obliged if you will let me know what compensation you will allow me." He had never suggested to the firm that the accident was caused through negligence for which they were responsible. His application as above was intended to be made under the Workmen's Compensation Act.

Several other carpenters and labourers gave evidence generally supporting the plaintiff's case.

Counsel for the defence submitted that he had no case to meet, for the plaintiff had claimed under the Workmen's Compensation Act, and having been paid all that he was entitled to under that Act, he could not claim under the Employers' Liability Act.

The Judge: The construction to be put upon this letter is an important matter.

Counsel for the defence urged that the question was not so much one of documents as of intention. The plaintiff admitted that his intention was to claim under the Compensation Act, and the defendants had paid him under that Act.

Counsel for plaintiff maintained that the sums paid by the defendants were not payments under the Compensation Act, for there was no proper agreement between the parties for settlement under that Act.

The Judge: This point requires consideration, but I think that the case must go on.

William Cripps, the deputy-foreman on the job, was then called. He said that the plaintiff at the time of the accident was working upon boards supported by the trestles. Witness did not tell the plaintiff to use the trestles alone. The man did not suggest that there was anything unsafe in connexion with his work.

William C. Carrell, head foreman on the job, said the trestles with boards upon them would form a proper scaffold for fixing the ridge.

Other evidence was given, mainly to the effect that plaintiff had boards as well as trestles to work upon at the time that the ridge fell.

The jury found in favour of the plaintiff, and assessed the damages at 15*l*.

His Honour gave judgment accordingly, allowing costs.

AN ARCHITECT'S DUTY.

In the City of London Court on the 28th ult. Mr. H. H. Collins, architect, Old Broad-street, made a claim for 42*l*. 18*s*. for professional services rendered to the defendant, Mr. W. G. Fernley, 2, Crutched-friars. Mr. Ellis Griffiths, M.P., appeared for the plaintiff, and Mr. Penry Oliver for the defendant. The defendant was the freeholder of some premises at Wapping, which he purchased in 1897 at a cost of about 1,500*l*. Certain notices were served upon him by the London County Council under the Dangerous Structures Clauses Act, and the plaintiff was employed to attend to the defendant's interests in connexion with the property. He had sued for his fees, and it had been found that the amount was not in dispute. The defendant now objected to pay the fees, alleging that the plaintiff had been guilty of negligence in his capacity as a surveyor. Legal proceedings, he said, had to be taken about the light and air of the premises, and it was said to have been diminished. In spite of that the plaintiff did not attend as he should have done to the defendant's best interests. The plaintiff did not take proper measurements of the buildings which interfered with the defendant, and he did not qualify himself for the duties which he had to perform. The Deputy Judge, without calling on Mr. Collins to answer the defendant's assertions, said he could not see any case to reply to. The jury were of the same opinion, and judgment was entered for the plaintiff, with costs.—*City Press.*

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

4,472.—KILNS FOR BURNING BRICKS, TILES, &c.: *I. Baumann and M. Baumann.*—To provide for the adoption of widened chambers in annular kilns, and for the maintenance of a uniform and effective amount of heat, the central and outer walls are alike formed with branch flues whereof each jet is separately joined to the chimney; the branch flues are disposed in such an order that they shall not be opposite the one to the other, whilst each of them is provided with a separate damper.

4,520.—A POLISH FOR WOOD: *C. W. Luther.*—The polish is prepared from resin which is very finely pulverised and then exposed to the atmosphere during an interval of from one to three years, or it may be made into a paste which is dried and sifted, and its powder is heated during some weeks at a temperature of from 40 deg. to 60 deg. C.; by these processes the essential oils of the resin become converted into resin. The product is then finally dissolved in alcohol, together with a small quantity of ether; pumice-stone and oil are sparingly applied to the surface of the wood when its pores have become impregnated with the polish.

4,607.—GRABS: *W. H. O'Hara.*—The grabs are placed side by side so that in each case an equal dumping distance between the inclined shoot and the grab shall be obtained. In cases where the jibs are arranged, step-wise, at different heights, the grab-carriages run upon rails fitted to the braced jibs, whilst stop-blocks, pins, or chains which can be adjusted for altering the grab's position, restrict the carriage's motion downwards upon the rail. The grab is worked by closing it upon the soil by haulage upon the cable, the pull being continued until the grab is lifted above the shoot, and the grab being raised until it reaches the carriage, which, together with the grab, is then pulled up the rails. When the jibs are at the same height the varying lengths of the suspending heads are so arranged as to give an equal distance between the shoot and the grab, when the latter is in a position for being emptied.

4,671.—BRICKS FOR CHIMNEY-BUILDING: *J. Wingender.*—The bricks are fashioned in an especial shape that they may serve for being built into a wall so as to form a stove-pipe within a surrounding air-space; they have openings for taking the metal stove-pipe and for securing ventilation into the air-space, together with holes and grooves for cement, or they are made hollow without the inner section for the stove-pipe which is to be raised up within them.

4,681.—MACHINES FOR SWEEPING ROADS: *G. C. Freeman.*—On the casing of the elevator is fixed a pan into which the sweepings are turned by the brush which is set obliquely; the elevator presents a range of flat brushes or discs which are mounted upon endless chains, and the wheels of the carriage drive both the brush and the elevator; provision is made for discharge of the sweepings into a cart at the front.

4,708.—CLEANSING OF SOIL-PIPES: *E. Helme.*—The operation is to be effected more readily when the pipes have been fitted at the several floor-levels with branch pipes into which brushes can be inserted; for each branch is provided also an inner cap fastened with a washer, a plate, and screws, an outer cap being secured to the tapped plate by the engagement of a screw.

4,736.—FLOORS AND CEILINGS: *G. Badin.*—The ceilings are built up of slabs or tiles, and the floors of interlocking blocks or bricks, the tiles and bricks being fashioned with grooves and ribs upon their sides, and laid upon the girder's upper and lower flanges in such a manner as to break joint.

4,766.—WINDOWS AND SASHES: *H. Niederländer.*—A slide sustains the bottom sash, which is caused to slide through the sill; the sashes can be removed from the frame by making the lower portions of the inside beads removable; the upper sash, which is narrower than the lower one, slides in guides which are cut away at the frame's lower portion in order that the sash may be taken out of the frame; for excluding the weather a strip is hinged on to a cross-bar at the meeting-rails, and is to be turned upwards when the sash is lifted; for prevention of draughts a hollow beading is attached to the outer sill and has channels for the flow of moisture down the sill.

4,797.—A SAWING MACHINE: *G. E. Schlegelmilch and F. A. Mann.*—The machine is ring-shaped, and has its teeth set within. Upon the end of a radial arm is mounted an annular sprocket-wheel, on to which the saw is bolted; the arm is forced downwards by means of a weight, which is joined to it with a cord that passes over pulleys, and a pitch-chain from another sprocket-wheel drives the wheel which carries the saw.

4,813-4.—MANUFACTURE OF PORTLAND CEMENT: *L. White.*—The slurry is mixed with powdered fuel, and the admixture is dried and burned in a rotary-furnace; by the latter process a hopper feeds the wet slurry into the drying-furnace, whence a chute passes it to the calcining-furnace, from which it is passed through a pipe within a flue; a blast of flame from gas and air pipes heats to a high temperature the furnace wherein the calcined cement becomes clinkered; flues and an upper subsidiary furnace convey the cooling products of combustion away from the lower furnace to the chimney; a pipe serves to draw off carbonic acid, and passes it through heated fuel for its conversion into carbonic oxide which is used in the clinkering-furnace.

4,817.—AN APPLIANCE FOR MEASURING LENGTH: *J. L. Brown.*—The instrument is devised for measuring lengths and for indicating certain fractions say one-half and one-third, of the lengths at the same time. The frame contains three graduated sliding-rules which are geared together by means of pinions and racks upon a spindle in such a manner that the first rule shall move twice as fast as the second moves and thrice as fast as the third moves; if, then, any length is measured by the first rule, the second and third rules will give readings of one-half and one-third of that length respectively.

4,874.—PARTITIONS, &c., FOR ROOMS AND SIMILAR PURPOSES: *H. Whiteley.*—Leaves are hinged together so that they can be folded against the side of the room; brackets upon the end leaf hold a vertical spindle upon which a bracket swivels, the leaf being hung from a rail by means of a roller mounted upon the bracket; the spindle also carries pinions that gear with fixed racks; rollers, in swivelling brackets and guided by runners and forks, support the other leaves of the partition; in another shape of the contrivance the racks extend from one end to the other of the room, the leaves being separately mounted and provided apiece with pinions and a spindle.

4,928.—BRAKES FOR LIFTS: *R. F. Carey.*—The inventor provides means for an automatical support of the load when the power is stopped; he passes the rope around a pulley which is keyed loosely upon the driving-shaft upon which latter also is keyed loosely an eccentric that operates within a strap with a side-pin that moves freely in a fixed slot; the strap fits within an eccentrical recess in the pulley's face; upon removal of the power the pulley turns to a small extent in respect of the eccentric and so becomes jammed upon the strap, but when power is again employed, for either lifting or lowering purposes, the eccentrical recess in the pulley and the eccentric become registered, whereupon the strap is set free to rise or fall by the eccentric's action.

5,029.—JOINTING OF METAL TUBES: *J. Grouvelle and H. Arquembourg.*—The contrivance extends to flange-joints and union or sleeve joints for ductile metal pipes and tubes; the ends of the pipes are expanded, flanges or unions with rounded shoulders that abut against the backs of the lips are applied, and washers made of hard metal or alloy and having concaved faces to take the rounded lips of the expanded ends are placed between them; separate rings with rounded shoulders are also used, and for preventing horizontal displacement annular edges are fashioned upon the flanges.

5,030.—APPARATUS FOR ELECTRICAL LIFTS: *A. E. Maccoun.*—For automatically reducing the cage's rate of speed as it reaches its journey's end a cam upon a shaft which is geared to the winding-drum engages with a pin upon a lever which by means of a set of levers and links works a sliding contact, and thereby automatically effects an increasing resistance in the motor-circuit so as to reduce the cage's rate of ascent or descent; an electro-magnet is put into series with the motor, its armature being linked to a switch which short-circuits a part of the resistance when the switch is closed, and a spring bears upon the switch in opposition to the electro-magnet; in order to prevent the cage, when heavily loaded, from stopping too soon, it is contrived that the current shall hold up the magnet and so keep the switch closed for a little, but a longer time than usual; as the cage draws near to its either end of travel, the cut-out switch—that may be turned at any moment by the hand—is automatically moved by means of a traversing nut upon a screwed shaft which is geared up to the winding-drum.

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MEETINGS.

SATURDAY, JULY 7.

People's Palace Architectural Society. — Visit to Metropolitan Fire Brigade Station, Southwark Bridge-road, S.E., at 3 p.m.

Northern Architectural Association. — Annual Excursion. Members to assemble at the Central Station, Newcastle, at 9.20 a.m., and to obtain railway tickets from Newcastle to Leyburn. After lunch (upon arrival at Leyburn at 11.36 a.m.), the following places will be visited:—Spennithorne, Jervaulx, and Middleham. The party will dine at Leyburn, at 6.15 p.m.

WEDNESDAY, JULY 11.

Institute of Sanitary Engineers (Incorporated).—General Purposes and Finance Committee at 3.30 p.m. Election Committee at 5 p.m.

FRIDAY, JULY 13.

Architectural Association of Ireland.—Annual Excursion, Kilkenny.

SATURDAY, JULY 14.

Architectural Association.—Third summer visit, to Mr. C. E. Kempe's house (Old Place, Lindfield), and Cuckfield Park.

British Institute of Certified Carpenters.—Visit to Royal Naval College, Greenwich. Boat at Old Swan Pier, 3.30 p.m., London Bridge.

Architectural Association of Ireland.—Annual excursion (concluded). A visit will be paid to Jupoint Abbey, about fifteen miles distant.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

June 18.—By MORRIS & PLACE (at Sutton-in-Ashfield).

Skegby, &c.—Notts.—Enclosures of land, also a farmhouse, 95 a. 2 r. 28 p., f. and c. (in lots).. £9,537
Mansfield, Notts.—Belvidere-st., "The Midland Arms" Inn, area 240 yards, c. 3,000

June 20.—By FOSTER & CRANFIELD.

Tooting.—9, Albert-ter., u.t. 67 yrs., g.r. 3s. 235
Leyton.—Lea Bridge-rd., Meadow Lodge and 1 a. 0 r. 22 p., f. 1,550
Enfield.—Byculiah Park, Boldrewood and 1¼ a., f., r. 136*l.* 10s. 3,050

By FULLER, MOON, & FULLER.

Rotherfield, Sussex.—Holly Grove Farm, 66 a. 2 r. 15 p., f. 2,575
Chaldon, Surrey.—Main rd., a plot of land, 1 a. 3 r. 2 p., f. 175

By RUSHWORTH & STEVENS.

Leytonstone.—19, Wallwood-rd., u.t. 78¼ yrs., g.r. 6*l.* 6s., r. 36*l.* 305

By R. ELLIS & SON.

Stepney.—Carr-st., &c., c.g.r.s' 26*l.* 0s. 6d., reversions in 12 and 13 yrs. 2,850
Rhodeswell-rd., "The Vulcan" b.-h., &c., c.g.r. 9*l.*, reversions in 12 and 13 yrs. 2,500
Rhodeswell-rd., c.g.r.'s 9*l.* 15s., reversion in 12 yrs. 455
Galt-st., c.g.r.'s 14*l.*, reversion in 14 yrs. 900
Galt-st., f.g.r. 5*l.*, reversion in 14 yrs. 1,000
Rhodeswell-rd., f.g.r. 5*l.*, reversion in 13 yrs. .. 270

By H. DUKE & SON (at Bridport).

Symondsbury, &c., Dorset.—The Symondsbury Estate, 577 acres, f. 17,600

By A. DOWELL (at Edinburgh).

Alvah, Banff.—The Estate of Inverichnie, 920 acres 20,150

By MORETON RICHES (at Battersea).

Putney.—5 to 8, Floss-st., u.t. 75 yrs., g.r. 20*l.* .. 650
Fulham.—34, Townmead-rd., u.t. 95 yrs., g.r. 6*l.* 15s., r. 40*l.* 375
Wandsworth.—72, Allfarthing-lane, f., e.r. 40*l.* .. 525

By J. T. PEAT (at Redhill).

Redhill, Surrey.—Cromwell-rd., business premises with slaughter-house, u.t. 63 yrs., g.r. nil.... 610
21, 23, and 25, Mill-st., u.t. 64 yrs., g.r. 7*l.* 10s. 350
7 and 9, St. John's, f. 450
9 to 15 (odd), Linkfield-st., f. 1,025
Horley, Surrey.—West and East Cottages, f. 300

By W. J. PIERCE & THORPE (at Daventry).

Hellidon, Northants.—Attlefield and Spinney Farms, 179 a. 0 r. 20 p., f. 5,600
Two freehold farms, 169 a. 1 r. 11 p. 2,975
A farmhouse and residence adjoining, f. 605

June 21.—By R. C. S. EVENNETT.

Witley, Surrey.—Mervel Hill, and 5 a. 3 r. 7 p., f. 5,050

By HUNTER & HUNTER.

Lewisham.—Lewisham-rd., i.g.r. 29*l.*, u.t. 62 yrs., g.r. nil 550
Fulham.—Munster-rd., f.g.r. 18*l.*, reversion in 94 yrs. 450

By JENKINS & SONS.

Brockley.—2, Suffolk-villas, u.t. 72 yrs., g.r. 9*l.*, e.r. 60*l.* 800
34, Wickham-rd., u.t. 82 yrs., g.r. 18*l.* 1,050
Stoke Newington.—6, Cowper-rd., u.t. 56 yrs., g.r. 6*l.*, r. 52*l.* 345
New Cross.—77 to 83 (odd), Lewisham High-rd., u.t. 29 yrs., g.r. 23*l.* 2s., r. 184*l.* 1,265

By ALFRED SQUIRE.

Crouch End.—16, Palace-rd., u.t. 58½ yrs., g.r. 8*l.*, e.r. 40*l.* 380

By RICHARD TEMPLE.

Hammersmith.—Norfolk-st., f.g.r. 24*l.*, reversion in 65 yrs. 600

By H. J. BLISS & SONS.

Mile End.—53 to 59 (odd), Emmott-st., u.t. 70 yrs., g.r. 15*l.* 10s. 1,080
78 to 84 (even), Harford-st., u.t. 63 yrs., g.r. 20*l.* 1,120
22 to 26, Cordova-rd., u.t. 48¼ yrs., g.r. 18*l.* 17s. 6d. 980
Stepney.—14, Walker-st., u.t. 63 yrs., g.r. 3*l.* 10s. 245
11, St. Dunstan's-rd., u.t. 49 yrs., g.r. 3*l.* 10s... 185
Leytonstone.—100, Colworth-rd., u.t. 68 yrs., g.r., 4*l.* 215
Bethnal Green.—80 and 82, Seabright-st., u.t. 17 yrs., g.r. 5*l.* 180
Poplar.—Bygrove-st., &c., i.g.r. 31*l.*, u.t. 28 yrs., g.r. 14*l.* 200

By FAREBROTHER, ELLIS, & Co.

Rugby, Warwick.—Church-st., The Moat and 8 a., f. £16,000
Byfleet, Surrey. — A freehold cottage and 0 a. 1 r. 0 p. 330
Hyde-pk.—1, Stanhope-st. and 11, Sussex Mews West, u.t. 34½ yrs., g.r. 20*l.*, r. 370*l.* 3,825

By C. C. & T. MOORE.

Spitalfields.—67 and 69, Commercial-st., 4, Shepherd-st.; and Shepherd-st. Buildings, u.t. 60 yrs., g.r. 240*l.* 2,820
Bow.—240 to 250 (even), Roman-rd., f., r. 285*l.* .. 4,610
Commercial-rd.—9, George-st., f. 300
Limehouse.—51, Salmon-lane, c., r. 35*l.* 370
Canning Town.—99 to 105 (odd), Forty Acre-lane, u.t. 67½ yrs., g.r. 15*l.* 10s. 425

By NEWBON, EDWARDS, & Co.

Highbury.—130, 146, 152, 156 to 176 (even), Drayton Park, u.t. 76 yrs., g.r. 89*l.* 10s., r. 483*l.* 5s. 6d. (in lots) 4,250
Paddington.—Shirland-rd., i.g.r. 107*l.* 6s., u.t. 63 yrs., g.r. 2*l.* 2,130
Caledonian-rd.—No. 304, u.t. 44 yrs., g.r. 5*l.*, r. 55*l.* 545
Holloway. — Andover-rd., &c., f.g.r.'s. 33*l.* 16s., reversion in 57 yrs. 795

By STIMSON & SONS.

Rotherhithe.—42 and 44, Union-rd., u.t. 15½ yrs., g.r. 7*l.* 10s., r. 76*l.* 300
Hackney.—239, Amhurst-rd., u.t. 64½ yrs., g.r. 7*l.* 7s., r. 52*l.* 630
Muswell Hill.—Main-rd., The Shrubberies, u.t. 59 yrs., g.r. 8*l.* 1,250
Old Kent Road.—26, Smyrks-rd., u.t. 19½ yrs., g.r. 9s. 140
69, Ormeside-st., f., e.r. 35*l.* 430
73, Ormeside-st., u.t. 65 yrs., g.r. 4*l.* 215
103, Ormeside-st., f. 340
Tooting.—11, Ross-ter., u.t. 96½ yrs., g.r. 6*l.*, e.r. 35*l.* 250
Clapham.—53, 57, and 59, Solon New-rd., u.t. 78½ yrs., g.r. 19*l.* 10s. 905
Blackfriars.—24, Brunswick-st., u.t. 19 yrs., g.r. 10*l.* 190
Kingston-on-Thames.—Mill-st., "The Swan" b.-h., f., r. 40*l.* 1,350
61, 63, and 65, Mill-st., f. 440

By WILSON & PHILLIPS (at Rochford).

Great Wakering, Essex. — Two cottages and Golden Acre and Hills House Field, 24 a. 2 r. 22 p., f. 1,000
Barling, Essex.—The Bolts, and 3 a. 2 r. 35 p., f. 400
A freehold farm and four cottages, 26 a. 1 r.... 1,000

By W. T. HALL (at Baschurch).

Weston Lullingfields, Salop.—Four fields, 55 a. 1 r. 6 p., f. 2,200

By G. E. SWORDER & SONS (at Bishops Stortford).

Much Hadham, Herts.—The Hill Farm, 159 a. 1 r. 13 p., f. 3,000
Grudd's Farm, 72 a. 1 r. 38 p., f. 800
Two Cottages and Windmill Field, 7 a. 3 r. 36 p., f. 480
Several enclosures, 28 a. 2 r. 20 p., f. 740
Woodside Cottages, and 0 a. 1 r. 8 p., f. 150
Bishop's Stortford, Herts.—1 & 2, River Maltings, area 1 a. 0 r. 1 p., f. 5,000

June 22.—BRADSHAW, BROWN, & Co.

Poplar.—Bridge-rd., freehold engineering premises, r. 80*l.* 1,500
1, 2, and 3, Emmett-pl., f. 900
79, 81, 85, and 87, Glengall-rd., u.t. 43¾ yrs., g.r. 12*l.* 910
29 and 31, Glengall-rd., u.t. 62 yrs., g.r. 7*l.* 595
Cubitt Town.—145 and 147, Manchester-rd., u.t. 50¾ yrs., g.r. 10*l.* 250
Millwall.—48, Mellish-st., u.t. 58½ yrs., g.r. 2*l.* 15s. 265
Ferry-st., freehold waterside premises 1,500

By C. H. BROWN.

Pimlico.—3, Charlwood-st., u.t. 26 yrs., g.r. 6*l.*, e.r. 52*l.* 400

By BUNCH & DUKE.

Mill Hill.—Shakespeare-rd., four plots of land, f. 135

By H. DONALDSON & SON.

Holloway.—33, Hertslet-rd., u.t. 42 yrs., g.r. 6*l.* 6s., e.r. 45*l.* 450
Dalston.—180, Richmond-rd., u.t. 40 yrs., g.r. 4*l.* 7s. 6d., e.r. 65*l.* 590

By DOLMAN & PEARCE.

Hampstead.—20, Provost-rd., u.t. 47 yrs., g.r. 8*l.* 750

By W. HOLLIS.

Finchley. — Regent's Park-rd., Engadine, f., e.r. 70*l.* 1,100

By MABBETT & EDGE.

Islington.—88, High-st., f., e.r. 80*l.* 1,100

By S. WALKER & SON.

Norwood.—19 to 25 (odd), Farquhar-rd., u.t. 60 yrs., g.r. 4*l.* 1,675

By G. RAVENSHEAR.

Ealing.—64 and 65, The Broadway, f., r. 164*l.* .. 7,800
5 and 7, Marlborough-rd, f., r. 93*l.* 1,375
Kilburn.—12, Malvern-rd., u.t. 62 yrs., g.r. 8*l.* 4s., r. 75*l.* 1,000
5 and 7, Chippenham-gdns., f., r. 60*l.* 900
Notting Hill.—19 and 21, Bramley-rd., u.t. 65 yrs., g.r. 11*l.* 10s., r. £4*l.* 510

By A. J. SHEFFIELD.

Canning Town.—44 to 82 (even), Trinity-st., u.t. 75 yrs., g.r. 60*l.*, r. 572*l.* 4,005
Bow.—14 to 24, 34 to 40 (even), Blondin-st., u.t. 7 yrs., g.r. 20*l.*, r. 208*l.* 325
Walthamstow.—The Avenue, a freehold corner site 270
Old Ford.—16 and 17, Maverton-rd., u.t. 60 yrs., g.r. 7*l.* 450

By A. PREVOST & SON.

Mile End.—39, 41, and 43, Alderney-rd., u.t. 41 yrs., g.r. 10*l.* 14s. 6d. 1,025
Upton Park. — Green-st., a plot of building land, f. 120
West Ham.—23 to 33 (odd), Union-rd., u.t. 75 yrs., g.r. 30*l.* 950
Limehouse.—22 and 26, Aston-st., u.t. 26 yrs., g.r. 6*l.* 10s. 390
43, Brenton-st., u.t. 44 yrs., g.r. 6*l.* 200
Shadwell.—44, St. George-st., f., r. 52*l.* 555
Islington.—11, Oxford-rd., u.t. 26 yrs., g.r. 2*l.* 5s., r. 24*l.* 155
Kingsland.—307 to 313 (odd), Kingsland-rd., u.t. 17 yrs., g.r. 15*l.*, r. 138*l.* 540
Whitechapel.—23, Newnham-st., u.t. 29 yrs., g.r. 3*l.* 5s. 365
Commercial-rd. East.—21 and 23, Grove-st., f. .. £830
Whitechapel.—149, Whitechapel-rd., u.t. 39 yrs., g.r. 70*l.*, r. 110*l.* 370
Mile End.—1 and 3, White Horse-lane, u.t. 64 yrs., g.r. 10*l.* 600
14, 22, 23 and 24, Rectory-sq., u.t. 63 yrs., g.r. 18*l.*, r. 120*l.* 1,520
1 to 19 (odd), Lemon's-ter., and 3, 4 and 5, Hayfield-passage, u.t. 38 yrs., g.r. 36*l.* 10s. 3,620
47, 53 and 55, St. Peter's-rd., and 55, Willow-st., u.t. 30 yrs., g.r. 12*l.* 16s. 1,350
92 and 94, Maplin-st., f. 550

By CUMBERLAND & SONS (at Derby).

Yeaveley, Derby. — Gravelley Bank Farm, 110 a. 2 r. 24 p., f. 4,250
Osleston, Derby.—A Freehold Farm, 40 a. 3 r. 19 p. 3,400

By J. M. LEEDER & SON (at Talgarth).

Bronllys, &c., Brecon. — Marish Farm, 86 a. 2 r. 22 p., f. 3,401

By BLACKFORD & SON (at Exeter).

Kingsnympton, &c., Devon.—Waddington Farm, 281 a. 0 r. 20 p., f. 3,050

By COTTON & CHAPPELL (at Redditch).

Feckenham, Worcester.—Middle Bean Hall Estate, 171 a. 0 r. 4 p., f. 3,250

June 23.—By SALTER, SIMPSON, & SONS (at Norwich).

Reedham, Norfolk.—The Reedham Hall Estate, 1,903 a. 2 r. 22 p., f. (in numerous lots) 44,990

June 25.—By C. RAWLEY CROSS & Co.

Brentford, Middlesex. — Windmill-rd., Windmill and Whitestile laundries, f., r. 104*l.* 1,070
Kensington.—72 to 80 (even), Addison-gdns., u.t. 94 yrs., g.r. 42*l.* 10s., r. 262*l.* 2,705

By G. F. HARRINGTON.

Bow.—37, Wellington-rd., u.t. 73 yrs., g.r. 3*l.* 10s. 200
Mile End.—8, Edwards-rd., u.t. 45 yrs., g.r. 4*l.* 10s. 190

By HENDRIKS & FOSTER.

Wembley, Middlesex. — East-lane, The Woodlands, f., r. 30*l.* 445
Barnes.—90, Castelnau Villas, u.t. 24 yrs., g.r. 10*l.*, r. 50*l.* 300

By G. B. HILLIARD & SON.

Great Dunmow, Essex.—Toolies Farm, 155 a. 0 r. 14 p., f. 1,550

By WEATHERALL & GREEN.

Notting Hill.—84 and 86, Bramley-rd., u.t. 64 yrs., g.r. 12*l.* 16s. 425

By WILKINSON, SON, & WELCH (at Brighton).

Hove, Sussex.—23, Brunswick-sq., f., r. 160*l.* 2,500
2, Brunswick-pl., f., r. 120*l.* 1,700

June 26.—By DRIVERS, JONAS, & Co.

Stoke Prior, Hereford.—House, smithy, and 2 r. 20 p., f. 255

By JONES, SON, & DAY.

Stepney.—57, White Horse-st., f., r. 30*l.* 650
Canning Town.—200, Barking-rd., and plot of land, f., r. 32*l.* 610
Poplar.—16, Emmett-st., f. 325

By ALFRED RICHARDS.

Enfield Highway.—Carterhatch-lane, four blocks of building land, f., 27 a. 1 r. 7 p. 3,980
Hoe-lane, enclosures of land, 14 a. 0 r. 10 p., f. and c. 2,300
London-rd., Home Farm Nurseries, 13 a. 3 r. 17 p., f. 4,200
Brimsdown, a block of land, 6 a. 0 r. 8 p., f. 1,300

By FIELD & SONS.

Wapping.—High-st., Seward's Upper Wharf, u.t. 75½ yrs., g.r. 150*l.* 7,000
Dulwich.—24, 26, and 28, Underhill-rd., f., r. 156*l.* 1,960
Hackney.—4 to 14 (even), Brunswick-st., area 6,300 ft., f. 2,600
16 to 22 (even), Brunswick-st.; 33, Dunloe-st.; 17, 19, and 21, Scawfell-st., area 8,100 ft., f... 3,280
Southwark.—Mermaid-court, a plot of land, area 11,900 ft., f. 3,000
Mermaid-court, f.g.r. 21*l.*, reversion in 10 yrs... 1,210

By F. SLADDEN.

Fulham.—109, Fulham-rd., u.t. 63 yrs., g.r. 6*l.*, r. 100*l.* 300
South Kensington.—54 and 56, Finborough-road, u.t. 62½ yrs., g.r. 20*l.*, r. 105*l.* 795

By C. SPARROW & SON.

Finchley.—Long Lane, a plot of land with a mission room, &c., thereon, f. 175

By WESTON & SONS.

Streatham.—20, 22, and 24, Wellfield-rd., u.t. 63 yrs., g.r. 15*l.* 720
Brixton.—150 and 157, Loughborough-rd., u.t. 22½ yrs., g.r. 5*l.* 5s., r. 76*l.* 520
2, Akerman-rd., u.t. 13¾ yrs., g.r. 3*l.* 6s. 6d., r. 40*l.* 200

By WILLIAM WESTON.

Paddington.—269, Harrow-rd., u.t. 47 yrs., g.r. 9*l.*, r. 110*l.* 1,650
450, Harrow-rd., u.t. 63 yrs., g.r. 10*l.*, r. 80*l.* 16s. 1,310
9, Marylands-rd., u.t. 62 yrs., g.r. 9*l.*, r. 55*l.* .. 580
6, 8, and 11, Rodborough-mews, u.t. 62 yrs., g.r. 10*l.* 10s. 890
Bayswater.—9, Celbridge-mews, u.t. 43 yrs., g.r. 5*l.*, r. 30*l.* 245

By JOHN KITTOW (at Launceston).

Lezant, Cornwall.—Larrick Estate, 116 a. 0 r. 15 p., f. 2,550

By WATERS & RAWLENCE (at Salisbury).

Shrewton, Wilts.—Old Bustard House, and 27 a. 1 r. 7 p., f. 720

By COTTON & CHAPPELL (at Bromsgrove).

Finstall, Worcester.—Crossbrook Cottage and 10 a. 2 r. 28 p., f. 2,070

By W. BROWN & Co. (at Amersham).

Chesham Bois, Bucks.—The Chestnuts and 8 a. 1 r. 25 p., f. 1,240
Three freehold cottages and 3 a. 1 r. 18 p. 370
Two freehold paddocks, 3 a. 1 r. 38 p. 500

June 26 and 27.—By PERCIVAL M. PUCKRIDGE (at Cannon-street Hotel and at Pewsey).

Wilcox, Wilts.—The Stowell Lodge Estates, 823 acres (in numerous lots), f. 20,653

June 27.—By ALDER & WRIGHT.

Norwood.—9, Highland-rd., u.t. 54 yrs., g.r. 22*l.* 10s., r. 110*l.* 850
12, Farquhar-rd., u.t. 37 yrs., g.r. 20*l.* 10s., r. 95*l.* 700
6, The Avenue, u.t. 37 yrs., g.r. 12*l.* 6s., r. 75*l.* 550

By G. BRINSLEY & SON.

Kennington.—14, 16, and 18, Montford-pl., c., r. 87*l.* 1,000
Walworth.—30 and 32, Liverpool-st., u.t. 8 yrs., g.r. 7*l.* 16s., r. 52*l.* 150
31, Lorrimore-rd., u.t. 44 yrs., g.r. 4*l.*, r. 32*l.* .. 410

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Camberwell.—151, Coldharbour-lane, u.t. 41½ yrs., g.r. 5l., r. 42l. £360
Walworth.—4, Cavour-st., u.t. 43 yrs., g.r. 5l., r. 32l. 345

By DYER, SON, & HILTON.

Blackheath.—6, Park-villas, u.t. 76 yrs., g.r. 9l. 8s., r. 55l. 570
56, Lee-rd, u.t. 57 yrs., g.r. 20l. 1,490

By HOOKER & WEBB.

Selhurst.—2 to 80 (even), Charnwood-rd.; 45 to 87 (odd), and 113, Holmesdale-rd.; 2 to 44 (even), Pembroke-rd.; 27 to 53 (odd), Clifton-rd.; and 1 to 6, Clifton-mews, f., r. 2,364l. 6s. 28,000
Purley, Surrey.—1 to 8, Gloucester-villas, f., r. 360l. 3,210

By MAY & PHILPOT.

Brixton.—75, Beechdale-rd., u.t. 90 yrs., g.r. 7l., e.r. 45l. 525
7, Stockwell Pk.-walk, u.t. 81 yrs., g.r. 8l. 12s. 6d., r. 48l. 450
7, Somerleyton-rd., u.t. 79 yrs., g.r. 8l., r. 45l. 425

By E. W. RICHARDSON & SON.

Wandsworth.—20 to 26 (even), Fullerton-rd, u.t. 75 yrs., g.r. 13l. 810
Merton.—High-st., Uppingham and Oakham Villas, f. 680
Southgate.—Avenue-rd., two plots of land, f. 140
Norwood.—47 and 49, Landsdowne Hill, u.t. 82½ yrs., g.r. 9l. 9s., r. 48l. 405
Tottenham.—61, Broad-lane, f., r. 34l. 500

By R. TIDEY & SON.

Hoxton, 38, Penn-st., u.t. 36 yrs., g.r. 5l. 10s., r. 36l. 310
De Beauvoir Town.—137, De Beauvoir-rd., u.t. 73 yrs., g.r. 4l., e.r. 48l. 370

By DOUGLAS YOUNG & CO.

Clacton-on-Sea, Essex.—Bennett Farm, 12 a. 2 r. 18 p., f. 2,000
Holland-rd., &c., five blocks of building land, 18 a. 1r. 14 p., f. 2,105
Marine Parade, a block of building land, f. 205
Marine Parade, a freehold hotel site, area 3 acres 1,470
Enclosures of land, 145 a. 3r. 6 p., f. 2,000
A freehold messuage and 2 a. 2r. 20 p. 250

By S. & G. KINGSTON (at Boston).

Kirton Fen, Lincs.—A farmhouse and 204 a. 1 r. 20 p., f. 6,840

By A. DOWELL (at Edinburgh).

Kenbach, &c., Fifeshire.—The Estate of Blebo, 1,350 a. 38,300

By ALFRED RICHARDS (at Tottenham).

Tottenham.—353, High-rd., u.t. 84½ yrs., g.r. 5l. 5s. 400
174, Northumberland Park, u.t. 50 yrs., g.r. 4l. 10s. 215
Enfield.—Freezywater, a block of freehold land .. 200

By GEORGE HONE (at Tewkesbury).

Awlench, Glos.—Enclosures of land, 4 a. 1 r. 39 p., f. 210
Overton, Glos.—Cottage and pasture land, 4 a. 0 r. 1 p., f. 232
Woolstone, Glos.—Brook House, and 3 r. 6 p., f. 275
The Manor House and 17 a. 3 r. 32 p., f. 1,7 0
Three freehold cottages 170

June 28.—By CHESTERTON & SONS.

Shepherd's Bush.—10 Askew-cres., u.t. 53½ yrs, g.r. 4l. 10s., r. 26l. 240

By CURTIS & HENSON.

Hyde Park.—54, Gloucester-ter., u.t. 40½ yrs., g.r. 10l., r. 115l. 1,800

By EDWIN EVANS.

Highgate Hill.—The Bank, Mount Melleray, f., e.r. 70l. 1,100
Surbiton, Surrey.—King Charles-road, f.g.r. 18l., reversion in 64 yrs. 475

By C. C. & T. MOORE.

Hackney.—95 and 101, Well-street, f., r. 80l. 1,120
South Woodford.—7 and 8, Derby Villas, f. 620

By NEWBON, EDWARDS, & SHEPHARD.

Willesden Green.—Chapter-road, f.g.r. 20l., reversion in 96 yrs. 530
Islington.—31, Packington-street, u.t. 36 yrs., g.r. 8l., r. 50l. 440
Hoxton.—54, 54, and 56, Bridport-place, u.t. 31 yrs., g.r. 12l. 12s., r. 90l. 820
South Newington.—139 and 141, Newington Green-road, u.t. 49 yrs., g.r. 20l., r. 165l. 1,780
Tottenham.—24, Park-road, u.t. 88 yrs., g.r. 7l. 10s., r. 92l. 230
69, West Green-road, f., r. 35l. 650

By ERNEST OWERS.

Hampstead.—84 and 86, Fortune Green-road, f., r. 132l. 12s. 2,150

By PRATT & MARSLAND.

Lee.—17, Brightfield-rd., u.t. 60 yrs., g.r. 3l. 140

By C. H. & J. W. WILLMOTT.

Notting Hill.—165, 171 to 181 (odd), Walmer-rd., u.t. 69½ yrs., g.r. 24l. 15s. 2,075
179 to 211 (odd), Walmer-rd., u.t. 28½ yrs., g.r. 22l. 770

By FARRERBOTHER, ELLIS, & CO.

Crouch End.—Harringay Park, "Fairlawn," u.t. 38 yrs., g.r. 7l. 10s., r. 52l. 10s. 520
Clapham.—Pitcairn-st., f.g.r. 20l., reversion in 31 yrs. 560
Chertsey, Surrey.—Staine's-lane, Beomond's Farm, 70 a. 0 r. 8 p., f. 2,850
New Haw, an enclosure of land, 32 a. 3 r. 13 p., f. 660
Petersham, Essex.—World's End Farm, 90 a. 1 r. 36 p., f. 860
Bentley, Suffolk.—The Grove Estate, 158 a. 2 r. 3 p., f. 11,500
A freehold building site, 3 a. 1 r. 1 p. 220
Playford, Suffolk.—The Playford Field, 31 a. 1 r. 17 p., f. 1,200
Cowleaze, Gilford, Oxon.—Freehold iron and roundworker's premises, area half-an-acre 460
Two freehold cottages, f. 270
Wallingford, Berks.—Freehold wheelwright's premises, f. 20l. 600
Freehold riverside land, 1 a. 1 r. 21 p. 100

By WALTER HALL.

Tilbury, Essex.—Sydney-rd., &c., f.g.r.'s 1,590l. 8s., reversions varying from 85 to 88 yrs. (in lots).. 31,585
Regent-st.—19, Golden-sq., f., r. 180l. 6,460
4, Lower John-st., f., r. 50l. 2,600
20 Brewer-st. f., r. 120l. 3,710

By STIMSON & SONS.

Walworth.—53, Gurney-st., u.t. 42 yrs., g.r. 5l. 5s. £350
Camberwell.—3, 5, 7, and 21, Eastlake-rd., u.t. 64 yrs., g.r. 15l. 10s., r. 152l. 1,425
1, Linnell-rd., u.t. 66 yrs., g.r. 10l., r. 55l. 12s. 450
Peckham.—21, 23, and 25, Rainbow-st., u.t. 61 yrs., g.r. 15l. 960
9 to 17 (odd), Dowlais-st., u.t. 61 yrs., g.r. 23l. 7s. 1,630
32, Tilson-st., u.t. 62 yrs., g.r. nil 390
21 to 27 (odd), Atwell-rd., u.t. 64 yrs., g.r. 21l. 850
Battersea.—130 to 140 (even), New-rd, u.t. 28 yrs., g.r. 5s. 940
Deptford.—28 to 48 (even), Stanhope-st., u.t. 19 yrs., g.r. 16l. 16s. 425
Greenwich.—23 to 29 (odd), Haddo-st., f. 1,020
22, Tyler-st., f. 320
Stoke Newington.—8 to 14 (even), Woodlea-rd., u.t. 73½ yrs., g.r. 24l., r. 96l. 850
Bloomsbury.—20, Endsleigh-st., u.t. 20 yrs., g.r. 81l., r. 110l. 200

By T. WALKER & SON (at York).

Elvington, Yorks.—Manor House Farm, 127 a. 2r. 11 p., f. 5,000

June 29.—By ALLEN BOOTH.

Mile End.—66, 68, and 70, Shandy-st., u.t. 68 yrs., g.r. 15l. 625

By P. A. ENRIGHT.

St. Luke's.—136, Old-st., f., r. 45l. 1,160
Dalston.—41, Shrubland-rd., u.t. 41 yrs., g.r. 9l., r. 32l. 300
167, 169, and 171, Powerscroft-rd., u.t. 81 yrs., g.r. 16l. 10s. 675

By E. W. HARRIS.

Beckenham.—Blandford-rd., three plots of building land, f. 445

By Messrs. RUTTER.

Wethersfield, Essex.—Lower green, six cottages and a garden, f. 190

By E. FERGUSSON TAYLOR.

New Barnet, Herts.—King Edward's-rd., a parcel of building land, f. 490

By WAGSTAFF & SONS.

Finsbury Park.—9 and 11, Eade-rd., u.t. 85 yrs., g.r. 10l., r. 66l. 630

By F. WARMAN.

Highbury.—109, Highbury Quadrant, u.t. 50 yrs., g.r. 13l. 13s. 740
Canonbury.—31, Marquess-rd., u.t. 50 yrs, g.r. 10l., r. 65l. 675

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

WOOD.*

Per Petersburg standard hundred.

	£ s. d.	£ s. d.
White Sea: first yellow deals	17 15 0	22 10 0
Second do.	15 15 0	18 0 0
Third do.	12 15 0	14 10 0
Battens, 40s., 30s., and 25s. less respectively.		
Petersburg: first yellow deals	15 0 0	17 15 0
Second do.	12 10 0	13 15 0
Battens, 30s. and 20s. less respectively.		
Petersburg, white deals	12 0 0	14 15 0
Do. white battens	10 15 0	12 0 0
Riga, white deals	9 15 0	11 10 0
Swedish mixed yellow deals	16 5 0	21 0 0
" Third do.	14 10 0	16 15 0
" Fourth do.	13 0 0	14 5 0
" Fifth do.	12 0 0	13 5 0
Battens, 30s., 20s., and 10s. less respectively.		
Whitewood, 10 to 20 per cent. less.		
Finnish unsorted yellow deals	11 10 0	12 5 0
Battens, 10s. and 5s. less respectively.		
Whitewood, 5 to 10 per cent. less.		
Norwegian second yellow battens	8 10 0	9 0 0
Third do.	8 0 0	8 15 0
Fourth do.	7 15 0	8 5 0
Whitewood, 10s. less.		
Danzig, Crown Deck deals, per 40 ft. 3 in.	0 15 0	1 5 0
Brack	0 12 0	1 0 0
St. Lawrence Pine deals, &c., per P.S.H.:—		
1st, Bright and Dry, regular sizes	21 15 0	28 15 0
" " oddments	15 5 0	22 15 0
and " regular sizes	17 5 0	19 15 0
" " oddments	11 15 0	16 5 0
3rd, " regular sizes	11 0 0	12 0 0
" " oddments	9 10 0	10 10 0
4th " regular sizes	10 0 0	11 0 0
" " oddments	9 0 0	10 0 0
St. Lawrence Spruce deals, &c.		
First, regular sizes	12 15 0	15 0 0
Second "	10 10 0	11 0 0
Third "	10 5 0	10 10 0
Fourth "	9 15 0	10 5 0
Oddments and battens at 20s., 10s., 7s. 6d., and 5s. less respectively.		
New Brunswick Spruce deals, &c.	10 0 0	11 15 0
Oddments, battens, and fourths	9 10 0	10 0 0
United States pitch pine planks and boards	11 0 0	15 0 0

* The prices named are for the wood as imported and landed in the docks. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

PRICES CURRENT (*Continued*).

	£ s. d.	£ s. d.
Prepared Boards, per square		
1¼ by 6½ and 7 in. 1st yellow	11 6	16 6
" " and "	11 0	13 6
1 by 6½ and 7 in. 1st "	10 6	12 6
" " " white	9 6	10 6
" " and yellow	9 6	11 6
" " " white	8 6	9 6
¾ by 6½ & 7 in. 1st & 2nd yellow	8 6	9 6
" " " white	8 0	9 0
¾ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)	9 0	10 0
¾ by 6½ and 7 in. 2nd yellow and white (ditto)	8 0	9 0
¾ by 6½ and 7 in. 1st yellow and white (ditto)	7 0	8 0
¾ by 6½ and 7 in. 2nd yellow and white (ditto)	6 6	7 6
Narrower widths at 10 per cent. less. 3rd quality at 15 per cent. less than 2nd.		
Danzig and Memel Fir Timber—per load		
Best middling	3 10 0	3 15 0
Good middling and Second	3 0 0	3 5 0
Common middling	2 15 0	3 0 0
Undersized	2 15 0	3 0 0
Swedish and Norwegian Balks	2 5 0	2 10 0
Baltic Oak Timber—		
Danzig and Stettin—Large	4 5 0	6 0 0
Small	3 12 6	4 10 0
Quebec Timber per load		
Yellow Pine	5 5 0	6 15 0
Oak	4 0 0	6 0 0
Elm	4 0 0	4 5 0
Ash	3 5 0	4 0 0
Birch	3 12 6	6 0 0
New Brunswick, &c., Birch	3 7 6	4 5 0
American Pitch Pine Timber	2 17 6	4 5 0
Wainscot, per log, 18 cubic ft.—		
Crown (Eng. & Dutch) nominal	3 0 0	4 0 0
Brack nominal	2 7 6	3 0 0
Lathwood, per cubic fathom—		
Petersburg	4 0 0	6 10 0
Riga and Danzig	4 10 0	5 10 0
Norway Poles, per ft. run	0 0 1	0 0 1½
Oak Staves, per mille full size pipe		
Memel, Crown	220 0 0	230 0 0
Brack	190 0 0	200 0 0
Danzig	165 0 0	175 0 0
Bosnia, single Barrel (nominal)	98 0 0	30 0 0
United States, Pipe	37 10 0	45 0 0
Hogshead, extra heavy and double extra	30 0 0	35 0 0
Indian Teake per load	10 10 0	16 0 0
British Guiana Greenheart	0 0 0	8 0 0
Mahogany, per foot superficial—		
Honduras, cargo average	0 0 4½	0 0 5½
Nicaragua, do.	0 0 4½	0 0 5½
Tabasco, do.	0 0 4½	0 0 6
Mexican, do.	0 0 4	0 0 4½
Panama, do.	0 0 3½	0 0 4
African, do.	0 0 3½	0 0 5
Cuba, do	0 0 6	0 0 8
St. Domingo, do.	0 0 5	0 0 7½
Do. Curls (good to prime)	0 0 9	0 1 3
Walnut, American (logs)	0 3 0	0 5 0
Do. do. (planks and boards)	0 2 0	0 7 6
Italian, per foot superficial	0 0 3	0 0 7½
Black Sea, per ton	6 0 0	12 0 0
Satin Walnut (logs) per foot cube	0 1 0	0 1 6
" (planks and boards)	0 1 9	0 3 0
Sequoia (Californian redwood), per foot cube	0 1 9	0 2 0
Whitewood, American (logs)	0 1 4	0 1 9
" " (planks and boards)	0 1 9	0 2 9
Quartered oak " "	0 2 3	0 4 0
Kauri pine (logs)	0 1 9	0 2 0
" " (planks)	0 2 3	0 2 9
Jarrah (planks)	0 2 0	0 2 3
Lancewood spars each, fresh and large	0 5 0	0 7 0
Lancewood spars, ordinary to fair	0 3 0	0 4 0
Degame spars	0 8 0	0 10 0

METALS.

IRON—Pig, in Scotland ton	3 7	0 0 0
Bar, Welsh, in London	9 0 0	9 15 0
Do. do. at works in Wales	8 10 0	9 0 0
Do. Staffordshire, in London	9 15 0	11 15 0
COPPER British cake and ingot	75 0 0	76 0 0
Best selected	76 0 0	77 0 0
Sheets, strong	83 0 0	0 0 0
Chili bars	71 15 0	72 0 0
YELLOW METAL lb.	6¾d.	7d.
LEAD—Pig		
Spanish ton	17 10 0	- - -
English Com. Brands	17 17 6	- - -
Sheet, English, 6 lbs. per sq. ft. and upwards	19 7 6	- - -
Pipe	19 17 6	- - -
ZINC—		
Vieille Montagne ton	27 10 0	- - -
Silesian	27 10 0	- - -
Spelter	19 17 6	- - -
TIN—Straits	141 0 0	- - -
Australian	143 0 0	- - -
English Ingots	145 0 0	- - -
Banca	- - -	- - -
Billiton	- - -	- - -

ENGLISH SHEET GLASS IN CRATES.

1 oz. thirds	2¼d. per ft. delivered.
" fourths	2d. " "
21 oz. thirds	3d. " "
" " fourths	2¾d. " "
26 oz thirds	4d. " "
" " fourths	3½d. " "
32 oz. thirds	5d. " "
" " fourths	4½d. " "
Fluted sheet, 15 oz.	2¾d. " "
" " 21 "	3¾d. " "

[See also page 23.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Cemetery	Cheadle and Gatley U.D.C.	.....	July 31

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Temporary Buildings	Wimbledon U.D.C.	Electrical Engineer, Electricity Works, Durnsford-rd. Wimbledon	July 10
*Sand, Lime, Cement, &c.	St. Martin-in-the-Fields Vestry	Surveyor, Town Hall, Charing Cross-road	do.
School, Handsworth New-road	Birmingham School Board	Buckland & Farmer, Architects, Paradise-street, Birmingham	do.
Waterworks, Newtonstewart	Strabane R.D.C.	J. E. Sharkie, Strabane, Ireland	do.
Improvements, Wheatley-road	Halifax Corporation	J. Lord, Borough Engineer, Town Hall	do.
Granite Paving, Saville-street, North Shields	Tynemouth Corporation	J. F. Smillie, Borough Surveyor, Tynemouth	do.
Gymnasium, &c., Great Cheetham-street East		L. C. Evans, Town Hall, Salford	do.
Additions to Hospital	Mountain Ash U.D.C.	J. Williams, Town Hall, Mountain Ash	do.
*Coal and Coke	West Ham Council	Borough Engineer, Town Hall, West Ham, E.	do.
*Sinking Well, &c.	Coalville U.D.C.	J. B. Everard, Engineer, 6, Millstone-lane, Leicester	do.
*Garden and Park Seats	Willesden District Council	Engineer, Public Offices, Dyne-road, Kilburn, N.W.	do.
*Fence and Gates at Gladstone Park	do.	do.	do.
*New Roads and Sewers at Gladstone Park	do.	do.	do.
*Road Making and Paving Works	do.	do.	do.
*Kerbing, Channelling, &c.	Hackney Vestry	Chief Surveyor, Town Hall, Hackney	July 11
School, &c., Hedworth-lane, Boldon Colliery	Boldon School Board	W. & T. R. Milburn, Architects, 20, Fawcett-street, Sunderland	do.
Additions, &c., to Royal Grammar School, Colchester	Governors	H. Goodyear, Civil Engineer, Borough Surveyor, Office, Colchester	do.
Four Houses, Dyson-street, Brighouse, Yorks		Sharp & Waller, Architects, 32, Bradford-road, Brighouse	do.
Paving Main Roads	Ramsbottom (Lancs.) U.D.C.	J. Halliwell, Surveyor, Market-place, Ramsbottom	do.
Granite Paving, Shotley Bridge	Benfieldside U.D.C.	J. Dixon, Surveyor, Council Offices, Shotley Bridge	do.
Stables, &c., Portwood	Stockport Corporation	S. Meunier, Engineer, Gas Office, Stockport	do.
Cottages, Cardow Distillery, N.B.		C. C. Doig, Architect, 147, High-street, Elgin	July 12
Additions to Reinwood, Lindley, Huddersfield		J. Kirk & Sons, Architects, Huddersfield	do.
Additions to King's Arms Brewery, Bradford-on-Avon	Harding & Co., Ltd.	W. H. Stanley, Civil Engineer, Trowbridge	do.
Additions to Schools, Oldham's-terrace	Acton School Board	E. Monson, Architect, Grosvenor House, Acton Vale, W.	do.
Villa, Fairfield-lane, Abbey-road, Barrow		W. Moss Settle, Architect, Walney, Barrow-in-Furness	July 13
Stone Bridge, Cathcart-road, Glasgow	Renfrew County Council	G. B. Walker, 65, Bath-street, Glasgow	do.
Car Sheds, &c., Thornton Heath	Croydon Corporation	Borough Engineer, Town Hall	do.
*Artesian Wells	St. Pancras Vestry	T. W. Aldwinckle, Architect, 1, Victoria-street, S.W.	do.
Pipe Sewers	Great Ouseburn (Yorks.) R.D.C.	Fairbank & Son, Civil Engineers, 13, Lendal, York	July 14
Farm Buildings, Arlaw Banks, near Barnard Castle	Rev. H. Lonsdale	F. H. Livesay, Architect, 107, Newgate-street, Bishop Auckland	do.
Eight Cottages, Consett, co. Durham	Consett Iron Company	C. E. Oliver, Architect, Company's Offices, Blackhill, co. Durham	do.
Hospital, Milton Hill	Bedford R.D.C.	H. Young, Architect, Maitland-street, Bedford	do.
Additions to Presbyterian Church, Londonderry		W. E. Pinkerton, Architect, Diamond, Londonderry	do.
*Police Cottages at Farnborough	Southampton County Council	County Surveyor, The Castle, Winchester	do.
*Wood Paving, &c.	Camberwell Vestry	Surveyor, Vestry Hall, Camberwell	July 16
Baptist Church, Victoria-road, Exmouth		P. Kerley, Architect, Exmouth	do.
Four Shops and Bakery, Chirton	North Shields Indus. Society, Ltd.	Hope & Maxwell, Architects, Trinity Buildings, Newcastle	do.
*Works in Connexion with Tram Depot, Queen's-road	Sheffield Tramways Committee	City Surveyor, Town Hall, Sheffield	July 17
Station Buildings, Ashperton, Worcs.	Great Western Railway Company	G. K. Mills, Paddington Station, W.	do.
Additions to Schools	Patcham (Sussex) School Board	Clayton & Black, Architects, Brighton	do.
Alterations to Workhouse	Enniskillen Guardians	A. Scott & Son, Architects, Drogheda	do.
Schools, Cymmer, South Wales	Glyncorrwg School Board	G. F. Lambert, Architect, Bridgend	do.
*Kerbing, Tarpaving, &c., Ballina-street, Forest Hill	Lewisham Board of Works	Surveyor's Department, Town Hall, Catford, S.E.	do.
*Kerbing, Tarpaving, &c., Lamos-road, Anerley	do.	do.	do.
*Cottage at their Depôt, Home Park, Lower Sydenham	do.	do	do.
*Underground Conveniences	Westminster Vestry	Surveyor, Town Hall, Caxton-street, Westminster	July 18
*Drainage Works, &c.	English Schools Drainage Com.	Caretaker, English Schools, Church-street, Hampton, Middlesex	do.
Sewerage Works, Ashlyn's-rd., &c., Frinton-on-Sea	Mr. R. P. Cooper	Homer & Co., Architects, Estate Office, Frinton-on-Sea	do.
Filter Beds, &c., Clough Bottom, Waterfoot	Bury (Lancs.) Corporation	J. Cartwright, Civil Engineer, Market Place, Bury	do.
Enlarging of Nurses' Home at Infirmary, Marloes-rd.	Kensington Guardians	E. Flint, Architect, 30, Coleman-street, E.C.	July 19
Farm Buildings, &c., Bodmin, Cornwall		S. Trevail, Architect, Truro	July 21
*Fencing and Gates, &c.	Hanwell U.D.C.	Surveyor, Council Offices, Hanwell	July 23
*New Car Shed	Birkenhead Corporation	Borough Engineer, Town Hall, Birkenhead	July 24
*Generating Station in "Heckinger," Spa-road	Bermondsey Vestry	See Advertisement	July 26
Market Buildings, Fairground	Bury (Lancs.) Corporation	A. Neill, Architect, 18, Cookridge-street, Leeds	do.
*Casual Wards	Lichfield Union	See Advertisement	July 27
*Law Courts and Town Hall	Cardiff Corporation	Town Clerk, Town Hall, Cardiff	July 30
*Underground Conveniences	Whitechapel District Bd. of Works	Engineer, Board of Works Offices, 15, Gt. Alie-st., Whitechapel, E.	do.
*New Asylum Buildings, Canterbury	Visiting Committee	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury	Aug. 2
Shooting Lodge, Irvinestown, Ireland		T. Elliott, Architect, 37, Darling-street, Enniskillen	Aug. 15
Shops, Crompton-street, Bury	Mr. J. Whittam	Openshaw & Gill, Architects, 6, Fleet-street, Bury	No date
Stands, Gigg-lane	Bury (Lancs) Football Club	T. Nuttall & Son, Architects, 20, Market-street, Bury	do.
Villa, &c., Oatlands, Harrogate	Miss Atkinson	Bland & Bown, Architects, Harrogate	do.
Car Shed, &c., Milehouse-road	Devonport Tramway Company	F. S. Pilling, Engineer, 40, St. Aubyn-street, Devonport	do.
Schools and Hall, St. Augustine's, Hull		J. M. Dossor, Architect, 2, Manor-street, Hull	do.
Cottages, Beaumont-road, Plymouth		King & Lister, Architects, 8, Princess-square, Plymouth	do.
Church, St. George's, Swannington, Ashby-de-la-Zouch		G. H. Fellowes Prynne, Architect, 6, Queen Anne's Gate, S.W.	do.
Church and Hall, West Stanley, Durham		J. W. Thompson, Architect, 63, Grey-street, Newcastle-on-Tyne	do.
House, Sherwood		Collyer & Slater, Architects, 8, Bridlesmith-gate, Nottingham	do.
Additions to Crescent House, Belfast	Dr. J. Campbell	J. V. Brennan, Architect, Belfast Bank-chamners, Belfast	do.
Additions, &c., to School, Mabel-street, Belfast		Rev. T. A. Smyth, 1, Shaftesbury-square, Belfast	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Uxbridge R.D.C.	4*l.* per week	July 12
*Architectural Draughtsman	Shoreditch Vestry	2*l.* 10*s.* per week	July 13
*Assistant	Willesden District Council	85*l.* per annum	July 17
*Inspector of Works	Lewisham Board of Works	2*l.* 2*s.* per week	do.
*Junior Assistant	Sheffield Corporation	90*l.* per annum	do.
*Surveyor and Inspector of Nuisances	Frimley U.D.C.	175*l.* and 90*l.* per annum	No date

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv. vi. viii. x. xii. & xxiv. *Public Appointments, pp.* xxi. & xxiv.

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PRICES CURRENT (*Continued*).

OILS, &c.

	£	s.	d.	£	s.	d.
Raw Linseed Oil in pipes, per ton..	36	0	0	-	-	-
" " " in drums, per gal.	0	3	1	-	-	-
Boiled " " in pipes, per ton..	38	0	0	-	-	-
" " " in drums, per gal.	0	3	4	-	-	-
Tar—Stockholm.....barrel	1	6	6	-	-	-
Archangel.....—	1	0	0	-	-	-
Turpentine, in barrels, per cwt. ..	2	2	0	-	-	-
" in drums, per gal.	0	3	4	-	-	-
Genuine Ground English White Lead.....	26	10	0	-	-	-
Red Lead .....*	22	10	0	-	-	-
Best Linseed Oil Putty, per cwt..	0	9	0	-	-	-

VARNISHES, &c.

	per gallon.		
Fine Elastic Copal Varnish for outside work ..	0	16	6
Best Elastic Copal Varnish for outside work ..	1	0	0
Best Elastic Carriage Varnish for outside work	0	16	6
Best Hard Oak Varnish for inside work.....	0	10	6
Best Extra Hard Church Oak Varnish for inside work.....	0	10	6
Fine Hard Copal Varnish for inside work	0	16	0
Best Hard Copal Varnish for inside work	1	0	0
Best Hard Carriage Varnish for inside work....	0	16	0
Extra Pale Paper Varnish	0	12	0
Best Japan Gold Size	0	10	0
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Jet Black	0	9	0
Berlin Black	0	15	6
Knotting	0	10	0
Best French and Brush Polish	0	10	0

BRICKS, &c.

	s.	d.			
Hard Stocks	33	0	per thousand alongside, in river.		
Rough Stocks and Grizzles.....	30	0	"	"	"
Smooth Bright Facing Stocks..	58	0	"	"	"
Shippers	42	0	"	"	"
Flettons.....	30	0	"	"	at railway depôt.
Red Wire Cuts ..	34	6	"	"	"
Best Fareham Red	71	6	"	"	"
Best Blue Pressed Staffordshire ..	87	0	"		"
Best Stourbridge Fire Bricks	84	0	"	"	"
Best White Glazed Stretchers.....	260	0	"	"	"
Headers	240	0	"	"	"
Quoins and Bull-nose	340	0	"	"	"
Double Headers..	320	0	"	"	"
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	"	"	"
Quoins and Bull-nose	280	0	"	"	"
Double Headers...	280	0	per thousand at railway depôt		
Seconds Quality White and Dipped Salt Glazed	40	0	per thousand less than best.		

	s.	d.			
Thames and Pit Sand	8	0	per yard, delivered		
Thames Ballast	6	9	"	"	
Best Portland Cement	35	0	per ton	"	
Best Ground Blue Lias Lime..	23	6	"	"	

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s.	d.			
Ancaster in Blocks	2	0	per ft. cube, deld. rly. depôt		
Bath "	1	7	"	"	
Beer "	1	6½	"	"	
Cornbill "	1	10	"	"	
Best Portland in blocks	2	2	"	"	
Darley Dale "	2	1½	"	"	
Red Corsehill "	2	5	"	"	
Red Mansfield "	2	4½	"	"	
Hard York "	2	10	"	"	
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	7	per ft. super at rly. depôt.		
" " 6 in. Rubbed Ditto..	2	10½	"	"	
" " 3 in. sawn both sides slabs (random sizes)	1	3	"	"	
" " 3 in. self-faced Ditto	0	9	"	"	

SLATES.

	£	s.	d.		
24 in. by 12 in. best blue Bangor..	11	5	0	per 1000 of 1200 at rly. dep.	
" best seconds "	10	15	0	"	"
16 in. by 8 in. best "	6	2	6	"	"
24 in. by 12 in. best blue Portmadoc	10	18	0	"	"
16 in. by 8 in. " "	6	0	0	"	"
24 in. by 12 in. best Eureka unfading green.....	11	2	6	"	"
16 in. by 8 in. " "	6	15	0	"	"
24 in. by 12 in. Permanent green and Sedan green	10	0	0	"	"
16 in. by 8 in. " "	5	12	6	"	"

TILES.

	s.	d.			
Best plain red roofing tiles..	41	0	per 1,000 at rly. depôt.		
Hip and valley tiles....	3	7	per doz.	"	"
Best Keymer tiles	48	0	per 1,000	"	"
Hip and valley tiles....	4	0	per doz.	"	"
Best Rubbed Red, brown or mottled Do. (Edwards)	57	6	per 1,000	"	"
Do. ornamental Do.	60	0	"	"	"
Hip tiles.....	4	0	per doz.	"	"
Valley tiles.....	3	9	"	"	"
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000	"	"
Hip tiles.....	4	1	per doz.	"	"
Valley tiles.....	3	8	"	"	"

TO CORRESPONDENTS.

J. J. & M.—W. S.—H. H. (Amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDARE.—For erection of boundary walls, &c., at Training Schools, Aberdare, for Merthyr Tydfil Board of Guardians. Mr. J. Llewellin Smith, architect, Aberdare. Quantities by architect:—

Evan Jones	£260 18 6	David Davies,	
J. D. Wilkins ..	235 15 0	Aberdare* ..	£229 17 0

ABERDARE.—For the erection of a bakery, stables, &c., Gadlys, Aberdare, for the Aberdare Workmen's Co-operative Society, Limited. Mr. J. L. Smith, architect, Aberdare. Quantities by architect:—

J. Jones	£3,150 0	Morgan & Son,	
W. E. Willis	2,993 19	Aberdare*	£2,698 0
		Evan Jones	2,587 0

ABERDEEN.—For the erection of a house, Aboyne, for Miss Ross, Tarland. Mr. J. M. Pirie, architect, 229, Union-street, Aberdeen:—

Masonry.—Littlejohn Bros., Ballater	£180 0 0
Carpentry.—M. J. D. Brebner, Tarland	185 0 0
Slating.—Wright & Sons, Aboyne ..	36 9 0
Plastering.—D. Mitchell, Ballater ..	45 0 0
Plumbing.—Davis, Son, & Co., Banchory	61 13 6
Painting.—C. Abel, Ballater	23 0 0

BANAGHER (Ireland).—For the erection of a lecture-hall, &c., for the Committee. Mr. M. A. Robinson, C.E., Richmond-street, Londonderry:—

James Deeny, Dungiven, co. Derry*.....£700

BRENTFORD.—For alterations and redecorations to the "Waggon and Horses," Kew Bridge. Mr. J. Hume, architect, Chiswick:—

Speechley & Smith ..	£202	G. Challis	£187
Rowsell	192		

BROADSTONE (Dorset).—For the erection of a villa residence, for Dr. C. W. Curtis. Mr. Walter Andrew, architect and surveyor, Parkstone:—

Chinchen & Co.	£1,600	Baker & Pearcey ..	£1,180
J. W. Cross	1,282	A. & F. Wilson,	
E. S. Griffien	1,265	Parkstone*	1,085
E. H. Crabb	1,182		

BURLEY-IN-WHARFEDALE.—For the construction of a reservoir, Carr Bottom, Burley Moor, for the Urban District Council. Mr. Malcolm Paterson, C.E., 35, Manor-row, Bradford:—

Egan & Sons..	£8,374 8 6	Thomas Smith,	
W. & J. Foster	7,626 19 10	Bingley*....	£7,181 2 10
William Brigg	7,268 0 0		

CARDIFF.—For alterations and additions to premises, No. 105, Bute-road. Mr. Edgar G. C. Down, architect and surveyor, 31, High-street, Cardiff:—

James Allan..	£1,225 0 0	W. T. Morgan*	£1,060 0 0
Jos. Thomas..	1,100 0 0	Knox & Wells	1,039 0 0
Melhuish Bros.	1,085 10 0	Price Bros ..	1,039 0 0
Turner & Sons	1,075 0 0	Evans Bros...	1,039 0 0
Shepton & Sons	1,070 0 0	F. Couzens ..	998 10 6
Harry Gibbon	1,060 0 0	F. Small	940 0 0

CASTLEMAGUER (co. Cork).—For the improvement of the parish church (forming a new chancel, marble and mosaic work, and new ornamental pitch-pine ceiling). Messrs. W. H. Hill & Son, architects, 28, South Mall, Cork:—

Thomas Nash, Knocks, Ballineen, co. Cork* £333

CHESTERFIELD.—For making a new road, &c., Bolsover, for the Urban District Council. Mr. W. H. Wagstaff, A.M.Inst.C.E., 57, Saltergate, Chesterfield:—

Lane & Son	£4,939	Bateman Bros.	£2,837
Holmes & Sons	3,840	T. Meakin, Hill Top,	
Kerry & Co.....	3,509	Bolsover, near	
H. H. Barry.....	3,283	Chesterfield*	2,400

CHESTERFIELD.—For the laying of sewers, the construction of tanks and beds, and the laying-out of land at the Outfall Works, for the Bolsover Urban District Council. Mr. W. H. Wagstaff, A.M.Inst.C.E., 57, Saltergate, Chesterfield:—

Lane & Son £7,186	0	T. Meakin, Hill	
Kerry & Co. 6,463	14	Top, Bolsover,	
Holmes & Sons .. 5,250	0	nr. Chesterfield*	£4,912 0
H. H. Barry 5,037	0		

DRAYCOTT (near Derby).—For the erection of infants' school buildings, for the Draycott School Board. Mr. F. S. Antliff, architect, Draycott, Derby. Quantities by the architect:—

G. Peach	£2,815 18 3	Brown & Son	£2,586 0 0
Parker & Son	2,735 0 0	G. Wagg	2,554 15 0
A. Brown	2,705 0 0	Perks & Son,	
A. Burnham ..	2,690 0 0	Long Eaton†	2,493 0 0
Radford & Greaves	2,617 0 3		

EAST HAM.—For the erection of (1) municipal buildings, (2) public baths, (3) public library, &c., (4) fire station, &c., for the Town Council:—

Gregar & Sons	£87,992	Mr. Cormick & Sons	£78,933
J. W. Jerram.....	87,100	D. W. Barker.....	72,005
Shillitoe & Sons ..	84,500	Architect's estimate.	69,036

FALMOUTH. — For additions to National school buildings, for Managers. Mr. W. Swift, architect, 38, Lemon-street, Truro:—

Harvey	£360	Skinner	£295
Pye	347	Sage	295

[All of Falmouth.]

GARBOLDISHAM.—For alterations and additions, Garboldisham Manor, Norfolk. Mr. H. J. Green, architect, Norwich:—

Shillitoe & Sons £4,350		Gillow & Co., Ltd.,	
J. S. Smith	3,300	London*	£3,095

HARLINGTON.—For alterations, new drainage, &c., to the "White Hart" public house. Mr. J. Hume, architect and surveyor, Chiswick:—

Field & Son.....	£245	G. Challis	£227 0
Portsmith.....	234	T. A. Keens	218 10

HUNSTANTON (Norfolk).—For the erection of the "Glebe" Hotel. Mr. H. J. Green, architect, Norwich:—

Youngs & Son £7,622	0 0	R. Dye £6,318	0 0
Kerridge & Shaw	7,543 18 3	R. Shanks	6,033 0 0
Bardell Bros.	7,405 0 0	Giddings & Parren, St. Ives*	5,479 3 6

KIRKCALDY.—For the erection of cookery and class-rooms, for the Dysart Burgh School Board. Mr. D. Forbes Smith, architect:—

Masonry.—David Wilkie, Anderson-street, Sinclairtown*	£584 7 3
Joinery.—Scott & Co., Factory-road, Pathhead*.....	408 0 0
Plumbing.—A. Kirk, Back-street, Pathhead*.....	205 16 0
Plastering.—J. Easton, Lina-street, Kirkcaldy*.....	123 0 0
Slating.—J. Lawson, Alexandra-street, Kirkcaldy*	59 10 0
	£1,380 13 3

KIRKCALDY.—For the erection of Workmen's Houses at Boreland, for The Earl of Rosslyn's Collieries, Limited. Mr. D. Forbes Smith, architect.

Masonry.—Henry Masterton, Institution-street, Sinclairtown*	£829 0 0
Joinery.—Geo. Hay & Sons, Relief-street, Dysart*.....	822 0 0
Slating.—Currie & Cant, Alexandra-street, Kirkcaldy*	95 0 0
Plastering.—H. & J. Schoolbraid, 49, Links-street, Kirkcaldy*	158 16 8
Plumbing.—James Robb, High-street, Dysart*	157 7 0
	£2,002 3 8

KIRKCALDY.—For the erection of house in Market-place, Gallatown, for Mr. Thos. Davidson. Mr. D. Forbes Smith, architect:—

Masonry.—David Wilkie, Anderson-street, Sinclairtown*	£208 10 10
Joinery.—Harrow & Turnbull, East Smeaton-street, Kirkcaldy*	120 0 0
Plastering.—Henry Masterton, Institution-street, Sinclairtown*	31 0 0
Plumbing.—Robert Briggs, Townhead, Dysart*	20 10 7
Slating.—Currie & Cant, Alexandra-street, Kirkcaldy*	15 10 0
	£395 11 5

LONDON.—For alterations and repairs to the "Green Man" public-house, Balls' Pond, N. Messrs. Foulsham & Herbert Riches, architects, 3, Crooked-lane, King William-street, E.C., and Bromley-by-Bow, E.:—

J. T. Robey.....£725		Sheffield Bros.*	£635
J. & W. Inkpen	643		

LONDON.—For the erection of a coach-house at Wanstead, N.E. Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, E.C.:—

F. L. Willmott £238	0	W. Mundy*	£234 12

[*See also next page.*

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LONDON.—For U.M.T. Church and Schools, Fentiman-road, South Lambeth. Messrs. Geo. Baines & Reginald P. Baines, architects, 5, Clement's Inn, Strand, W.C. :—

	Church.	Schools.	Boundary Walls, &c.	
Chessum & Sons	£4,950	£2,950	£290 0	£8,190 0
S. J. Scott	4,967	2,857	290 0	8,114 0
T. Rider	4,815	2,767	280 0	7,862 0
Lascelles & Co.	4,651	2,934	237 0	7,822 0
Holloway Bros.	4,700	2,707	253 0	7,660 0
Simson & Son	4,506	2,725	232 10	7,463 10
Patman & Fotheringham	4,571	2,581	221 0	7,373 0
J. Carmichael	4,441	2,457	245 0	7,143 0
H. L. Holloway	4,440	2,432	237 0	7,109 0
Turtle & Appleton	4,437	2,410	237 0	7,084 0
F. & H. F. Higgs	4,429	2,417	235 0	7,081 0
T. G. Minter	4,275	2,480	237 0	6,992 0
Prestige & Co.	4,260	2,472	245 0	6,977 0
Geo. Parker	4,230	2,523	220 0	6,973 0
Battley, Son, & Holness	4,277	2,287	226 0	6,790 0
J. C. Richardson*	3,924	2,355	209 0	6,488 0

Architects' estimate, £6,650.

LONDON.—For a new police-station at Rochester-row, for the Receiver for the Metropolitan Police District. Mr. J. Dixon Butler, architect. Quantities by Mr. W. H. Thurgood :—

Ashby & Horner	£14,310	Holloway Bros.	£13,496
T. Parker	14,150	Lawrance & Sons	13,482
H. Lovatt	14,125	Grover & Sons	13,132
Mowlem & Co.	13,950	S. Hart	13,127
Lascelles & Co.	13,905	F. & H. F. Higgs	12,640
Patman & Fotheringham	13,775	Scrivener & Co.	—
Higgs & Hill	13,660	Pattinson	—

LONDON.—For new laundry and bakehouse at St. Anne's Home, Streatham-hill, for the Guardians of St. Pancras. Messrs. Salter, Issott, & Salter, architects, 13, Phœnix-street, St. Pancras :—

Laundry Machinery.

D. & J. Tullis £717 2

Drying-room Plant.

Blackman Ventilating Co., Limited .. 112 8

Two Bakers' Ovens.

P. Crook, Chelsea 105 15

LONDON.—For alterations and redecorations to the "Cross Keys," Black Lion-lane, Hammersmith. Mr. J. Hume, architect, Chiswick :—

Bailey	£187 10	T. Bendon	£172 15
Wakeley	176 10		

NEW BROMPTON (Kent). — For alteration and extension to Sunday schools; renovation of interior and exterior of church; installation of electric light; and erection of retail shop on site adjoining, for the trustees of the Congregational chapel. Mr. E. J. Hammond, architect, 111, High-street, New Brompton :—

H. Wells	£3,303	T. Cornelius, New Brompton*	£2,445
H. E. Phillips	2,653		

PLYMOUTH.—For additions, &c., to No. 148, Union-street. Mr. B. Priestley Shires, architect, 104, Old Town-street, Plymouth :—

Thomas Crews	£830 0 0	A. Truscott	£740 0 0
G. P. Finch	821 10 9	Pearn Bros.	675 0 0
Wakeham Bros.	815 0 0	F. Widger	664 0 0
W. H. Lethbridge	810 0 0	A. N. Coles, Stonehouse*	629 0 0
A. H. Goad	807 0 0	W. T. Stevenson	620 0 0
W. E. Blake	805 0 0		
G. B. Turpin	797 0 0		

PLYMPTON (Devon).—For the execution of water-supply works, Egg Buckland, for the Rural District Council. Mr. F. A. Clarke, surveyor, Old Town Chambers, New Town-street, Plymouth :

Thos. Shaddock, Plymouth* £1,091 8 9

RAINHAM (Kent).—For the erection of two villas and shop, for Mrs. E. Knight. Mr. E. J. Hammond, C.E., High-street, New Brompton :—

H. Wells	£1,521	G. Gilbert, Rainham*	£1,050
H. E. Phillips	1,475		

SALTASH.—For the erection of a dwelling-house and offices on the Park Fields Estate, for Mr. J. A. Parkes. Mr. E. M. Leest, architect, Public Hall Chambers, Devonport, and 59, Fore-street, Saltash :—

W. V. Alford	£870	S. E. D. Ough*	£685
Taylor & Mutton	699		

TEIGNMOUTH (Devon).—For additions, &c., to West Holt, for Mr. S. A. Croydon. Messrs. Watson & Watson, architects, 1, Lower-terrace, Torquay. Quantities by Messrs. Stoner & Sons, Boston House, New Broad-street, London :—

Yeo & Sons	£1,600 0 0	Vanstone & Mumford	£1,375 0 0
E. Andrews	1,474 8 10		
G. Lee	1,450 0 0	R. Truman	1,201 14 3
J. Smerdon	1,407 0 0		

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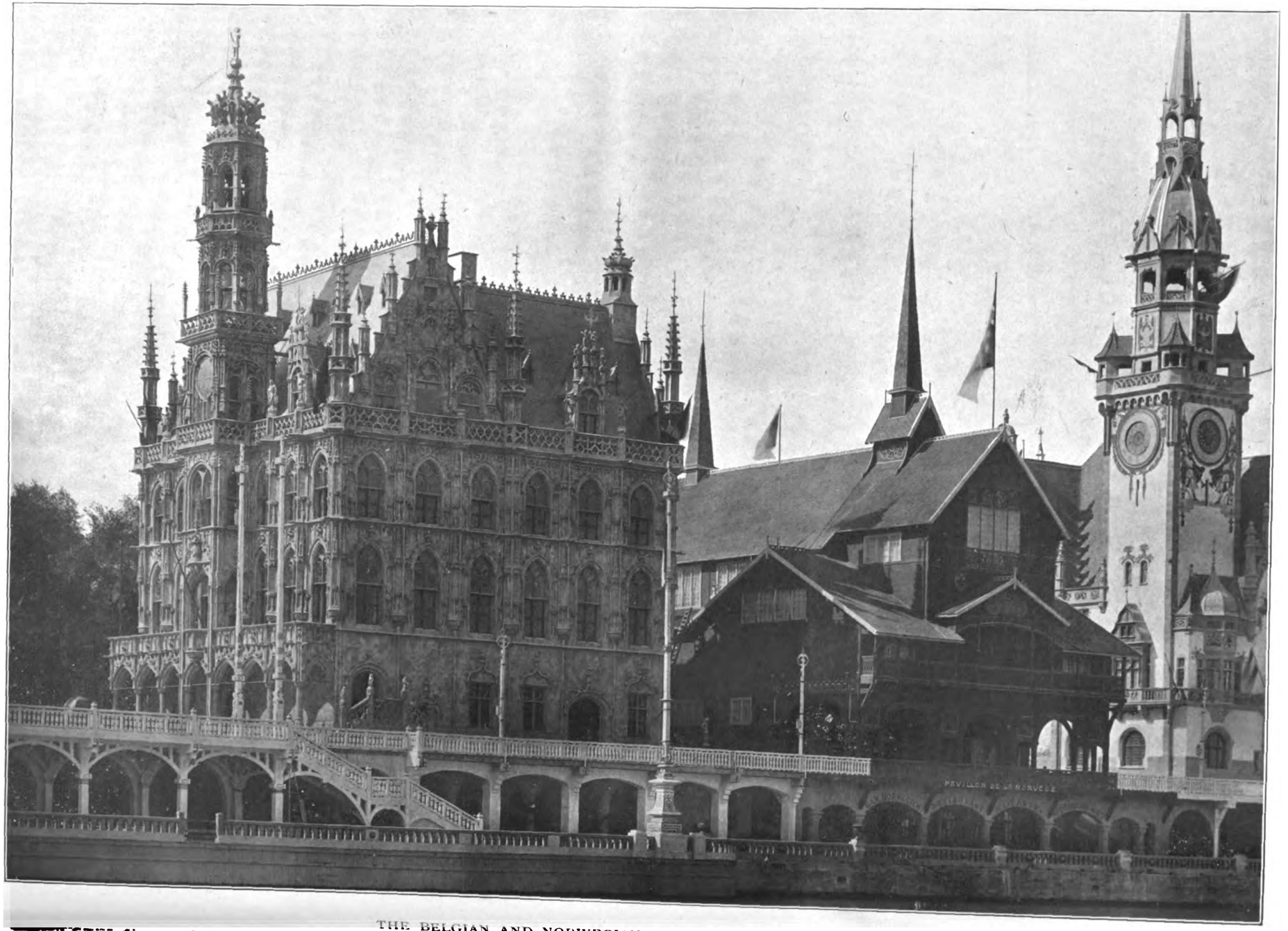

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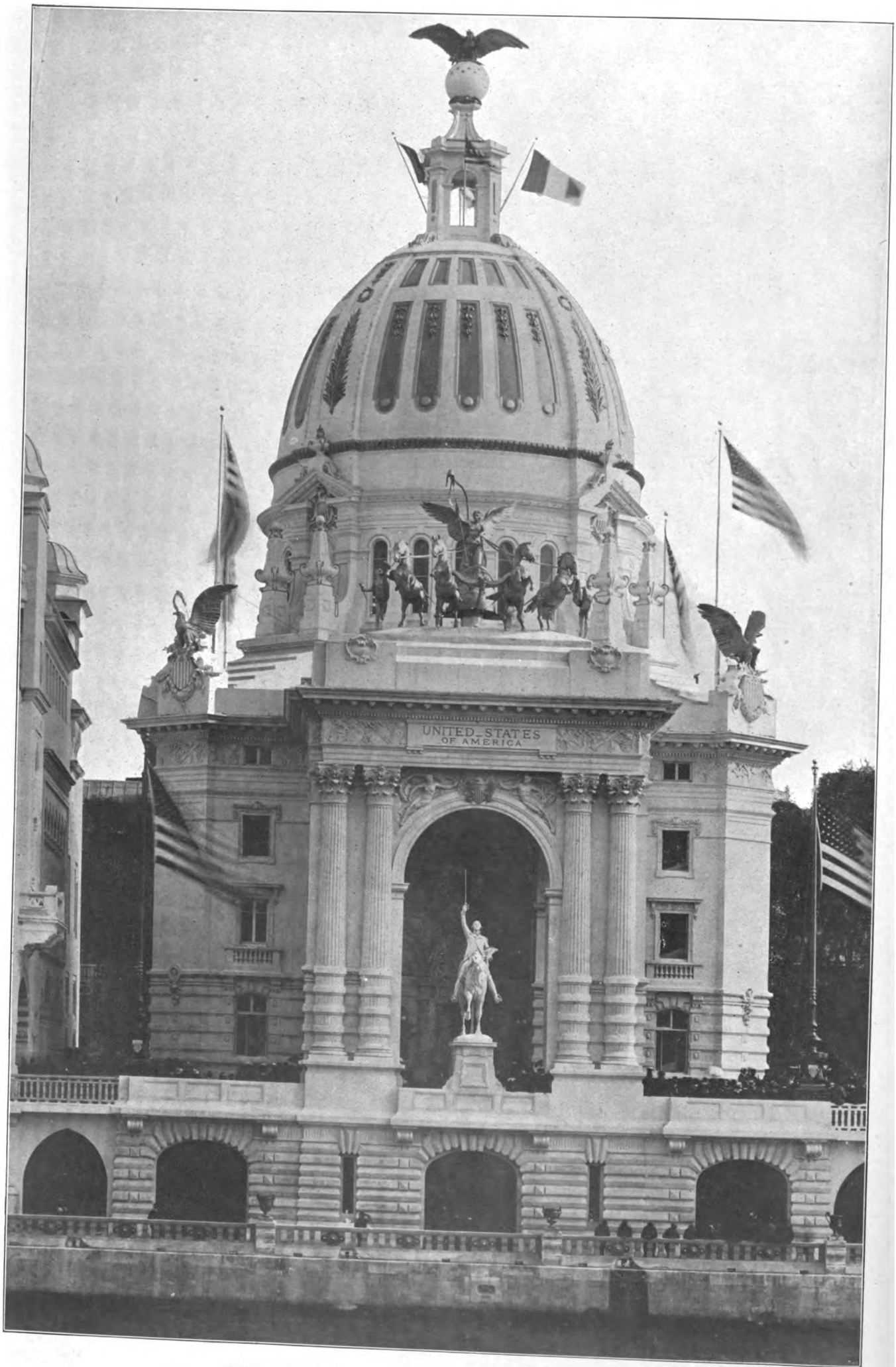

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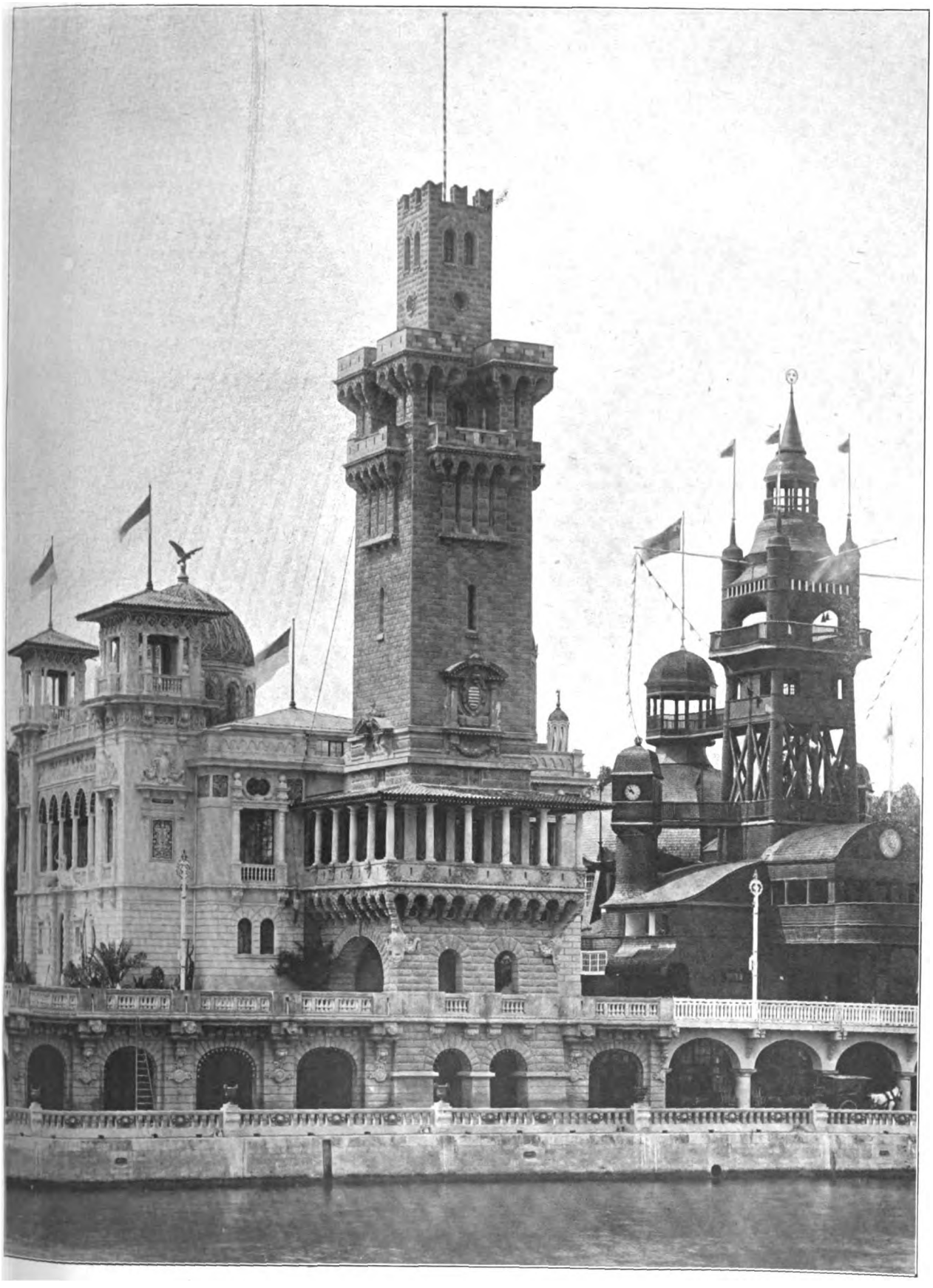

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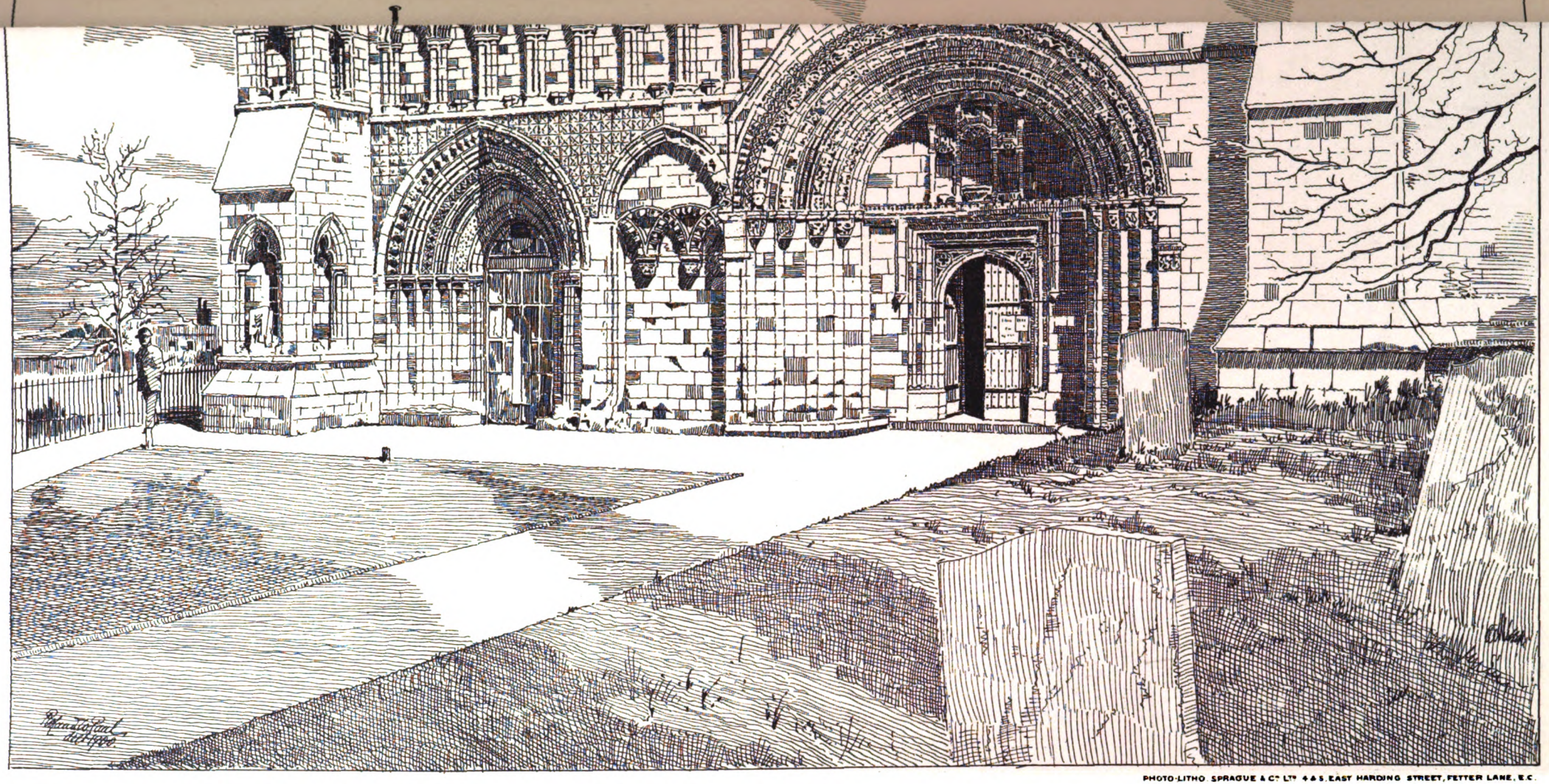

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The Builder.

VOL. LXXIX., No. 2997. JULY 14, 1900.

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Portland Cement.

ALTHOUGH the use of Portland cement is increasing to such an enormous extent, we believe that many architects who have to make use of it are still far from fully understanding its characteristics and the points it is necessary to observe in order to do satisfactory work with it.

Probably the best way to describe Portland cement would be to call it a tempered lime, the word tempered in this case meaning the adjustment of its active or cementitious properties to a certain fixed point, to give a certain result. Portland cement of a good quality consists of from 61 to 63 per cent. of lime, the most important of the other component parts being silica and alumina, the proportion of the two latter having a certain effect on the setting time; and the proportion of lime governing the strength and soundness. In certain cases (which, however, are very rarely met with) a natural formation is found, approximating to what is required for manufacturing good cement. Unfortunately, as a rule, the proportion of carbonate of lime varies to such an extent, according to its level and position in the quarry, that it is practically impossible to obtain a regular good quality of cement without the ordinary adjustment of proportions, as described later. If it were possible, such cement could be made much cheaper. In one district in Belgium a large quantity of cement is made from such a deposit, which sometimes may be of good quality, and at other times is very inferior.

Where the proportion of lime is not just what is wanted, the usual way is to get a limestone as pure as possible; that is to say, containing as little as possible outside of the lime and carbonic acid, and reducing the proportion of lime down to that necessary by the admixture of a suitable earth or clay. Probably the ideal materials are those used by the manufacturers of cement on the Thames and Medway, viz., chalk, which exists in practically unlimited quantities in Kent, Essex, Sussex, &c.—this contains 98 or 99 per cent. of carbonate of lime, and is soft and easily reduced by washing—and clay, which is dug up from the marshes in the lower reaches of the Medway. This has been brought down by the river and precipitated there. The presence of these two ingredients comparatively close together has led to the result that some three-fifths of the entire output of cement made in this country is manufactured in this district; this three-fifths amounting to between 1½ and 2 million tons of cement per year. In other parts of the country, where the chalk and clay do not exist, a limestone is used, mixed with suitable earth or clay from natural beds. In other parts again, such as in the North of England, chalk is imported from the South-country chalkfields, and mixed with a local clay, the disadvantage of having to pay carriage on the chalk being met, more or less, by the advantage of cheapened fuel. Deposits of limestone exist there, but they are not suitable for cement-making, as a rule.

With the ordinary South-country material the chalk and clay are weighed into what is called a washmill. This washmill is simply a circular tank from 14 ft. to 20 ft. in diameter, according to the quantity of material to be dealt with, and some 4 ft. to 6 ft. deep. It is fitted with a framework revolving on a central pier, to which are suspended by chains heavy harrows, travelling round and round in the washmill, through the material, mixing it altogether and with water, added in such a quantity as to bring the mixture to about the consistency of treacle. This water amounts to about 35 or 40 per cent. of the whole. It may here be mentioned that this wet method of mixing is, with chalk, practically imperative, in order to get rid of the flint which is always present, more or less, with the white chalk most commonly used. With limestones not containing flints, as will be explained later, a different method of mixing is used, in which water is not introduced.

One of the most important points a cement manufacturer has to watch is the putting into the washmill of the right proportions of the raw materials to give, when the cement is finished, the proper proportion of lime. In the old times, before cement tests were so high as at present, and when the margin between the cement manufactured and the cement that would blow was therefore greater, it was the usual practice to roughly measure the raw materials into the washmill with barrows. However, at the present time the cement has, in order to pass the usual tests, to contain a percentage of lime so near to the percentage at which the cement would be liable to crack and be unsound that, if the manufacturer wishes to make a reliable cement, the two raw materials must be most carefully weighed in. In other words, if the rest of the process of the manufacture is properly carried out, and the two raw materials are suitable, and carefully weighed in in such proportions as to give in the finished cement the proper proportion of lime, the cement *must be* of satisfactory quality. On the other hand, if the raw materials are not mixed in this proper proportion, nothing can be done later in the process to correct it, and the result will be an inferior cement, and probably unsound. When the mixture in the washmill is reduced small enough, it passes through a grating and is then ground through millstones. This grinding serves two purposes: it not only reduces all the chalk to such a size that the necessary intimate mixture may take place with the clay, but also assists this mixing and makes it more regular. This slurry, as it is then called, is ready to be dried and burned. In the ordinary way it is dried by being placed upon floors over which, or under and over which, the waste heat from the kilns, or heat from special furnaces or coke ovens, is passed. The slurry, or as it is also generally known when dried, slip, is then ready for burning, and is in thick, irregularly shaped lumps, mixed with more or less small.

Where limestone is used instead of chalk, as mentioned before, the mixture is not mixed with water. The raw materials are ground, either separately and then mixed, or ground and mixed in the same operation, both being dried if necessary beforehand. Care is, of course, taken, the same as in the wet process, to have the proper proportions. This mixture has then sufficient water added to make it hold together, and it is pressed into bricks. These bricks are then generally dried, in modern works, in a tunnel dryer, such as is now ordinarily used in modern brickworks. In the two modern cement kilns described later the drying of the bricks

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is not necessary—an additional point of economy in these kilns.

One other system of drying and burning in one operation is just being introduced into this country from America, where it has proved fairly successful on their material. This consists of a cylinder varying from 80 to 100 ft. long, and up to 6 ft. diameter. It is set with one end lower than the other and is capable of being slowly rotated. The slurry is pumped in at the high end, and as the cylinder rotates gravitates naturally to the lower end. Here it drops out, having been gradually dried and burned on its way. Heated gases, either from sprayed coal or from a jet of producer gas, are admitted at the lower end and travel through to the other. This system at first sight appears very much simpler and cheaper than the ordinary method of drying and burning, and it may prove to be so. It has not, however, as yet been used on English works, and its success and economy in dealing with English slurry is very problematical. It has, amongst others, one great advantage, viz., that although there are some differences in detail, the principle of it is very old, and the patent that covered it having long since expired, any manufacturer can use it without payment of royalty. There are some disadvantages that more or less cancel the apparent advantages. For instance, it is stated that cement burned by this rotary kiln will not stand one of the tests now often stipulated for, viz., the hot-water test, in which the cement, after being gauged, is placed and kept in hot water for a certain time, and must not show signs of cracking. Again, the slurry has to be much finer, necessitating probably a second grinding, which means extra cost. If fired with sprayed coal, this coal has to be dried and ground very fine, again entailing extra cost.

The next operation is the burning, which has for its object, principally, the driving off of the carbonic acid that is in combination with the lime. The slip (or bricks) has to be brought to such a temperature that, although not melted to a fluid, it is in a semi-vitrified or plastic condition, as, when burnt, the resulting clinker is much altered, generally, from the shape and size in which it entered the kiln; although at times, however, bricks do come through the kiln very little altered. That this point of temperature is absolutely necessary for a good quality is proved by the fact that pieces of the slip that are not sufficiently burned (of which there is nearly always a certain proportion, more or less, in each kiln) are practically unaltered in shape. For the highest quality of cement it is indispensable that there should not be any of this underburnt slip, as although it quickens the setting of the cement, yet if the proportion of lime be high, or should there be any particles of chalk comparatively large in this underburnt slip, the cement will be more or less unsound and inclined to crack, while if nothing but thoroughly burnt clinker is used, this danger is not so great. In making high-class cement particular care is taken to have all such half-burnt portions picked out.

The ordinary kiln used in England during the last few years consists of a chamber of varying form, built of brick, and lined with fire-brick. The slip is placed in this with alternate layers of coke, and, when full, is lighted. In some cases the kiln is allowed to burn itself right out without being touched. After cooling, the clinker is drawn and the kiln loaded again, &c., while in others, as it burns and shrinks in the kiln, other layers of material and fuel are placed on it before it is allowed to die out and cool ready to be drawn. At the present moment, however, the question of the burning of cement is demanding the time and attention of cement manufacturers to a very large and unusual extent. Coke is getting so scarce and difficult to obtain, except at very greatly enhanced prices, that it would seem that other systems in which less coke is used, or in which it is possible to substitute coal wholly or partly for it, will have to be adopted.

There are two new patent kilns that are working successfully on British material, and consuming, approximately, one-half the proportion of fuel (which may be wholly or partly coal) of that used by the ordinary type; and as the first cost of these, even when the separate cost of drying plant is added, only amounts, approximately, to the same cost per ton output as the old system, this alteration in method does not so much affect manufacturers who are laying down new plant. To those, however, who have already works fitted up with the old plant, which practically has to be thrown away in substituting the new method, this question of alteration is a very grave one. That the alteration is judged to be necessary is proved by the fact that some of the manufacturers have already commenced to make it in spite of the great cost and loss it entails. The principal difference between the old method and the two kilns mentioned is that instead of burning the kiln right out, and cooling and drawing it empty each time, the burning of the kiln is continuous, these kilns having points in the construction and working (that are novel and patented) that make it possible for them to work successfully on this really old-fashioned principle. The economy in this system, as used in the new type of kiln, is probably due to the fact that the air is travelling up through the burnt clinker, cools that clinker, and is at the same time itself heated on its way to the fire zone, after leaving which, in the form of heated gases, it parts with the greater part of its heat to the material that is travelling downwards on its way to the fire zone, through which it passes on its way to the chimney, thus utilising a much larger proportion of the heat generated instead of wasting it as usual. That this is so is proved by the comparatively low temperature at which the gases reach the chimney, being so reduced that although the temperature must have been somewhere about 2,000 deg. Fahr. at the fire zone of the kiln, the hand may easily be held in the gases leaving it.

The clinker, on leaving the kiln, is ready for grinding. It consists of rough, angular lumps, varying from about 12 in. cube to mere dust. This clinker, so long as it is in a furnace clinker-like form, and thoroughly burnt, is practically inert, as, with the exception of the surface, it is not affected by water. Even if soaked in water and dried again, properly burnt clinker is little altered; in fact, if ground and tested after such wetting and drying, there would be very little difference from what it would have been if not so wetted. This is correct, whether the pieces are as they leave the kiln or reduced, so long as they are not in the form of flour. This proves that the cement that is ground to flour is the only cement that is properly and thoroughly active or cementitious, although, for the reason that follows, the smaller the residue, the more cementitious, as the proportion of surface or exterior to the interior is greater, and a larger proportion of the bulk is reached by the water, while the smaller the residue the closer it fits together. There have been numerous arguments as to the reason for the apparent inactivity of residue, but the correct one seems to be, firstly, that clinker, whether in the form of large lumps or small residue, is so dense, that in gauging it for testing the skin or surface only is acted upon by the water, the interior remaining untouched by it, and, therefore, remaining unaltered; and, secondly, that when in the form of residue the atoms or particles do not have that intimate contact, by reason of their ruggedness or angularity, that appears to be necessary to, as it were, make a continuous joint between each particle with the next, and there are spaces, however small, that impair the solidity, and therefore strength, of the sample.

The flour has one peculiarity, viz., that it it be gauged with water, put in a mould and tested in the usual way, neat, the tensile strain it will stand is stated to be very much lower than if gauged with its ordinary accompanying residue, and from this it may be assumed that, in order to get the best neat test out of a cement, the presence of some other inactive, but preferably angular and rugged, material is necessary. This in the ordinary cement is provided by the clinker that is not ground to flour, which in the ordinary present-day grinding amounts to 50 per cent. of the bulk or more. Further, if all this residue were taken away from the flour and replaced by the same percentage of a like angular material that was inert and not liable to disintegrate, there is every reason to suppose that the mixture would stand as good a test as the original cement. It is, of course, a matter of common knowledge that some small manufacturers are mixing with their cement Kentish rag, or slag, and one argument that has been used in the attempt to justify this addition of what is only an adulterant is, that with a certain percentage of such adulterant, the test the cement will stand is really about the same. The above may be the reason for this, provided the adulterant used is of a harmless kind chemically and provides some more of the angular residue needed as mentioned. A certain proportion of it will, however, in the grinding be reduced to an inert flour, the addition of which must reduce the proportion of lime to the whole, and, therefore, the test. It is, however, usual that cement that is going to have such an admixture with it should be washed in the first place with a larger proportion of carbonate of lime in order to make up for this reduction. It may, therefore, reasonably be supposed that, providing the adulterant is mixed regularly throughout the bulk and is a suitable material, cement made with such admixture may be practically equal in neat test to cement without it. There is, however, always one danger with cement washed with an extra high proportion of lime in order to mix with or carry off an inert material—viz., that if this adulterant is not mixed regularly throughout the whole, any of the cement that does not get its share will probably be

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unsound and liable to crack. There is also naturally the feeling that a buyer has, that when he pays for cement he expects to get cement, and not cement mixed with a proportion of cheaper material, and for such a mixture he should pay less, according to the relative proportions. The question of the proportion of flour does, however, most certainly govern the amount of sand the cement will stand to give the strength wanted in the work.

There are a number of different ways of grinding cement, each one having its advantages and disadvantages, but these we need hardly go into in detail, as, so long as the cement is reduced and contains sufficient flour, it matters very little which grinder is used, except to the manufacturer, as a question of relative cost. That a large proportion of the cement at the ordinary fineness contains some 50 per cent. or more of residue which, through not being ground down to a flour, is comparatively inert, and has little more cementitious value than, for instance, sand, is proved by the fact that if briquettes that have been gauged, tested, and allowed to stand for a considerable period are ground up finely and, without any further burning, gauged up again, these briquettes will stand nearly as high a test as the original briquettes. This proves that the original gauging has not used up all the cementitious part of the cement, and that that unused part has been, when the original briquettes were made, unaffected by the water, and yet has been put by the second grinding into such a form as to be rendered active by the second gauging, the reason for which we have given earlier when dealing with the inactivity of residue.

From these facts it may be concluded that the present system of testing fineness does not show the comparative cementitious value of the cement. This method, it may be explained, is to take a certain quantity of cement and sift it through a sieve containing a given number of holes to the square inch, thus arriving at the proportion of residue that will not pass through that sieve. But even if a very fine sieve is used it still allows to pass through it a varying proportion of cement that is nearly as inert and useless, from the point of view of hardening or cementing, as the residue kept back by it. The result of the test has merely shown the proportion of the cement that is too large to go through that particular sieve. This knowledge is worth little in the estimation of the cementitious value of the cement, but seeing that, until just lately, there has been no simple method of estimating the amount of actual flour, it has been taken as a rough guide, although the fact of there being a certain proportion of the cement fine enough to go through any particular sieve cannot be accepted as a proof that it contains a certain proportion of flour. Each of the different classes of grinding machines leaves a different proportion of unfloured cement, even if the proportion left on a given sieve is the same. Even with a knowledge of the proportion of actual flour, there is one point to be noted, viz., that under-burnt cement is easier ground to a flour than properly burned cement, which might be a temptation to leave in more of this under-burnt in order to increase the proportion of flour, but this would show itself when the cement is tested for weight or specific gravity, as under-burnt cement is much lighter than properly burnt cement.

To sum up, good cement consists of suitable materials mixed finely and intimately in right proportions, burned to the proper point, and ground to contain the maximum of flour, without adulteration in any shape or form.

NOTES.

The Hellenic Society.

THE annual meeting of the Hellenic Society, held at the rooms of the Society of Antiquaries on Thursday last week, derived special interest from the account given by Mr. Arthur Evans of the discoveries made by Mr. Hogarth and himself at Cnossus, a site which for many years past has been believed to be worth exploration, but from which archæologists have been deterred by local opposition. This has now been overcome, and Mr. Evans has been able to report a series of finds of an interest even beyond what was expected. The remains of a large palace of a very early civilisation have been disinterred. Among other points of interest were a series of chambers, apparently store-houses or magazines, containing a number of large jars standing on a pavement *in situ;* these jars, of which photographs were shown, are of a finely curved shape and decorated mostly with a large and bold zig-zag ornament round the middle. Underneath one of the floors, at two different depths, were two stone cists lined with lead. A considerable quantity of decorative fresco-painting was discovered, illustrating flowers fishes &c., and a number of paintings of men and women, the sexes being distinguished not only by costume but by the curious conventionalism of representing all the men with brown skins and the women with white. (Possibly the difference in the mode of life of the men and women may really have given a distinctive colouring to the skin.) The costumes of some of the female figures were characteristically described by the director of the French school as "almost Parisian" in style. In connexion with the northern propylæa were found the remains of a large figure of a bull, ("suggesting the Minotaur," said Mr. Evans), of which the head and a large part of the body had been brought out—a photograph of the head was shown. Perhaps the most interesting detail of all was the throne-room with its stone chair with a decoratively-treated back, still *in situ*, and a long stone bench on each side of it; a photograph of this was also exhibited, as well as a plan of the remains, and photographs of different portions of the excavations and of many other objects found in them. Mr. Evans mentioned that beneath the level of these remains was a considerable stratum of neolithic remains. It is to be hoped that funds will be found for continuing the exploration of a site of such exceptional interest. Sir W. Richmond, in seconding the adoption of the annual report, mentioned that he had the other day been promised a subscription by one gentleman of 250*l.* towards the prosecution of the researches at Cnossus, and that he himself would be glad to go out and make copies of the paintings if the expenses of his journey out and home could be defrayed by the Society. In any other country the Government would vote money to assist in such an excavation; but we suppose it is hopeless to expect this in England.

The Architectural Museum.

THE annual meeting of the Royal Architectural Museum and Westminster School of Art will be held at the Museum on Friday, the 20th, at 4 p.m., when Mr. Emerson, the President of the Institute of British Architects, will be nominated as President of the Architectural Museum in place of the late Duke of Westminster, and Messrs. Aston Webb, John Belcher, A.RA., G. F. Bodley, A.R.A., and Geo. Frampton, A.R.A., will be nominated as Vice-Presidents. Mr. Aston Webb will take the chair, and we hope that there will be a good attendance of architects, both in support of Mr. Webb and of the institution itself. The Museum has laboured under two disadvantages; it is in a rather out-of-the-way situation, where people are not likely to find it unless they know of it beforehand; and its large collection of casts was made during the enthusiasm of the Gothic revival—the Museum was, in fact, essentially a Gothic revival scheme—and consequently in the present state of architectural tendencies the collection of casts is felt to be too one-sided, and does not represent architectural detail in an all-round manner. Nevertheless, it is the only large collection of casts of architectural detail to be found in London, and the object ought to be to take advantage of what already exists there, and to supplement it with a collection of casts of detail of the Classic and Renaissance schools, so as to give it a more comprehensive character. The one half of an admirable collection is already there; we want to see steps taken to supply the other half. Whether this can be done in the present building is perhaps a question; if not, it is time to consider whether the building can be enlarged, or whether a new home can be found which will take the present collection and a large future addition to it, to be made by degrees as casts can be acquired. It is certainly worth while seriously to consider the possibility of doing this. A large collection of architectural casts representing the best detail of all schools would be of the highest value, and we ought to be grateful to those who took at all events such an important step in that direction by forming the collection of casts now at Tufton-street.

The L.C.C. Works Department.

AT the last meeting of the London County Council the question of the Works Department came up again in regard to the old grievance of excess of expenditure over estimate, which during the past half-year has amounted to nearly 20,000*l.* The detailed reports furnish legitimate explanations of some portion of this expenditure, such as rise of prices; impossibility of getting some materials, such as cement, fast enough supplied to carry on work at a profitable rate, &c.; but there still remains a good deal which can only be accounted for by inefficient management. The chief excess has been in the Housing Department and in connexion with some engineering work carried on at the Crossness outfall. In the latter work—foundations for a new engine-house, &c.—the estimate was 34,617*l.* 6s. 8d., and the cost exceeded this by 16,279*l.* 12s. 10d., or about 47 per cent. The works manager states that the principal cause of this excess was the insufficiency of the calculated prices. He says:—

"The work was accepted by the late manager in June, 1896, but I am very decidedly of opinion that

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he should have reported the estimate insufficient. The cost of pumping was undoubtedly miscalculated (the actual cost was about 8,095*l.*), due probably to the late manager looking upon the bills of quantities as containing every individual item of expenditure as in architectural works, instead of engineers' quantities and modes of measurement, giving only general items, each including many contingencies. An example of this is found in the items for making the various connexions to existing sewers, &c., which are in constant use, for which the prices allowed are absurdly inadequate, especially bearing in mind the frequent flooding of the work whilst these connexions were being made.

The work was commenced in August, 1896, before I took charge of the Department, and several thousands of pounds had been expended. Instead of the works being forwarded, it took something like three months to rectify the errors in the mode of procedure adopted. Sheds and sidings had to be removed from the site of excavations and reconstructed, and a new sump, greatly enlarged, had to be sunk. The excavation for the engine-house foundations had been commenced, but timbered in such a manner that it had to be altered before it was possible to get timbers down for the lower depths of the excavation, &c. This serious state of things, due probably to the disorganisation of the Department at that time, without doubt added largely to the cost of the work, and I consider that little of the money expended up to that time had been of any assistance in the carrying out of the work."

This certainly seems to show that not only were the prices miscalculated, but that a good deal of blundering was made over the work in its initial stage. This and other reports tend, so far, to justify the conclusion of a member of the Council that it was time to give way and admit that the Works Department was a failure, and put future work out to contract.

Trade Unionism and Work.

THE sixteenth of the able communications on "American Engineering Competition" which are being published in the *Times*, which appeared on Monday last, draws a dramatic contrast between the conditions under which work is carried on in England and America. The writer has collected a number of delightful statistics in regard to the system of doing as little work as possible for your wage, which seems to be the ideal of the English trades-unionist. We may quote the following:—

"An apprentice was 'interviewed' because he machined three stamp millheads a day, whilst the society men did but two, and he had to give up the work. Another firm had a society man turning pulleys at 35*s.* a week, taking 26½ hours. Afterwards, at the same lathe, another man, not a society turner, at 24*s.* a week turned out similar pulleys in 22¼ hours. Another firm found it took a society man 190 hours to plane a lathe bed. A promoted labourer under a non-union foreman did the work in 135 hours. A Glasgow firm gave instances of saving in time on machine work after the society men had gone out on strike and apprentices had been put on. In one class of work the saving was 50 per cent., in another 35 per cent., in another 30 per cent., in another 50 per cent., in another 18 per cent., in another 10 per cent., and in another 17 per cent. In another shop a journeyman and five labourers took 40 days to erect three cranes, whilst a pupil and the same five labourers erected three similar cranes in 27 days."

The writer goes on to say that in nearly every engineering factory which he visited in the United States he found the piecework system followed to the fullest extent possible, and that "its effect is remarkable. The men are spurred by ambition; they feel the reward of exertion. The more they make, the more they want to make." In some instances day wages are preferred by the employers, but in that case the greatest care is taken in organising the staff of foremen; and it is significantly remarked that the American foreman is never a "men's foreman," he is an employer's foreman. There is no uniformity of payment such as is enforced by trades-union rules in England; "a man gets just what he is worth." The contrast is one which ought to set us thinking.

The Workmen's Compensation Act.

THE case of Pattinson & Son *v.* Stevenson, briefly reported in our legal column last week, has raised a very important question in regard to the capitalised redemption of weekly sums payable to a workman by his employers in respect of injury from an accident. It would have been desirable to know what the Appeal Court said upon the question as to whether there was any limit to the sum to be paid for the redemption of a weekly sum payable as compensation, and also as to the deductions which the learned judge of the county court had made and specified; but it must, of course, be assumed that they concurred as to the principle, although perhaps not as to the amount. It may, indeed, be suggested that the learned judge of the county court and the Court of Appeal might have taken into consideration the question of a further deduction, viz., in respect of the possible insolvency of an employer and the difficulty of following his assets after his decease; but this would apparently involve an impossible inquiry, and therefore could not be taken into account. Employers and workmen, at all events, will learn from all this a great deal as to the mode in which such applications may be dealt with by the courts of law, and it may be assumed that in future masters and also insurers will always endeavour to effect the redemption of the weekly sums payable as compensation by agreement with the workmen, and will rarely have recourse to arbitration under the Workmen's Compensation Act.

Newcastle House, Lincoln's Inn Fields.

ON the 26th inst. will be offered for sale at auction the freehold property consisting of No. 67, Lincoln's Inn-fields, at the corner of Great Queen-street. The premises form the northern portion of Newcastle, or Powis, House, being the only house on the west side of Lincoln's Inn-fields that stands outside the limits of area as scheduled in the Act for the new street from High Holborn to the Strand. It was built in the year 1686 for William Herbert, Marquis of Powis, by—according to Walpole—William Winde. Having become forfeited to the Crown by Lord Powis's attainder, the house was sold to John Holles, Duke of Newcastle, at whose death, in 1711, it passed to his nephew the Duke of Newcastle of George II.'s reign. Powis House had been occupied for a while by Lord Somers, and the Government at one time intended to vest it as an official residence or offices in the Lord Chancellor. Of late years No. 67 was occupied by the Society for Promoting Christian Knowledge, who have just celebrated the bicentenary of their foundation, and who removed thence to their new premises in Northumberland-avenue, erected after John Gibson's plans and designs, and illustrated in our number of October 18, 1879.

Harley House, St. Marylebone.

MESSRS. BOEHMER & GIBBS have been appointed architects for a large block of residential flats that are about to be built by, we gather, Mr. C. J. Hinsley, of George-street, Manchester-square, contractor, upon the site and grounds of Harley House, Marylebone-road. The house, which was built in the former half of the current century, was pulled down two or three weeks ago. It was occupied by the Queen of Oude when she visited England some years since, and was afterwards taken for a convent (Marie Réparatrice) of nuns, for whom a chapel was built on the east side of the house, and who have migrated to Priory Lodge, at Frognal, Hampstead. The grounds contained some fine trees, in which, until two or three years ago, was a rookery.

Mr. Arthur Hughes's Exhibition.

AT the Society of Fine Arts a room is filled with small paintings, chiefly landscapes, by that thoughtful and intellectual artist, Mr. Arthur Hughes, one of the last of the old Pre-Raphaelite band, or at least of those who were immediately influenced by it, though his works have always shown only the good qualities of the school—earnest attention to nature and careful and thoughtful painting—without its eccentricities or exaggerations. For many years those who visit the Royal Academy with a view to finding out what is best in it have been on the look-out for Mr. Hughes's painting (we regret that there is none this year), generally an allegorical or romantic subject treated with great originality and expression, though little understanded of the people; but it is rather a new interest to come across Mr. Hughes as a landscape painter. Here we have, however, a number of small and delicate landscapes full of bright sunlight, lawns and meadows gay and joyous in the light, seas in zones of blue and green and purple, as the cloud-shadows or other influences colour them, woods and streams, all treated equally with a view to general effect and to the truthful rendering of detail. These are landscapes quite out of the ordinary course of things; original and with a special beauty of their own. Among those which might be selected as the most interesting are "Corn by the Sea" (12), "Springtime" (18), a cliff scene by the sea; "Potato Harvest" (23), a little picture of work in a storm of rain, the horses' tails blowing in the wind; "Home with the Dawn" (29), a fishing fleet coming in, with its lights just paling in the dawn; "The Fisherman's Home" (44); "The Shepherd" (47), and "A Flowery Corner" (78), the two last specially delightful for their fine composition as well as other qualities. At the end of the room hangs the painter's fine triptych, "Viola d'Amore," exhibited some three or four years ago at the Academy, to the bewilderment of the average exhibition-goer. We are sorry to hear that this work is still on the painter's hands, nor has it been reproduced in any way. Unfortunately it is a class of picture that appeals only to a minority.

PUBLIC GARDENS, GREAT YARMOUTH.—The gardens and promenades adjacent to the Wellington Pier were opened on the 2nd inst. The gardens are 500 ft. long with a width of 200 ft., and contain a band-stand (not yet completed), and on the east side of the ground a glass shelter nearly 500 ft. long and between 20 and 30 ft. deep. The work was carried out under the direction of the Borough Surveyor, Mr. J. W. Cockrill.

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THE MUNICIPAL PAVILION AT THE PARIS EXHIBITION.

THE Pavilion illustrating the work of the "Ville de Paris" at the present Exhibition is a much more important affair than that of the 1889 Exhibition, which, it may be remembered, was a comparatively small building placed on the axis of the Champ de Mars portion of the Exhibition. The Ville de Paris Pavilion of this year is a very large erection on the north bank of the Seine, close to the head of the Pont de l'Alma. It is constructed mainly of timber, but is very dignified in appearance, and it has appropriately been given some of the architectural proportions of the central portion of the Hôtel de Ville, so as to give a suggestion of its relation to the Municipal Government.

Within this Pavilion are illustrated, by drawings, photographs, and models, all the various classes of public works and public departments of the Paris Municipality. The first room we enter is that devoted to the Police Department, which need not detain us, except for some very interesting historical documents which are hung up, in the shape of printed official notices for the preservation of public order, issued during the early days of the Revolution, and which serve to bring home to one in a very realistic manner the turbulent state of the city in that time. The next rooms (marked "Domaine Departmentale") contain models or drawings of various departmental works. Among these is a model of the bridge at Suresnes, a very elegant steel bridge in three spans, noticeable for its simplicity of design and treatment—an exceedingly good specimen of engineering architecture. The Asylums Department (Service des Aliénés) is illustrated by a sectional model of a large asylum ward, and by a quantity of examples of work done by the inmates. All this seems very satisfactory; one feels less satisfaction with the bird's eye view of the Ecole Le Peletier de St. Farjean; a school with buildings and grounds all laid out in squares and crossing lines like a grid-iron—about as uninteresting and uninviting an abode for youth as can well be imagined; but that is the inherent defect in the French school system, State or Municipal; the schools suggest prisons, and are totally destitute of that semi-domestic appearance which is fortunately to be found in so many English schools. It is in keeping with the whole French idea of government, which is a system of drilling individuals into subordination to a doctrinaire ideal, and is duly reflected by the buildings erected for educational purposes. In a sanitary and structural sense we have little doubt that French school buildings are better constructed and laid out for providing material health than the majority of English ones; but what about their effect on mental health and development?

Within this very varied "Domaine Departmentale" we may notice also a case containing a collection of objects of antiquity found in 1886 in a cemetery at Bry-sur-Marne—they include a number of simple ornaments, horse-shoes, a hatchet, a large bit, &c.; reproductions of medallions modelled as official prizes in contests of music, gymnastics, shooting, &c., all of them very well designed and modelled, as may be expected; and a chart showing graphically the increase in population, since the commencement of the century, of the principal Communes in the Department of the Seine. The supposed stationary condition of population in France at present is at all events not illustrated in the Department of the Seine, if we are to take this diagram as evidence. St. Denis, for instance, possessed a population of 4,000 at the commencement of the century, and has now risen to 55,000, and many other of the Communes have increased in nearly the same proportion. Probably, however, the decrease or lack of increase in the population is to be perceived in the rural districts of France rather than in the towns and villages near Paris.

Coming through the outer range of galleries, we find the interior portion of the building laid out in a large central court surrounded by galleries on the upper level, with the staircases leading up to them treated very effectively as central features rising from the central part of the court. In this court are casts of some of the principal sculptures acquired by the Municipality for the adornment of the streets and squares of the city. On the wall at the upper end of the court is an immense map of the Department of the Seine, about 20 ft. square, and beneath it a large geometrical representation of the bridge over the Marne at Nogent-sur-Marne, a fine example of an iron bridge treated with great simplicity in one sweep of an arched girder, with no ornament but a symbolical fish cast on it in relief at each end, and a gracefully designed balustrade above. In the centre of the court is a large erection which looks like a huge drinking-fountain, but is exactly the reverse, as its basins contain water which you may not drink, being specimens of the untreated water from the principal sources of the Paris water-supply. Four basins contain respectively the water of the Vanne; of the Ourcq, a water of a very red tinge; of the Arve, greenish in tint (probably a chalk water), and of the dirty-brown water of the Seine, with the label "Absolument exclué de la consommation privée." A couple of little drinking-fountains close to supply the purified water as delivered for drinking; the object evidently is to give the public an object-lesson as to the care with which a paternal City Council prepares their drinking-water, but it is a superficial show from which one gets no information; some sections of the filtering-beds would have been more to the purpose. At the farther end of the building there are, however, some very elaborate and interesting models of the "Captage" of the water of the Vanne and of the Loing and Lunain; in the former the water bubbles up in the centre of a large circular artificial pond vaulted over and covered to a considerable thickness with a made soil banking overgrown with grass. Of more practical interest are the detail models of the great distributing sewer-pipe which takes a considerable portion of the Paris drainage to the filtration district at Achères. A section of this pipe, full size, shows that it is about 6 ft. in internal diameter and only about 4 in. in thickness; it is a construction of light circular hoops of iron on edge, tied together by a series of small iron bars running longitudinally, and the whole imbedded in about 4 in. thick of fine concrete; a very strong pipe-drain, but somewhat costly in make. A collection of the different sizes of pipe used in the Paris water-distribution is also shown here; the largest is about 4 ft. in diameter, with a "frette d'acier," a steel band about 3½ in. wide, ringing the pipe at every 2 ft. or thereabouts. In an adjoining room is shown a part model, part panorama, of what is called the "Parc d'Achères," the sewage park of Paris.

Among other engineering details and models in this part of the hall are sections of the Paris streets and sewers, including some sections of old Paris sewers which are of historical interest. A sewer made in the sixteenth century, and which was in use as late as 1840, shows a round-arched stone culvert with a wide and perfectly flat channel. A rather more scientific section, dating also from the sixteenth century, is formed as in the accompanying cut (fig. 1); this also was in use until near the middle of the present century. The

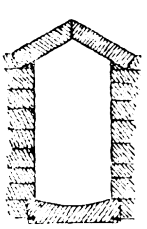

Fig. 1.—Sketch Section of a Paris Sewer of the Sixteenth Century.

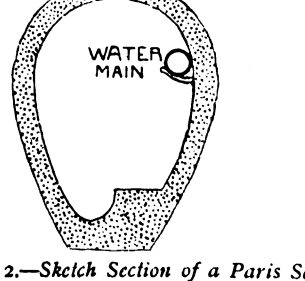

Fig. 2.—Sketch Section of a Paris Sewer of the Present Day.

approved section of Paris sewer of the present day is as sketched in fig. 2, the circular pipe on iron brackets carrying the water-supply. This system of carrying the water-pipes along the wall of the sewer is not modern; it was used in some of the old Paris sewers, of which sections are given, only it was carried not on metal brackets, but on a continuous course of masonry projecting from the sewer-wall just below the springing of the culvert-arch. In this portion of the Exhibition also is shown a large model of a lock on the Saint-Denis Canal, in which the water for filling the lock, instead of being introduced at one end and thereby producing a violent current, is poured into parallel sluices at each side of the lock-chamber, which it enters through openings formed at intervals along the whole length of the lock, so as to cause a steady vertical rise of the water at all parts of the lock. Among other things illustrated in the ground-floor rooms are the apparatus for meter-testing; the street-lamp system of Paris—the "tri-bec" lamp with the Auer burner, a form of mantle-burner; and examples of the materials used for paving in the Department, with statements of their co-efficient of wear. This exhibit, however, appeared in the 1889 Exhibition, when we gave some particulars as to the statistics of wear of the different stones.

In the upstairs galleries are found specimens of the work done by the boys and girls in the technical schools of the Department, which make a very good show. Among those more specially noticeable are those of the Diderot school of metal-working, and those of the "Ecole Boule," in which the design and execution of furniture and decorative textiles is taught. A model of the Rollin College impresses one with the conviction that the interior courtyards, entirely surrounded with buildings, are too small for proper hygienic conditions, in relation to the height of the buildings.

Towards the eastern end of the gallery (south side) is a small but interesting collection of old maps and views of Paris. The latest in date, "Paris in 1697," is described in the title as "Dressé sur les memoires de M. Jouvin de Rochefort, par N. de Fer, Géographe à Monseigneur le Dauphin." It is covered with remarks in a beautiful small written character, and embellished on the margins with small views of the fountains and bosquets of Versailles, then in their pristine splendour. Round the east end of the galleries are collected illustrations of various Municipal buildings; a great model of the new Sorbonne, 16 ft. long (this, we think, was in the 1889 Exhibition); M. Formigé's drawings of the Paris crematorium; photographs of the Sapeur-pompier barracks and of "Groupes Scolaires," including a building bearing the attractive title of "Ecole Maternelle," and looking, unhappily, like a kind of cross between a railway station and a gaol. There is nothing more disagreeably characteristic in modern French architecture than these forbidding and prison-like education buildings, from which all sentiment and feeling seems excluded.

A long gallery on the south side of the building contains a very curious and interesting collection of the artistic possessions of the Municipality. Among these are drawings of historical or topographical interest; a view, for instance, of the Champ de Mars on the day of National Federation (July 14, 1790). Among other water-colour views there is one of the theatre of the Tuileries under Louis XVI., apparently a built-up scene of Classic colonnades; the drawing is dated 1788; strange to think of this elaborate and costly piece of Royal amusement going on placidly the very year before the storm was to break over it. A drawing by Cochin shows the theatre of the Trianon at the performance of "Acis and Galatea," with the actresses on the stage in immense hoops. Another water-colour drawing gives us the Pont Neuf in the eighteenth century, showing that the semicircular balconies corbelled out over the piers were then carried up as covered half-domed shelters — probably removed because they were used for purposes not intended; an earlier drawing by Lespinasse gives a view up the Seine before the quays were built, with a wide beach bordering the river, and a bridge covered with lofty houses, like Old London Bridge, filling up the background. The Napoleonic period is recalled by a drawing of a "Projet" for the Rue de Rivoli with its arcades, dated 1808—for the Rue de Rivoli from the Place de la Concorde to the Tuileries was Napoléon's work, Haussmann only completed it eastward; by a model of

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Napoléon's State carriage with the Imperial eagle seated on the draw-bar, and by the actual cradle presented for the King of Rome by the city of Paris—like the carriage, all gilded, and with the eagle seated on the end as if contemplating the son and heir. Among interesting portraitures is a bust of Bailly, astronomer and mayor of Paris at the outbreak of the Revolution; a very powerful bust of Mirabeau by Houdon; a profile portrait of Napoléon by Prud'hon, and Drolling's characteristic portrait of Isabey, wearing a great peaked cap and engaged in painting a miniature. In short, there is enough of historical and artistic interest in this one gallery to employ a whole afternoon.

Before quitting the Ville de Paris Pavilion we should notice downstairs, in a small room on the south side, near the entrance, the exhibition of the "Vieux Paris" Committee, consisting of a collection of objects found in Paris soil and in the bed of the Seine. These include a great variety of pottery of almost all dates; axes and spear-heads of the stone age; coins from the period of ancient Gaul to the present day, &c. On the wall of this room is hung a restoration or copy of an ancient tapestry-plan of Paris. This is a modern reproduction of an old plan of Paris, known as the plan "de la Tapisserie," which is said to have been executed in the year 1540, by order of Cardinal Louis de Bourbon, after cartoons by Jean Bourdichon, valet-de-chambre and painter to the king ("Peintre du Roi"). After having been for nearly two centuries in possession of the Guise family, it was acquired by the Municipality of Paris in 1737. It disappeared, somehow, a little before the Revolution; but there existed at the Hôtel de Ville a copy of it in water-colour, on nine sheets of paper. This, in its turn, was burned in the conflagration of 1871. A little before this, however, M. Destailleurs, a well-known collector, had several portions of it again copied in water-colour. These copies are preserved in the Municipal library, and there is also in the Bibliothèque Nationale an authentic drawing from the original tapestry made in 1690, a photogravure of which is given in the atlas of "Anciens Plans de Paris." There are also photographs of the Hôtel de Ville water-colour copy, taken before the war.

It is from these various sources that the present reproduction in tapestry, of the estimated size of the original (4·70 by 3·35 mètres), has been made by Mmes. Lépine, who have lent it for exhibition on this occasion.

EGYPTIAN ANTIQUITIES AT UNIVERSITY COLLEGE.

THE enterprise of English archæological societies working in Egypt was splendidly rewarded last winter, and the results—after the usual toll had been levied upon them by the Gizeh Museum—are on view throughout the month of July at University College. The site of the temple and cemetery of Abydos was secured last year for the Egypt Exploration Fund, and the Egyptian Research Account also worked on part of this concession. Probably several seasons will be profitably spent there. Though it has been plundered of antiquities for nearly a century, it is still far from exhausted, and scientific work under Professor Petrie's direction finds the gleanings of greater scientific value than the harvest ever was to previous excavators.

The importance of Abydos lies partly in its being the funerary city of the first dynasties in Egypt, attached to their capital at This, partly in its having been the chief centre in Upper Egypt of the worship of the great god Osiris, the king of the dead. Thus, while for the later periods its remains are inferior only to those of the great capitals Thebes and Memphis, it is the chief, nay, almost the only source of monuments of the earliest times of the monarchy, the date of which may lie anywhere between 3000 and 5000 B.C. Three or four years ago Egyptologists were disposed to treat the first two dynasties as mythical; but Amélineau, the last *concessionaire* of Abydos, discovered royal tombs and remains on which German scholars recognised names of kings of the First Dynasty. Now, by regular excavation of several of these tombs, Professor Petrie has established the succession of the kings and thrown much light on the civilisation and arts of that remote period. He finds that as yet pyramids were undreamt of. The royal tombs consist of large underground chambers with massive, crude brick walls, panelled on the outside, the inside lined, roofed, and floored with wood. The plans have been carefully recovered by Professor Petrie himself, and show considerable development from the beginning to the end of the dynasty. They can be studied in copies hung on the walls of the room, and still better in the memoir on the tombs which has been published to coincide with the exhibition. The burial chamber was more or less surrounded by store chambers for provisions, and beyond these again were the graves of the courtiers.

The royal tombs had all been destroyed at a late period by fire. The contents were naturally found, if at all, only in a very imperfect state, but they are of great interest. Among them were endless fragments of jars in pottery, in rock crystal, and in other hard or soft stones. Many of them bore the royal titles or other inscriptions, and many had plaster caps sealed with cylinder seals. The art of writing was already highly developed and, in fact, displays all the employments of signs that are found later in Egypt. It is, however, stiff and clumsy, and the occasional examples of cursive signs are very different from the fluent writing of 2000 B.C. There are many remarkable pieces of engraved ivory. One is well carved in the form of an Asiatic prisoner. Some of the hieroglyphic signs engraved on hard stone are exquisite; but on the whole the quality of the workmanship in these remains seems to fall below that displayed in the Prehistoric Period. The few scenes that are represented, and the longer pictorial inscriptions, though royal, are decidedly muddled and careless, without any attempt at artistic grouping. Yet there are indications that better style existed at this period. There is an improvement also observable at the end of the dynasty, paving the way for the careful and beautifully executed designs of the Fourth Dynasty. But at Hieraconpolis Quibell found very neat scenes that may be earlier than the First Dynasty.

Besides these earliest remains, the most interesting of all scientifically, there is a wonderful display of stelæ, statuettes, vases, jewellery, &c., of the Twelfth and Eighteenth Dynasties and subsequent periods found by Messrs. MacIver, Mace, and Garstang, such as has seldom or never been seen before at these exhibitions. For the first time also the plan of a temple of the Twelfth Dynasty has been secured. This temple was built chiefly of brick with columns in the façade, stonework at the corners of the main building, and numerous brick chambers attached to it. There is also exhibited an octagonal limestone column of the same age inscribed with titles. It probably supported the roof of a tomb-chamber.

An excellent little interleaved catalogue serves as a guide to the whole exhibition, which includes some drawings and tracings of remarkable scenes in rock-tombs of the old kingdom, made for the "Archæological Survey" by Mr. Davies.

LEICESTER INFIRMARY COMPETITION.

WE last week announced the result of this competition and the names of the three premiated competitors. The drawings have been exhibited during the past week at the Poor Law Offices, and after careful examination of them we are quite prepared to endorse the opinion of the assessor, Mr. W. H. Ward, of Birmingham, that the drawings on the whole are not of so high a standard of excellence as the importance of the competition would naturally lead one to expect. We also thoroughly agree with Mr. Ward that the first premiated design is immeasurably superior to any other exhibited, as, indeed, might almost be taken for granted when one remembers the very large experience in buildings of this character that has fallen to the lot of Messrs. Giles, Gough, & Trollope.

The site, situated on the boundary of the borough of Leicester at Evington, is of irregular form, and with levels varying from 283 ft. to 336 ft. above the ordnance datum. As the highest point of Leicester market-place is 207 ft., it will be seen that the guardians have chosen a fairly well-elevated position for their new infirmary. The site contains about sixty-three acres, and, as this is far more than is required for the infirmary only, competitors were instructed to leave a portion of the site suitable for the erection of a workhouse in the future, for which, under a proper disposition, there is ample space. Provision was also to be made for future extension of the required infirmary itself.

The first premiated design is far superior to any other in the disposition of the infirmary buildings on the site—being cleverly arranged so that while sufficient space is left for the future workhouse in perhaps the most suitable position on the land, the infirmary buildings occupy almost a level situation on the highest part of the ground, and at same time have a considerable acreage open and unoccupied towards the south. The blocks for imbeciles and epileptic patients are also well situated, both as regards their elevation and isolation, whilst at the same time being sufficiently easy of access. Altogether it is difficult to conceive how any better block plan of the establishment could be devised; it certainly, as we have already indicated, is far superior to that of any other competitor. In the arrangement of the infirmary itself it is almost enough to say that it is worthy of the authors' experience and reputation. The main building consists of an administration block, from which a central main corridor running east by north and west by south gives access on each side to receiving wards and two double pavilions.

The administration block is admirably arranged with the commissariat department, comprising stewards' stores, kitchen and adjuncts, and servants' mess-rooms on the north of the main corridor, and the medical, nursing, and managerial departments round a large open quadrangle on the south of the main corridor. In the centre of this quadrangle is the operating-room, a position which differs in principle from that adopted by other competitors, and although, perhaps, open to the objection that it necessitates a slightly longer journey for a patient from the wards, possessing nevertheless the counterbalancing advantages of being isolated, quiet, and exceedingly convenient for the medical staff — advantages which amply compensate for the slight extra distance to be traversed by the patient. In this quadrangular group of buildings the entrance offices and visitors'-room are on the south side, the medical department on the west, with the dispensary adjoining the main corridor, and the nurses and matrons' sitting-rooms and mess-rooms on the east. On the upper floor is provided ample accommodation for the staff.

As we have already noticed, the receiving-wards are on the main corridor, with the store-room for patients' clothes on the north side; this, we think, is a far superior arrangement to that of an isolated block of receiving wards near the entrance, which is adopted by the generality of the competitors.

The infirmary wards are in four double blocks or pavilions, with their axis north by west and south by east. Each pavilion is in two floors, and on each floor is a ward for twenty-four beds, with a day-room and verandah at one end and a special ward, ward-kitchen, and stores at the other end, the whole being in communication with, but separated from, the main corridor by a disconnecting lobby. All wards have their water-closet block central in the length of the ward and placed on the east by north side, whilst a verandah also to every ward is on the west by south side, a minor but important point which has been neglected by other competitors.

The block for short-period lunatics comprises on each side two bed wards, attendance-room with padded-room adjoining, store, bath-room, and water-closet. This building is placed near the porter's lodge at entrance.

The epileptic block is complete in itself in two stories, on each side of which for either sex is a ten-bed dormitory, a day-room, two single rooms, attendants'-room, store, bath-room, and lavatory block. On the ground floor is the general dining-room, kitchen, and accessories. The isolated block is also a complete establishment in itself, with small administration block in the centre, containing nurses'-rooms, kitchen, and adjuncts, washhouse, disinfector, and mortuary, the ward blocks being on either side at the end of a central corridor.

The second and third premiated designs are so far inferior to the first and so little superior, if at all, to some other non-premiated designs, that we opine that the assessor must have had far more difficulty, as indeed frequently happens in competitions, in selecting these designs than in placing the first. The second premiated design locates the infirmary on the north-west portion of the site, thus entailing a considerable fall in the ground line of this building, which is, to a certain extent, obviated by raising the whole of the blocks on open arches. The iso-

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lated blocks are well placed, but the blocks for epileptics and imbeciles are arranged in rather a straggling fashion on the south-west boundary of the site on falling ground. The authors have preserved a position for the workhouse on fairly high ground towards the north-east boundary of the site, but seem to have sacrificed too much for the sake of the position of this future building, which, moreover, although in a good position, is not as indicated on the block plan in itself compact. The arrangement of the administration block is defective, the stores are badly arranged, the vegetable, meat, and bread stores, for example, being open only to the kitchen. The operating-room is on the main corridor, to the disadvantage of the medical staff and of the seclusion which is desirable for this apartment. The infirmary wards are, as in the first premiated design, in two stories, with twenty-four beds in each ward, a single ward, and what is called a balcony day-room at the end of the day-ward. In an alternative plan a day-room is shown separated from the main ward by a bath-room and nurses' kitchen. The sanitary blocks to the main wards are placed in the centre of the long side, but in half the wards it is on the north-east side, and in the other half on the south-west. The adjuncts of the wards at the corridor end are not so well arranged as in the first premiated design, nor is there a disconnecting lobby separating the pavilion from the main corridor.

The plan of the laundry is good, as are also those of the receiving-wards, infectious, and short-period lunatics, although these are of ordinary type, but this design is one of those in which the receiving-wards are isolated buildings near the main entrance. In the blocks for epileptics the dormitories are wholly on the upper floor, the dining-room and day-rooms on the ground floor. The mortuary and post-mortem room are not well arranged.

The third premiated design places the infirmary on the north-west portion of the site, and constitutes it part of a grand future scheme rather than a complete entity. The laundry and engineering department particularly emphasises this idea, in which the future workhouse is to form the centre of the group of which the infirmary laundry and blocks for epileptics, &c., are separated parts. As a whole this would form a good general scheme.

The administration block has an attractive plan and many good points, but also serious defects, notably in the steward's department, which lacks proper arrangement for the reception of stores, there being apparently only one door of access and that on an internal corridor. The ward units in this design are for twenty-four beds and of fairly good plan, with the day-room at the end. They are cut off from the main corridor by an isolating lobby, but the sanitary blocks are in some cases on the north-east, in others on the south-west side of the wards. The operating-room is on the main corridor. The laundry is well arranged, but the officers' washing is proposed to be done in the same washhouse with that of the patients', although separate machines are indicated for it; these probably would, unless under strict supervision, be sometimes improperly used. The block for epileptics is in this design arranged in one story with a dormitory for twenty-four beds.

Taking some of the other designs in the order of their number, we come to design No. 4, which is, in many respects, an excellent and well-worked-out scheme, somewhat expensive, and possessing two features which the assessor considered detrimental, and which undoubtedly placed this design out of court; these are the arrangement of the infirmary wards in three stories, and the provision of a separate nurses' home, this latter in particular being against the express wish of the Guardians.

The infirmary is here placed on the best part of the site, and forms part of a good general scheme for the future. The administration block is excellently arranged, though of a different type to that adopted in the first premiated design. The receiving wards are a separate building near the entrance, intended to be balanced by vagrant wards hereafter. The operating-room is on the main corridor. The detail of the infirmary wards and other buildings leaves little to be desired, and the whole is a most excellent design, although non-suited by the features to which we have already referred.

No. 8 leaves the best part of the site unoccupied, except for a future chapel, and places the infirmary on the southern side, with a considerable slope in the ground, necessitating high arches below the ground floor in order to maintain the level. The ward unit is of an old-fashioned type, not isolated from the main corridor, and with the sanitary arrangements in angular end towers. The administration block is defective.

No. 9 is a design with several good points, but has three-story wards, and leaves no room for convenient arrangement of a future workhouse, both of which form vital defects in the judgment of the assessor.

No. 10 has a general plan resembling somewhat that of the first premiated design except that the aspects of the administration block are reversed, so that the entrance is from the north-west instead of from the south-east. This plan shows a fairly good administration block, and also a good ward unit, although not isolated from the main corridor. The operating-room is on this main corridor, and the receiving wards are separate blocks near the entrance, and are not quite of the best arrangement in detail.

No. 16 is a workmanlike set of drawings, but like several others, although good in itself, is put out of court by the adoption of three-story wards.

In No. 17 the infirmary is placed on the southern end of the site on a south slope. The arrangement of the administration block is good, and so also is that of the ward unit, although it is not isolated from the main corridor.

No. 20 has a site-plan approximating to that of the first premiated design, but the blocks for epileptics, isolated patients, and laundry are scattered. The entrance to the administration block is on the north-west, instead of on the south-east side. The arrangement of the infirmary wards is inferior, and incomplete in the adjuncts.

No. 21 is fairly well arranged on the site, and the arrangement of the administration block is fairly good; but the ward unit is poorly planned, and generally the design follows an old-fashioned type of planning in buildings of this class.

No. 22 in the site-plan suggests an eligible building estate, but is nevertheless not without merit, save that the space reserved for the future workhouse is rather pinched. The administration block is somewhat straggling, but still fairly planned. The ward unit is good, and considerable pains have been taken to give an access exactly north and south. The design, however, if for no other reason, is hopeless through the provision of a separate nurses' home.

No. 25 has a compact site-plan with the infirmary on the highest and most level ground, as in the first premiated design. The administration block is, however, poorly conceived, and, indeed, is little better than a jumble of heterogeneous parts, whilst the buildings are of an old-fashioned type.

In our remarks it will be noticed that we have made no mention of the external architectural treatment of the various designs in this competition. Everything has turned upon plan, and scarcely one of the competitors has furnished anything approximating to a pleasing exterior. Even in the first premiated design one would wish for more artistic, though not necessarily more expensive treatment. It must, however, be admitted that in this particular, as in others, this design holds its own. Perhaps the most artistic elevations are to be found in design No. 4, which we have already commended for its many excellences, although placed out of court by the considerations which have, justifiably enough, determined the judgment of the assessor.

CONGRESS OF ARCHÆOLOGICAL SOCIETIES.

THE twelfth annual Congress was held in the rooms of the Society of Antiquaries on July 11, when Sir John Evans presided. There was a good attendance of delegates from all parts of the country, and a considerable number of subjects discussed. Sir John Evans introduced the question of the "Law of Treasure Trove," with special reference to the present action of the Treasury with regard to the Irish gold finds now at the British Museum; Mr. Round read a good and amusing paper on the "Systematic Study of Place Names"; the custody of diocesan and local records was discussed at length; but the two subjects that were of the most interest were those that came before the morning session.

The first of these was the British Museum Bill, which was introduced by Mr. J. Willis-Bund. Although this Bill was now withdrawn, the principle might be reasserted and so he thought it was worth criticising. He said he looked with favour on any proposal to strengthen the hands of Local Authorities in preserving and dealing with their records, and so he had no objection to the idea of the Trustees of the Museum entering into agreement with County Councils as to the transference of part of their stores, whether newspapers or otherwise. But if such a proposal was to be rendered acceptable there must be financial assistance. He spoke as chairman of a County Council (Worcester) that had just spent a good deal more than 1,000*l.* over their record-rooms to accommodate and preserve the documents in their custody. But it would be too bad for the ratepayers to have to not only find buildings to store the overplus of the British Museum, but also to provide for their suitable supervision and inspection. In this view Mr. Willis-Bund was strongly supported by Sir John Evans, who was careful to explain that on this occasion he did not speak as a Trustee of the Museum, but as Vice-Chairman of the Herts County Council. The discussion was quite one-sided, for all seemed to take the view put forward pretty plainly by Mr. Willis-Bund that it was "a dodge" of the Treasury to make ratepayers do their work. No one seemed to object to local newspaper files being kept in the localities; but the outcome was a resolution urging that the Treasury should press on speedily with the new buildings of the Museum. Sir John Evans said that if the comparatively small scheme of these buildings was carried out, there would be ample room in the basements for the storage of all the literature they had hitherto received.

The other question was the Union of Benefices Bill so far as it affected buildings. This was most ably explained and criticised by Mr. Philip Norman and Mr. E. H. Freshfield. This Bill, promoted by Convocation, has passed through the House of Lords, but is sure to meet with strenuous opposition in the House of Commons, and will probably be withdrawn for this Session. It proposes to extend the Union of Benefices Act of 1860 to the whole of England. That Act gave authority to pull down churches in the City of London and to sell the sites and apply the proceeds to church building in the outlying parts of the Metropolis. The uniting of benefices was only a secondary consideration. Churchyards cannot, unless a special Act is repealed, be built over, so this Act will only allow of the pulling-down and selling the sites of churches in provincial towns or in country districts. Such sites will yield little return, and so very little will be done by such means to relieve the poverty of the clergy. It was argued that that could better be secured by some relaxation of the Pluralities Act. However, the Congress was brought back by the Chairman to the consideration of the archæological aspect. Mr. Willis-Bund was as emphatic as Messrs. Norman and Freshfield in denouncing the Bill, notwithstanding its unanimous episcopal support, and so were two of the clergy who joined in the discussion, the Rev. P. J. Ditchfield and the Rev. R. Dute, Rural Dean of Pershore. The Congress passed with unanimity a resolution of protest against the Bill, as likely to lead to the destruction of a large number of ancient and historic churches throughout the land.

COMPETITIONS.

HONITON WATER SUPPLY.—The competition for a plan for supplying Honiton with water has resulted as follows: First premiated design, Messrs. Beesley, Son, & Nichols, 11, Victoria-street, Westminster, S.W.; second premiated design, Mr. Fred Hammond, St. Ann's House, 27, Bridge-street, Chepstow.

MISSION CHURCH, CARNOUSTIE, FORFAR.—A mission hall in connexion with the Church of Scotland is in course of erection in Carlogie-road, Carnoustie. Messrs. James Maclaren & Sons, of Dundee are the architects, and the following are the contractors:—Masonry, Messrs. A. Black & Son; joinery, Mr. James Miller; slating, Mr. William Robertson; plumbing, Mr. John M'Andrew; plastering, Messrs. Alexander M'Ritchie & Co., all of Carnoustie.

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MAGAZINES AND REVIEWS.

IN the *Art Journal*, under the title "The Story of a Tower," Mr. S. Fisher gives a historic description of the ancient erection at Westminster known as the Jewel Tower. The article by Mr. Quentin on that collection of eccentricities and unfinished figures to be found in the Rodin Exhibition at Paris is a curious example of the manner in which the critics of the present day will accept and bow down to any kind of new humour in art which claims originality. M. Rodin is a genius, undoubtedly, but he is throwing his genius away on the kind of things he is doing now. "Design in a Dead Century," a rather flippant article by Mrs. Bruce Clarke, deals with lacework, and is illustrated by some pleasing designs by the author and other ladies. The Paris Exhibition Supplement is a very good one.

The *Studio* (June 15), a very finely-illustrated number, gives a review of "The Art of 1900" accompanied by many illustrations of decorative work, paintings, and sculpture, including some of Mr. Byam Shaw's studies for figures in "The Ways of Man" and other works, and the nude study for Mr. Draper's "Gates of Dawn," from a very un-beautiful model, which gains by the drapery of the complete work. There is also the second part of the article on "Suggestions for the Improvement of Sporting Cups and Trophies." The illustrations to this have been expressly designed. Some of them, as the "Sketch model for a yachting cup" by Miss Gertrude Smith, are too broken in line and want constructive unity and the quality of "style," which is in fact too often lost in the search for originality; and the design for a silver sporting cup by Mr. David Veazey is ruined by the unfortunate realism of the naturalistic joint in the stalk. This naturalistic treatment of vegetable form is quite out of place in silverwork, or in fact in any metal design. Miss Houston's two cups are admirable.

The Artist includes among its multifarious contents a very good paper on "Design for Stencilling," read before the Society of Designers; an attempt to define the principles which should govern this class of artistic work. The author rightly dwells largely on the work of the Japanese in stencil patterns, from which, as he says, we have much to learn. An article on Dresden China is also of considerable interest.

The *Berliner Architektur-Welt* contains illustrations of considerable variety and interest, especially those of the Villa Staudt in Berlin, of which Herr Otto Rieth is the architect, and Herren Vogel and Widemann the sculptors, whose part in the work is important. The row of windows at the side, with their strongly-moulded architraves and the deep band of sculpture running along between them, has a very powerful effect. Then, with the want of reticence and good taste so characteristic of the Germans, the architect or sculptor or both go and spoil the whole thing by the colossal sculptured head between columns shown on page 128, which looks like a bad joke. The house front in the Behren Strasse, by Herr Messel, is quiet and good. There is a good deal of curious furniture illustration, clever but not beautiful.

The *Architectural Review* (Boston, U.S.A.) contains an article, with a profusion of small illustrations, on the work of Mr. F. Lloyd Wright, an American architect whose name is unfamiliar to us, but who seems to be a man of original ideas and methods, and that without eccentricity, which is a rare virtue. The whole of the plates are also devoted to his work, and are worth attention by English architects.

The *Architects and Builders' Magazine* (New York) contains some illustrations of the buildings at the Buffalo Exhibition, of which the electric tower is a striking design, and a curious scheme by an American architect, Mr. A. L. Valk, for adapting the French cathedral plan to a modern American church; the chapels of the chevet becoming class-rooms! The experiment is hardly a happy one.

The *Engineering Magazine* contains an article of considerable practical value to architects, on "The Electrical Equipment of Office Buildings." The number also contains an article by Mr. J. O'Connell, on "Piecework in the Machine-shop," which, if it refers to American workshops (it is not always easy to say whether an article in the *Engineering Magazine* is American or English unless specially stated), is quite at variance with the view given by the writer in the *Times*, referred to in a note on another page.

Feilden's Magazine is largely devoted to mechanical engineering, but there is also an interesting illustrated notice of the Paris Exhibition, from an architectural point of view, by Professor Jaques Boyer, and some account of the Great Northern Railway widening between Finsbury Park and Wood Green, with photographs illustrative of the structural work involved, chiefly in connexion with alterations to bridges.

The *Antiquary* includes an article on "The Study of Pompeii," by Mr. Fitzgerald Marriott, and one on an old wooden chest at St. Oswald's, Hooe, Sussex. This is a very curious and ancient affair, a dug-out, being a length of oak trunk hollowed out and rudely squared. The writer of the article, Mr. J. J. Newport, is of opinion that it is of Saxon workmanship; it is certainly of very ancient date. "Ancient Customs and Traditions still Lingering in Italy" is the title of an article by Miss Vansittart. The *Antiquary* also records among its Notes the discovery of a hitherto unknown circular staircase in Durham Castle, presumed to have been a means of access to the upper floors of the castle before the construction of the black oak staircase by Bishop Cosins in the seventeenth century.

The *Nineteenth Century* contains a long article by Mr. Spielmann on the "National Gallery in 1900," largely concerned with the question of the selection and acquirement of pictures, in regard to which he notes several important gaps still remaining (no example of Masaccio for instance), and further urges that superfluous Turners and Landseers should go to the Gallery of British Art at Millbank, only enough being retained at the National Gallery to represent adequately the two painters. The view that British art should not be more largely illustrated at the National Gallery than any other school is perfectly sound; the Gallery represents the art of the world, not of England. Mr. Spielmann naturally speaks strongly as to the necessity of thoroughly isolating the building, after the warning we have recently had; and proposes also an increase of internal space by roofing over the two small open courts and throwing them into the galleries. As to the façade, we are glad to see that he expresses the strong opinion that something should be done in the way of improving or rebuilding it, but he does not seem to be alive to the equally great absurdity of the existing arrangements of the entrance and staircases.

The *Fortnightly* contains an article by his Honour Judge Parry on "The Workmen's Compensation Act: What it was to be and what it is." Judge Parry has of course no difficulty in showing that it is full of contradictions and anomalies, if not in itself, at all events arising out of its working, but he seems very much possessed by the idea of compensating workmen for every accident in the course of their employ, whether through their own fault or not. He mentions among other things the case of a boy who had to serve the worker of a machine but was forbidden to interfere with the machine, tried to clean it one day and was injured; and of a railway servant who jumped on the step of a moving train, not in the way of his duty but for his own pleasure, and was injured in getting off. He seems to write as if it were a defect in the Act that both these were ruled to have no claim for compensation! What possible claim ought they to have had, either legally or morally? The number also contains an article by Mr. H. H. Statham on the Paris Exhibition.

Blackwood, under the heading "Musings without Method," has some excellent critical remarks on the Paris Exhibition, showing that the writer appreciates the artistic genius of the French. Speaking of the new bridge, he says, "So simple and just is the design that it would have escaped any but a French brain. . . . The credit of perfect order belongs to France alone." After speaking of the brilliant effect of the Champ de Mars structures when illuminated at night, he adds, "But the two palaces, great and small, need not fear the light of day. None but French architects could have built them, and it is to the severe respect for tradition that they owe their beauty."

The *Westminster Review* contains an article of rather unusual interest as a piece of art-criticism—an essay on the Art of Rembrandt, by Mr. Henry Bishop. Whether the writer is not reading into Rembrandt more than the painter really intended may be a question, but it is an able attempt to analyse the secret of that peculiar power of expression and effect in such a work for instance as "The Rabbi"—to show why it is impressive—which is useful towards a thoughtful appreciation of the work of Rembrandt, although with the painter himself we are inclined to think that the treatment was the result of a kind of inspiration rather than of a settled intellectual theory. A very different type of artist is the subject of another article—the late Aubrey Beardsley, who we do not consider was worth taking in this serious manner; genius he had, no doubt, but he was a kind of disease in art, not pleasant to contemplate.

The *Century* contains two interesting light articles on Paris subjects—"A Pictorial View of the Paris Exposition" (Americans always persist in saying "Exposition" instead of "Exhibition," because it is more French), with pictures by M. André Castaigne, and "Artistic Paris," by Mr. Whiteing, forming the concluding article of a series on Paris of to-day, and also illustrated by Mr. Castaigne's very clever pictures. Mr. Cole's engraving from Constable's "Hay-wain" forms the frontispiece — a beautiful piece of broad line-engraving.

Scribner, under "The Field of Art," considers "Another way of designing a modern house," as illustrated in a Paris *maison à loyer* under the name of "Castel Béranger." This is, judging from the illustrations, a curious and perhaps in some respects wholesome variation on the typical Paris house front, but in the eccentric treatment of metal work and other details it seems to have entirely lost that quality of style which, with all their sameness of aspect, is so remarkable a characteristic of modern Parisian street houses.

The *Revue Générale* includes, in M. Trogan's "Lettre de Paris," some good critical observations in regard to the buildings of the Paris Exhibition. M. Trogan, among other things, is satisfied to find that, when it came to designing a permanent palace (or rather two) the French architects discarded the "esthétique du fer" which was the great novelty of the 1889 Exhibition, and became "architraditionnel"—a new and rather happily-coined word.

The *Gentleman's Magazine* contains a short article by Mr. Austin M. Stevens on "The Sedan-chair," a highly-interesting historic conveyance which would in fact merit a much fuller and more illustrative treatment than is contained in this short literary article. It is an interesting point that Horace Walpole, writing in 1791, attributed the gradual abandonment of the sedan-chair to the increase in the size of London—"The town is so extended that the need of chairs is almost lost, for Hercules and Atlas could not carry anything from one end of the enormous capital to the other." The same number contains one of Mr. Ellard Gore's astronomical articles, on "The Herschels and the Nebulæ."

The *Home Counties Magazine*—an excellent publication, which we recommend to the notice of our readers—contains an article on Lincoln's Inn Gatehouse, with a reproduction from an old drawing by Ireland showing its appearance in 1800. Other articles contain a good deal of matter of archæological and historic interest.

Knowledge contains an article by Mr. Charles Davison, an expert in earthquakes, as we may say, on "The Great Indian Earthquake of 1897." The article is a very interesting one, though it does not throw any special light on the effect of earthquakes on buildings. The number includes a fine illustration of "The Corona of May 28, 1900," drawn by Miss Catherine O. Stevens, from an observing station on the roof of the Hôtel de la Régence at Algiers. Taking the known diameter of the sun as a scale, one of the spikes of the corona must be over 250,000 miles long, or high whichever way we choose to put it. Mr. A. E. Mitchell, in a short letter returning to the subject, "Is the Stellar Universe Finite?" puts the question in a new position by observing that the probability, and the generally received opinion, is that the galaxy, of which our sun is a member, is only one amongst many huge star-groups, which appear where visible to us as nebulæ (some of the apparent nebulæ, however, are surely within our system). If the discussion is confined to the galaxy alone, then its general shape, and our position in it, are fairly well understood. "If the *whole* of the visible stellar universe is to be included, then the question assumes a different aspect entirely, and becomes more formidable than I should care to deal with." Indeed, the difficulty of conception, to

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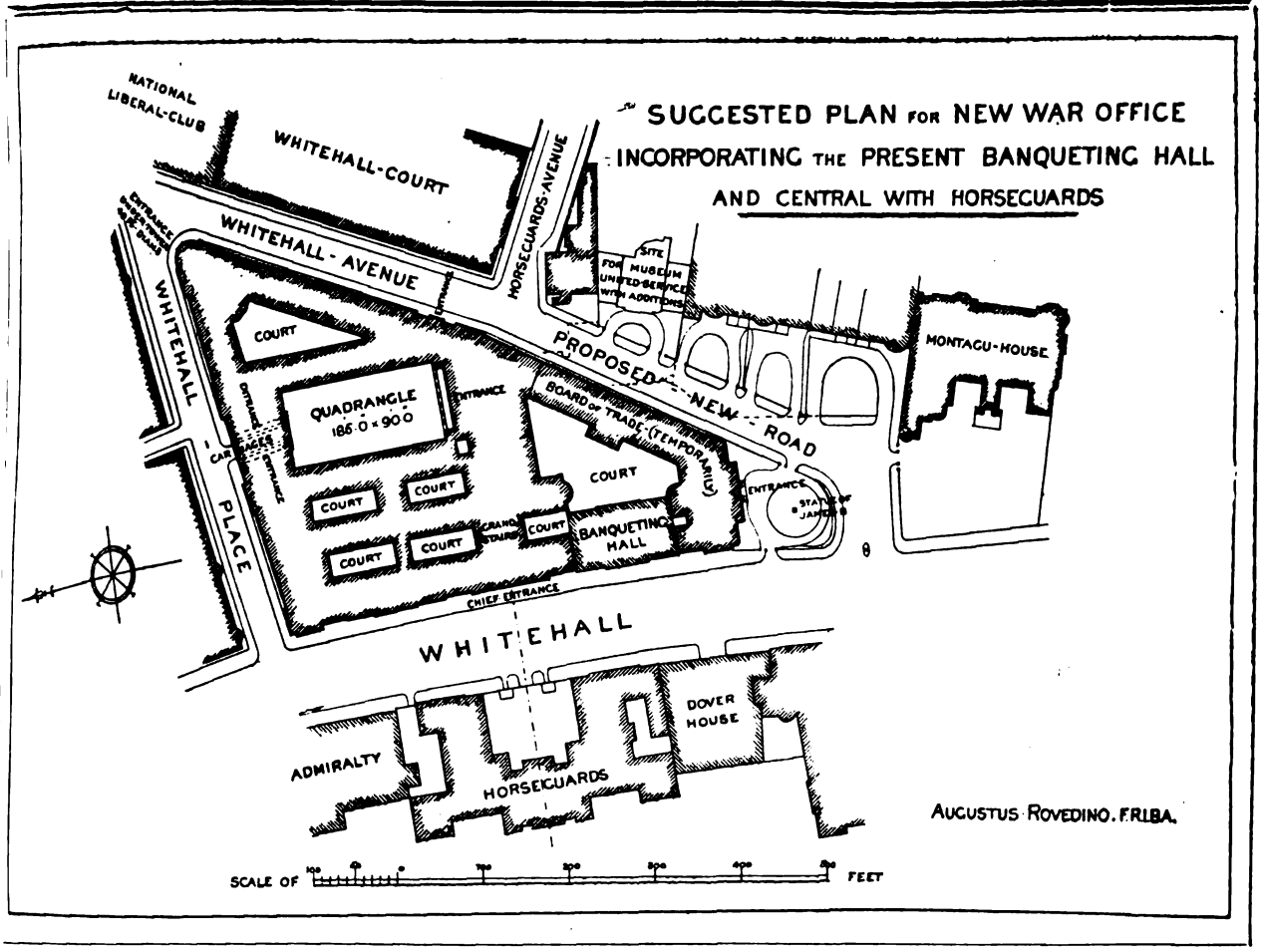

the human mind, seems about as great whether we try to think of it as finite or infinite.

Longman's Magazine contains an article by Mr. Stanley Lane-Poole on "Egypt in the Middle Ages"; it is to a considerable extent social and political, but touches on the works of Ibn Tulun and his great mosque, which the writer claims to have been "the first example of the pointed arch used throughout a building."

The Pall Mall Magazine contains an article on Naworth Castle, by the Rev. A. H. Malan, with illustrations from photographs by the author.

Monuq's Quarterly continues its essay on the "Architecture and Art of Siena."

The Quarry, besides its serial article on "The Mineral Industries of the United Kingdom," includes an article on "Comparative Tests of Different Forms of Cement Briquettes," and one on "A Visit to the Slate Quarries at Angers."

The Genealogical Magazine, which is beginning to add a good many illustrations to its text, gives among others a plate showing the armorial bearings of Arbroath, with an article on their history. These illustrations of the armorial bearings of cities will be of considerable value as a collected series.

We have received also *Harper*, the *English Illustrated Magazine*, and *Climate*.

AN IMPROVED METHOD OF TIMBER PRESERVATION.

AMONGST the many processes adopted for the protection of timber from hostile agencies, there is none which can be said to be absolutely and entirely efficient, although all of them are useful so far as they go. It was formerly believed that the injection of metallic salts in solution caused the formation of insoluble chemical compounds with albuminous matter contained in the sap-wood. In the present day the opinion is generally held that no such combinations are formed, and that the value of metallic salts is only contemporary with their presence in the wood. As they are readily removed by the action of external moisture, no permanent effects can be anticipated. Creosoting is a more efficacious process, being both chemical and mechanical in its nature. Creosote contains a variety of antiseptic constituents of well-known value, but it is highly probable that the long life of timber treated by the creosote process is largely due to the fact that the pores of the wood are sealed up by the thick insoluble oils and naphthaline, so that air and water are excluded, and with them the germs causing decay. Creosoted timber is not thoroughly permeated with the oil, the interior portions are not absolutely sterilised, and the material is usually in a more or less spongy condition after treatment. A recent contributor to the "Proceedings of the American Society of Civil Engineers" gives an account of some experiments upon timber, an improved method known as the creo-resinate process. The writer in question starts with the excellent hypothesis that satisfactory treatment involves preliminary sterilisation concurrently with the removal of as much moisture as may be possible without injury to the fibre of the wood. The application of a suitable antiseptic fluid is then recommended, in order that germs of decay may not enter from without, and the preservative material must be such that it shall not be dissipated by any ordinary agency. Further, it must in some way be provided that the timber shall be able to resist external pressure without undue crushing. To sterilise wood by heat is difficult, firstly, because a very long exposure at the comparatively low temperature of from 215 deg. to 225 deg. Fahr. would be required to attain the desired effect; and secondly, because exposure to a high temperature of, say, 290 deg. to 300 deg. Fahr. would injure the fibres and induce extensive splitting. In the creo-resinate method of treatment the use of high temperatures is rendered possible by the employment of pressure simultaneously with the application of heat. By the adoption of this system it is said that the temperature necessary for destruction of internal germs is ensured throughout the timber, whilst the natural oils are conserved, and splitting or cracking does not ensue. After sterilisation, air is removed from the timber by vacuum apparatus in the usual manner, and the preservative fluid is then injected 200 lbs. under pressure. The mixture recommended consists of—creosote, 38 per cent.; formaldehyde, 2 per cent.; and melted resin, 60 per cent., by weight. The resin is intended to render the mixture thoroughly waterproof, and the formaldehyde is to strengthen the antiseptic nature of the compound, necessarily somewhat reduced by the addition of the resin. Finally, the timber is treated by the injection of milk of lime, which produces a hard, elastic surface. Experiments appear to indicate that the improved method of treatment reasonably complies with all essential conditions. It has already been adopted in the United States, and is certainly a process which merits careful consideration from those interested in the preservation of timber.

SUGGESTED PLAN FOR NEW WAR OFFICE CENTRAL WITH HORSE GUARDS.

IN the accompanying block plan, showing a suggested enlargement of the site for new War Office, it is proposed to do away with that part of the Horse Guards-avenue from its starting point in Whitehall to its junction with Whitehall-avenue (utilising this portion for building purposes), and to cut a roadway *through* Whitehall-gardens (now a *cul-de-sac*) in continuation and extension of Whitehall-avenue, giving thereby a direct route to and from the City and Westminster viâ the Embankment, and forming a very largely increased building area and frontage for the War Office.

That part of the enlarged site facing the new roadway it is proposed could be occupied temporarily by the Board of Trade, subsequently being appropriated to the War Office when further extension was required. By the Government scheme no such extension can be possible, and if a replica of the Banqueting Hall as a Parliamentary Library be carried out as proposed, it will necessarily involve the demolition of part of Whitehall-place and Great Scotland-yard.

Upon the question of cost (compared with the Government scheme), the proposed plan, whilst giving far larger building area and frontage, would destroy only the old buildings (of little value) which abut on the present Horse Guards-avenue.

In the Government scheme, should the Parliamentary Library be erected as proposed, or as in the suggested plan, it is obvious that the buildings of the United Service Museum and Gwydyr House would have to be removed. It is, however, to be noted that the suggested plan provides a site for the reconstruction of the building of the United Service Museum, with space for additions on either side upon the site of old Carrington House, and in the garden attached to this mansion galleries could be erected with top light as occasion required.

AUGUSTUS ROVEDINO, F.R.I.B.A.

P.S.—The approximate area of the Govern-

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ment scheme, including courts and quadrangles, is 102,575 superficial feet. The approximate area of my scheme, including courts, quadrangle, and Banqueting Hall, is 203,930 superficial feet.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Alderman W. H. Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend the Bermondsey Vestry 3,000*l.* for paving works; the Chelsea Vestry, 1,000*l.* for paving works; the Poplar District Board, 9,480*l.* for purchase of land, rebuilding of footbridge, and reconstruction of sewers; the Fulham Vestry, 50,519*l.* for electric light installation and dust destructor, &c.; the Lambeth Vestry, 21,000*l.* for paving works; the Islington Vestry, 8,579*l.* for electric lighting purposes, and 455*l.* for paving works; and the Shoreditch Vestry, 21,905*l.* for electric lighting purposes.

The Works Department.—The half-yearly return of the Finance Committee of works completed by the Works Department up to March 31 last gave rise to a long discussion. In all twenty-three estimated works are reported upon as having been completed during the half-year, and on these there is a loss or a balance of cost above final estimates of 19,950*l.* The loss is chiefly made on some work carried out for the Main Drainage Committee at the Crossness outfall. This was begun under the late management, or before the Department was re-organised, as a result of the report of the Special Committee appointed to inquire into its working. On this work alone, which was estimated to cost 34,617*l.*, there is a loss of 16,279*l.*, the actual cost amounting to 50,896*l.* Out of twenty-two works completed during the past half-year and begun under the present management, fifteen have been executed at a less cost than the respective estimates, and the resulting saving to the Council works out at 4,010*l.* On the other hand, certain blocks of dwellings erected for the Housing Committee have cost considerably more than the estimates. The total amount of excess cost upon these and other works in the list is 7,680*l.*, so that the net result as regards works begun under the present management and completed in the half-year is an excess of cost over final estimates of 3,670*l.*, or about 2½ per cent. The whole of the works commenced under the late management being now complete, it is possible to state the full result of the operations of the Department so far as these works are concerned. The statement shows that the final estimates of these works amounted in the aggregate to 793,990*l.*, and that they have been executed at a cost to the Council of 865,224*l.*, so that the excess of cost has been 71,234*l.*, which is equal to about 9¼ per cent. The works commenced under the present management and completed during the past three years show a saving over estimate of 6,094*l.*, or nearly 3 per cent. A statement of the total operations of the Department since its creation in November, 1892, shows a balance of cost above estimates of 64,539*l.*

Mr. Harris observed that in the past the excuse for the failure of the Works Department had been found in the action of the Moderate members. A new excuse had now been discovered, by which all the mischief was attributed to the late management of the Department, whilst the most rosy anticipations for the future were promised under the present management. The most serious aspect of the question was the bearing it might have upon the work of the Housing Committee. Up to the present time the building estimates had been exceeded by nearly 27,000*l.*, which meant a heavy addition to the debt for housing. The Council were rapidly drifting into a dilemma. He protested against the policy of drift, and hoped the Council would seriously consider how they were hampering housing operations by giving the work to the Works Department.

Mr. Beachcroft declared that the Works Department had proved itself an undoubted failure in regard to the erection of working-class dwellings. Even under the present management the losses were going on. If the results which were before the Council were placed before an industrial dwellings company the latter would either give up building or dismiss their manager. He urged that for the future no work of that kind should be given to the Department, unless it had been previously put out to tender.

Mr. Howell Williams complained of the irritating interference of clerks of the works, and said that while the present system of supervision was maintained the estimates would always be exceeded. If the Department were put on the same footing as the ordinary contractor it would be able to show a profit.

Mr. M'Dougall considered that, taking extras into consideration, there was very little difference in the results between works carried out by contractors and those which were done by the Department. The contractor was always urging for extras, whereas the Department could not get them.

Mr. Burns, M.P., said the Department had met with opposition from a section of the Council, bias on the part of the clerks of works, and a lack of sympathy on the part of some of the assistants. Even if the cost had in some instances exceeded the estimates, the quality of the work done by the Department quite justified its existence. The supervision had been abnormally critical towards the Department, and very superficial towards that of contractors. Whatever the reason might be, the fact was that clerks of works disliked the system of direct employment by public bodies. The Department had pulled down contractors' prices from 15 to 25 per cent. during the past seven years. No doubt there was room for improvement in the Department, and he thought the ridiculous establishment charges should be reduced. If the principle of direct employment were continued, and the occasional supervision of the architect substituted for the present army of clerks of works, the work could be carried out for 5 or 6 per cent. less than at present. In the interests of the ratepayers the Department should be continued, if only to keep bad contractors in order. The Council had secured full value for the expenditure, and the financial loss put forward was purely hypothetical. He looked to the re-establishment of the Works Committee as likely to occur at no distant date.

Mr. E. White agreed that the establishment charges were very heavy, but denied that the quality of the work done by the Department was superior to that of contractors.

Mr. Ward, an ex-chairman of the Works Committee, contended that, allowing for sinking fund charges, the loss on the Department since its formation was not 70,000*l.*, but only 40,000*l.*

The excess votes were then agreed to.

Technical Education.—In reply to Mr. Granville Smith,

Mr. T. A. Organ, Chairman of the Technical Education Board, stated that the Baroness and Mr. Burdett-Coutts had offered to the Council the freehold of the Westminster Technical Institute in Vincent-square, together with two houses and the site adjoining, for the purposes of future extension. The site comprises about half an acre, and the value of the site and the Institute building, which is nearly new, is not less than 11,000*l.* The classes held here have been the most successful of any technical classes in London.

The Strand to Holborn Street.—The Improvements Committee submitted a Report on the invitation to eight leading architects to submit designs in connexion with the new Holborn to the Strand street. The time for sending in the designs has been extended to October 8. The eight selected architects, whose names were given in our last issue, page 9, have been informed that perspectives or any drawings other than those provided for in the Council's conditions will not be admissible. The Report was adopted.

In reply to a question, Dr. Longstaff said, in connexion with the Strand improvement, half the new roadway would be thrown open to the public in three months.

Applications under the Metropolis Management and Buildings Acts Amendment Act, 1878.—The following recommendations of the Theatres and Music-halls Committee were agreed to :—

Proposed Royal room at the Great Queen-street Theatre (Mr. J. Murray).

Proposed engine-room at the new Grand Palace of Varieties, St. John's Hill, Clapham Junction (Mr. E. A. E. Woodrow).

The ventilation of the proposed Theatre, Shaftesbury-avenue (Mr. L. Sharp, for Mr. Lowenfeld).

The Council, having transacted other business, adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

AT the meeting of the London County Council on Tuesday, the following applications under the London Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated :—

Formation of Streets near Brockley Station, Brockley.

Deptford.—That the resolution of the Building Act Committee of July 25, 1898, acting on behalf of the Council, sanctioning the formation of streets, to be named Arica-road (in continuation), Horsted-road (in continuation), Revelon-road, Finland-street, Dundalk-street, Donyland-street, Avignon-road, St. Asaph-road, and Aspinall-road, on the Hogarth estate and Haberdashers' Company's estate near Brockley Station, be rescinded so far as relates to the formation of the proposed street to be named Donyland-street.—Agreed.

Lines of Frontage.

Bermondsey.—A building, partly one story and partly two stories in height, on the north side of Jamaica-road, Bermondsey, between Nos. 63 and 71 (Messrs. Gordon & Gunton for Messrs. Plowman & Co., Limited).—Consent.

Greenwich.—A cricket pavilion on the south side of Manor-way, Lee (Mr. S. Hill for the Derrick Wanderers Cricket Club).—Consent.

Greenwich.—That the application of Mr. L. V. Hunt for an extension of the period within which the erection of two houses on the south side of Manor-way, Lee, was required to be commenced, be granted.—Agreed.

Greenwich.—A house on the south side of Manor-way, Lee (Mr. L. V. Hunt for Messrs. L. Whitehead & Co.)—Consent.

Lewisham.—That the application of Mr. W. H. Woodroffe for an extension of the period within which the erection of a church and school on the south-west side of Perry-vale, Lewisham, at its junction with Perry-rise, was required to be completed, be granted.—Agreed.

Lewisham.—A four-story addition to Burton-villa, Sydenham Park-road, Lewisham, to abut upon Sydenham Park (Mr. G. Tolley for Mr. E. C. Christmas).—Consent.

Brixton.—The retention of a detached greenhouse erected on the forecourt of a house known as Rathcole, Ferndale-road, Brixton, to abut upon Bedford-road (Dr. C. Fenwick).—Consent.

Deptford.—One-story shops on part of the forecourts of Nos. 462 and 464, New Cross-road, Deptford (Mr. J. Webster).—Refused.

Dulwich.—A one-story shop on part of the forecourt of No. 99, Anerley-road, Anerley (Mr. S. C. Dunk).—Refused.

Dulwich.—A one-story shop on part of the forecourt of No. 97, Anerley-road, Anerley (Mr. W. R. Woodhouse).—Refused.

Dulwich.—A one-story shop on part of the forecourt of No. 170, Anerley-road, Anerley (Mr. J. Sherratt).—Refused.

Dulwich.—A timekeeper's office on the forecourt of No. 7, East Dulwich-road (Messrs. McKenna & Co. for Messrs. Batey & Co., Limited).—Refused.

Hackney, Central.—Two blocks of residential buildings on the west side of Clarence-road, Hackney (Mr. A. Bedborough for Mr. J. W. Woodall).—Refused.

Projections.

Hampstead.—Sham half-timber work and a timber-framed bay window and porch at No. 35, Kidderpore-avenue, Hampstead (Messrs. Treadwell & Martin for Mr. A. A. Barron).—Consent.

Lewisham.—An open timber-framed porch at the entrance to the Willows, Hengrave-road, Honour Oak Park, Lewisham (Mr. W. Avis for Major A. Locke).—Consent.

St. George's, Hanover-square.—That the application of Messrs. Holland & Sons for an extension of the period within which the erection of an open portico at the entrance to No. 25, Bruton-street, Berkeley-square, was required to be commenced, be granted.—Agreed.

Westminster.—Three pilasters in front of a building in course of erection on the west side of Regency-street, Westminster (Messrs. Hunt & Steward for the Canteen and Mess Co-operative Society).—Consent.

City of London.—Two oriel windows on the first and second floor levels of a block of offices on the site of Nos. 28, 29, 30, and 31, Bishopsgate-street Within (Mr. T. H. Smith for Messrs. Lewis & Marks).—Refused.

Strand.†—An iron and glass hood at the entrance to the Cocoa Tree Club, No. 64, St. James-street, St. James (Messrs. W. Johnson & Co., Limited, for Messrs. J. Woodward & Sons).—Refused.

Chelsea.—Two bay windows in front of No. 55, Church-street, Chelsea (Mr. R. Burr for Mr. P. H. Jeffries).—Refused.

Hoxton.†—A gallery at the second-floor level in front of Nos. 69 and 71, Willow-street, Hoxton

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(Messrs. Staines & Son for Messrs. Carlhian & Beaumetz).—Refused.

Woolwich.—Bay windows to twenty houses on the west side and twenty houses on the east side of Greenholm-road, Eltham (Mr. R. Stewart for Mr. A. Cameron Corbett, M.P.).—Refused.

Width of Way.

Westminster.—A block of buildings on the south-east side of Francis-street, Westminster, between Greencoat-street and Emery Hill-street (Mr. E. J. Stubbs for Messrs. J. Allen & Sons, Limited).—Consent.

Hoxton.—That Mr. G. R. Cherry be informed that the Council is not prepared to accede to his request for consent to the retention in front of a workshop on the north side of Hobbs-place, Hoxton-street, Shoreditch, of a boundary fence at less than the prescribed distance from the centre of Hobbs-place . . . but that Mr. Cherry be informed that a proposal to at once set back the boundary fence to a line drawn from the south-east corner of the building to the westward to the south-west corner of the building to the eastward, accompanied by an undertaking to set back such fence to the prescribed distance from the centre of Hobbs-place wherever required by the Council so to do, would be considered.—Agreed.

Greenwich.—A house on the east side of East-street, Trafalgar-road, Greenwich (Mr. G. A. Lansdown for the Star Omnibus Company, London).—Refused.

Space at Rear.

Deptford.—A modification of the provisions of Section 21 (1) (vi.) of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of a two-story dwelling-house on the south side of Grinstead-road, Deptford, at the corner of Trundley's-road, with an irregular space at the rear (Mr. J. Newton).—Consent.

Deviation from Certified Plan.

St. George, Hanover-square.—Deviations from the plan certified by the District Surveyor, under Section 23 of the Act, so far as relates to the proposed rebuilding of a stable and coach-houses with living-rooms over, on the site of Nos. 45 and 45B, Hay's-mews, Hill-street, St. George, Hanover-square (Mr. T. H. Smith for Mr. B. Lewis).—Consent.

Lines of Frontage and Width of Way.

Islington, South.—An addition at the rear of the Grand Theatre, Islington, to abut upon Torrens-street (Mr. F. Matcham).—Consent.

Kensington, South.—A temporary iron building on the north side of Holland-street, Kensington (Mr. E. C. Pilkington for the Kensington Estates Company).—Consent.

St. Pancras, West.—An addition in front of the Mitchell Cycle Factory, on the west side of Harmood-street, St. Pancras (Messrs. Thomson, James & Heard, Limited).—Refused.

Width of Way and Height of Building.

City of London.—A factory building on the north side of Fann-street, Aldersgate-street, City, at the corner of Hot Water-court, at less than the prescribed distance from the centre of Fann-street, and to exceed in height the distance from the front wall of the building to the opposite side of the street (Mr. F. E. Tubbs for Mr. H. T. Tubbs).—Consent.

Formation of Streets.

Hammersmith.—That an order be issued to Mr. J. L. Briggs sanctioning the formation or laying-out of two new streets for carriage traffic on the Lonsdale Bishopric Estate, Rylett Crescent, Hammersmith, and the abandonment of the formation of a proposed extension of Rylett-crescent appproved by the Council on April 4, 1894 (for Mr. H. Richardson). That the name Pitville-road and Rylett-crescent (in continuation) be approved for the new streets.—Agreed.

Norwood.—That an order be issued to Mr. C. J. Hewitt sanctioning the formation or laying-out of new streets for carriage traffic on the east side of Knight's Hill-road, West Norwood, and the abandonment of the formation of the proposed street to connect Ladas-road with Tivoli-road approved by the Council on July 24, 1894 (for Messrs. T. & J. T. Marsh and himself). That the names Dassett-street, Ladas-road (in continuation), Tivolo-road (in continuation) and Woodcote-place (in continuation) be approved for the new streets.—Agreed.

Lewisham.—That an order be issued to Messrs. G. Trollope & Sons sanctioning the formation or laying-out of a new street for carriage traffic to lead out of the north side of St. Julian's-farm-road, West Norwood, for the executors of the late Mr. G. F. Trollope. That the name Uffington-road be approved for the new street.—Agreed.

Lewisham.—That an order be issued to Mr. J. W. Webb, refusing to sanction the formation or laying-out of three new streets for carriage traffic on the Crofton Park estate, on the east side of Crofton Park-road, Brockley.—Agreed.

Means of Escape from Top of High Buildings.

City of London.—Means of escape in case of fire, proposed to be provided in pursuance of Section 63 of the Act, on the top story of a building known as Electric Railway-buildings, Finsbury-pavement, Moorfields, City (the upper surface of the floor of which story is above 60ft. from the street level) for the persons dwelling or employed therein (Mr. T. P. Figgis for the City and South London Railway Company).—Consent.

Buildings for the Supply of Electricity.

Lambeth, North.—A wood and Iron building on the roof of the meter room at the Charing-cross and Strand Electricity Supply Corporation's premises, No. 85, Commercial-road, Lambeth (Mr. W. B. Pinhey for the corporation).—Refused.

Cubical Extent and Uniting of Buildings.

Battersea.—Formation of openings in a party wall in Messrs. Ruby's works, Park-road, Battersea, at the rear of houses in Elcho-street (Mr. R. W. Price, for Messrs. Ruby, Limited.).—Refused.

The recommendations marked † are contrary to the views of the Local Authorities.

LONDON BUILDING ACT, 1894.

THE TRIBUNAL OF APPEAL AND NEW THOROUGHFARES.

THE Tribunal of Appeal under the London Building Act, 1894, sat at the Surveyors' Institution, Great George-street, Westminster, on the 6th inst., to hear an appeal by Messrs. A. H. & A. E. Simpson, under Sections 9 and 19 of the Act, against the order of the London County Council refusing to sanction the formation or laying out of new streets for carriage traffic on the Glyn Estate, on the east side of Daubeny-road, Homerton. The members of the Tribunal sitting were Messrs. Arthur Cates, F.R.I.B.A., A. H. Hudson, and J. W. Penfold.

The appellants were represented by Mr. Jutsum (Jutsum & Jones), and the London County Council by Mr. Andrews, from the Solicitors' Department.

The grounds upon which the appeal were based were that on May 2 the appellants made an application to the County Council under Section 7 of the London Building Act, 1894, for their sanction to the formation or laying out of certain new streets proposed to be named Meeson-street, Rensberg-street, Aliwal-street, and Ashdean-road respectively, on the Glyn Estate, Homerton. The Council refused to sanction the application, the reason assigned being "that the new streets would not at and from the time of forming and laying out each afford direct communication between two streets formed and laid out for carriage traffic." The appellants submitted that the proposed new streets would, from the time of forming and laying out, each afford direct communication between two streets formed and laid out for carriage traffic, and that, therefore, under Section 9 of the Act the respondents ought to have sanctioned the application, or, in the alternative, that the respondents ought to have sanctioned the laying out of one of such streets, or, as a further alternative, that they ought to have sanctioned the formation or laying out of such streets or some one of them subject to conditions.

Mr. Jutsum pointed out that the great obstacle to the plans being sanctioned was the fact that there was no direct communication with a public thoroughfare at the extreme end of the proposed roads, but he submitted that had the Council used their discretion they could have put the appellants in a position to complete the whole of the roads before any one of them should be utilised for any purpose, and if that were so, from the time of completion there would be direct communication between two streets. The appellants were quite prepared to accede to any reasonable conditions the Tribunal might impose. It was within their jurisdiction to say that these roads should be laid out and formed in the way in which it was proposed, at the same time precautions could be taken to carry out the intention of the Act, namely, to prevent the creation of *cul de sacs*. That the Tribunal had this power was evidenced by the remarks of Mr. Justice Phillimore in giving judgment in an appeal. In this his Lordship laid down that questions of this sort were purely matters within the discretion of the Tribunal.

Mr. Hudson pointed out that there was a piece of uncovered land intervening between the site and the public street. Had the appellants any right to deal with that?

Mr. Jutsum replied that he had no evidence as to that.

Mr. Frederick Meeson, architect and surveyor, having given evidence explanatory of the plans,

Mr. Andrews, for the County Council, contended that in the absence of evidence of the ownership of the strip of land referred to the Tribunal could not take cognisance of it. Generally speaking, it was the intention of the Legislature by these sections of the Act to secure the proper width and direction of streets, and the point in this appeal was not whether A, B, or C could develop his land by making some curious formation of streets, but whether on the whole evidence the Council, having regard to the public convenience, regarded the plan as such as they could sanction. He contended that, under the scheme suggested, any one going into Daubeny-road would get into a kind of maze. They would get into Ashdean-road at first and then into Rensburg-road, and there seemed no way of preventing a person getting out at the point at which he started. It was highly necessary in the public interest that there should be direct communication between two streets. In the Edmonson and London County Council case (66 *Law Times*, N.S., p. 200) this view was upheld in the Queen's Bench—that was, it was not only the interest of the landowner that must be considered in these schemes, but that of the public generally. As to cases which could be regarded as precedents, and which had engaged the attention of the Tribunal, he reminded them of the Butcher's-lane and Bevington-road appeal. A serious objection to the scheme was that, although the length of streets worked out at one-third of a mile only, there were no fewer than five rectangular turns.

Mr. Alfred Milwood, clerk in the Building Act Department of the London County Council, said these applications were always considered with due regard to the interest of the public and the convenience of the future inhabitants in access.

Mr. Andrews stated that the Hackney Vestry was represented by its Surveyor, and he had instructions to give evidence in support of the refusal of the application.

After the Tribunal had consulted, the Chairman said they had no alternative but to dismiss the appeal. They made no order as to costs.

ARCHÆOLOGICAL SOCIETIES.

ROYAL ARCHÆOLOGICAL INSTITUTE.—At the general meeting on the 4th inst., Sir Henry H. Howorth, President, in the chair, Mr. T. T. Greg exhibited two pieces of pottery. The first was a stove tile, 13½ in. by 9½ in., of the time of James I., made of red clay, and covered with a rich green glaze, and probably of German make. The design is heraldic in character. The other was a square-shaped slab or shield, with a round top, furnished with two stout handles. It is 17½ in. wide by 16½ in. high, and decorated with a rude floral and geometrical pattern in yellow and brown slip. It bears the letters and date, "F. T. E., 1758," and is supposed by Mr. Greg to be the door of an oven or a rude fire-extinguisher or curfew. —Professor Bunnell Lewis read a paper on Roman Antiquities at Baden (Switzerland) and Bregenz. He began with some prefatory remarks on the difference between hospitals in heathen and those in Christian times. The former were established for the use of soldiers and slaves, and not simply for charitable purposes as in our own days. In March, 1893, Herr Meyer commenced excavations at Baden, and the results led him to conclude that the Romans had a military hospital there. Surgical instruments in great numbers were found, amongst them a piece of a catheter, a forceps, spatulas, alembics, little bone spoons, balances for weighing drugs, and 120 probes (*specillæ*). In corroboration of Herr Meyer's conclusions, Professor Lewis pointed to the proximity of a Roman camp at Vindonissa, where a legion was quartered, and the fact that Baden (Aquæ) was frequented by patients on account of its salutary waters. The excavations carried out by Dr. Jenny at Bregantium (Bregenz) led to the discovery of the Roman roads that connected the town of Augusta Vindelicorum (Augsburg) with Vindonissa (Windisch). He also identified the site of many buildings—the Forum, public baths, &c. Professor Lewis exhibited maps, prints, and photographs in illustration of his paper.—In a paper on St. George in art, legend, ceremonial, &c., Mr. J. Lewis André pointed out the extremely mythical character of that saint, but argued that his having existed was proved by the very rapid rise of his cult in Europe, and especially in the East. The gradual promotion of St. George to the position of patron of England was next touched upon, and his connexion with guilds in this country, as in those of Chichester and Norwich. Miracle plays and *tableaux vivants* of incidents from the legends of the saint were briefly alluded to, and also reference made to representations of the warrior martyr, as seen on the walls of English churches. Mr. André concluded with asserting that St. George was rather the popular saint of the laity than the hero of the clergy. Messrs. Green, Talfourd Ely, and Rice took part in the discussions.

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Illustrations.

PROPOSED NEW DOCK OFFICES, LIVERPOOL.

WE have already, in our last issue, given a tolerably full review of the three premiated designs (which alone have been publicly exhibited) for the proposed new offices to be erected at Liverpool for the Mersey Docks and Harbour Board. We give this week the perspective view and the principal plans of the first premiated design, by Messrs. Briggs, Wolstenholme, Hobbs, and Thornely. The following reprint of the report by the architects, accompanying the design, will explain the objects which have been kept in view in the design, and the manner in which it is proposed to carry it out :—

"In dealing with the site at our disposal we have effected a saving of 12 ft. along the east boundary, and also set the building back on the south and west fronts. We have not followed the building line on the west side, as we consider it preferable that the building should be rectangular in form. The land thus available, in addition to that specified to be left for ornamental grounds, provides a space capable of being treated more effectively than would otherwise be the case, and also enables us to provide an easy access for carts under the main building to the areas within for the supply of heavy goods generally.

Entrances.

The main entrance is placed on the south-west front, the roadways on the south and west boundaries being the most important thoroughfares. Ample entrances have been also provided in Brunswick-street and the proposed new street on the east side. We would draw special attention to the manner in which the three entrances converge by spacious and well-lighted corridors to a central hall, from which the various floors would be served by the four passenger-lifts. The grand staircase is placed between the central hall and the main entrance-hall. By this arrangement the lift attendants are able to superintend the whole of the corridors and easily direct the traffic on each floor, thus reducing to a minimum the usual difficulty the public have in finding the various departments in a building of this magnitude. A further advantage of this plan is that the various departments are self-contained, and that access to all of them (with the exception of a few of the single rooms on the second floor) is obtained by direct approach from the hall or corridors without the necessity of passing any other department, thus considerably reducing the length of corridors. We would point out that by this arrangement of central corridors we are enabled to provide windows on each side of all the large offices of the various departments, an undoubted advantage both for effective lighting and ventilation. The concentrated arrangement of the hall and staircase will undoubtedly give a spacious and dignified appearance to the interior of the building.

Lavatories.

The lavatories for the principals, clerks, and lady typists are grouped in a central position on each floor, and within easy reach of the various departments. A ventilated lobby separates each from the corridors. The whole of the drainage is concentrated by this arrangement.

The Departments.

We would emphasise the following points in the various departments :—1. Rates and Dues Departments : The manner in which this most important department has been planned enables us to obtain in the fullest degree ready ingress and egress from the streets. Two direct entrances from the street are provided, in addition to that communicating with the entrance-hall. With this same object in view, we have thought it advisable to make the floor of the general office only 4 ft. above the street level, which also gives an additional height of 3 ft. to this office, increasing its height to about 19 ft. The difference in the floor levels also enables the principal to overlook the whole department from his private room. The whole of the clerks are placed in one group behind the counter, which facilitates intercommunication between the subdivisions of this department.

2. Harbour Master's Department—Graving Dock Offices : We have kept the floor of the graving dock office within one foot of the street level, and provided a separate entrance for the public using this office. 3. Board and Committee Rooms : A separate cloak-room and lavatory has been provided for the members of the board. 4. General Manager and Secretary's Department : Stationery Superintendent : A room has been provided in the basement for receiving and unpacking heavy cases of stationery, &c., with a lift communicating direct with a store-room on a mezzanine and the office on the first floor. 5 Check Office : The general office has been made sufficiently large to accommodate a series of racks for the large number of papers which accumulate in this department. 6. Marine Surveyor : The drawing office, which faces north, provides ample space for the exceptionally large table required for the charts made in this department. It has been thought advisable to provide a plan and record room, and also accommodation for chains and surveying instruments generally. 7. Strong Rooms : It will be observed that in most instances the entrances to these rooms have been arranged to lead out of an ante-room, so that when the doors to strong rooms are open the rooms will be lighted by the window opposite. We have taken advantage of the height available to provide a mezzanine floor over some of the strong rooms, where books and papers which are not in daily use may be stored.

Spare Office Accommodation.

Although the instructions and conditions issued 'suggest' on page 7 that the buildings should consist of six floors, exclusive of the basement but including the ground floor—the fact that the second-floor departments require little more than half of the superficial area of the first floor and that nothing is said in the instructions as to the remaining space on the second floor being available for future additions to the staff—we take it that the two entire floors of the building, viz., the third and fourth referred to in your instructions, are presumably to be of an equal area to that required by the departments of the second floor. We have, therefore, been able to provide on the second, third, and fourth floors more than an equivalent to the two vacant floors asked for, thus making the building five stories high. The superficial area of the vacant floors that we have provided (exclusive of the provision suggested by us for keeper's house and stores on fourth floor) amounts to 66,250 superficial feet. If further space, however, is required for vacant offices, a sixth floor could easily be provided by placing two stories in the roof without materially altering the design. The arrangement we have adopted has also this advantage—that the building above the first floor facing Brunswick-street and the new street need not be built until the accommodation is actually required. There would still be vacant offices on the third floor equal in area to the second-floor departments, as well as some available space on the fourth floor. The appearance of the building as seen in the perspective view would not be affected.

Style.

The style adopted in the design of the building is that of the Late English Renaissance, treated in a simple and dignified manner. The two towers flanking the main entrance form prominent features in the design. The treatment of the interior of the building has been designed in harmony with the exterior.

Heating and Ventilating.

Heating.—The heating throughout would be by means of low-pressure hot-water pipes leading from boilers placed in the basement. Radiators would be fixed throughout the building in convenient positions. The system would be divided into sections. A spare boiler is shown for use in case of emergency. The principals' private offices would have fireplaces in addition.

Ventilation.—The planning of the building lends itself to an easy and efficient system of ventilation. As previously mentioned, there are windows in the opposite walls of all the large offices. Warm fresh air would be introduced through the radiators. The extraction of the vitiated atmosphere would be accomplished by means of an electric fan placed in each of the towers and turrets at the angles of the building; these would be connected with a main air-duct formed in the roof. This main air-duct would again be connected to the rooms on the various floors by brick flues, built in the chimney breasts and other portions of the building where the thickness of the walls permitted it, and elsewhere by flues formed of galvanised steel, flush with the face of walls in chases left for the purpose. Into all these flues, immediately below the cornice, panels would be placed as outlets for the vitiated air. The lavatories would be similarly ventilated into the special air-flues, built around the smoke-flues, and kept absolutely separate from the general scheme of ventilation, the position of the lavatories facilitating this provision. Due provision would be made in all cases for the regulation and proper control of the inlet and outlets in the various rooms. The admission of the fresh air would be, as before described, through radiators, with supplemental air-inlet panels. These air-inlet panels when closed would be flush with the wall, and could be opened to any angle to admit the desired volume of air. The air admitted both through radiators and panels would be filtered.

Drainage.—The concentration of the lavatory blocks in the centre of the area allows of a very simple system of drainage; manholes are provided at every change of direction, and proper ventilation secured to every length.

Materials.

We propose that the whole of the frontage of the building be faced with specially selected stone from the Grinshill or Darley Dale Quarries. The walls of the areas would be faced with Aston Hall buff bricks, the size of the areas making it unnecessary to use white glazed-brick facing. The roof to be covered with green Westmorland slates. The walls of ground floor, halls, corridors, and entrances to be lined with marble. The architraves, arches, and jambs to doors and windows to be of polished Hopton Wood stone. The columns to staircase and halls to be of red polished granite, the steps and landing of staircase to be of granite, supported by steel joists. The balustrades to be of Hopton Wood stone. The walls of landings and corridors to the upper floors to have faience dados, the upper portions being finished in plaster.

Walls.—The walls of the principal public offices to be finished in plaster with dados of faience. The committee-room and principal's private offices to have dados of polished mahogany. The board-room to be panelled to underside of cornice with polished mahogany. The pilasters and columns to be of alabaster. The cornice, panelling above same, and ceiling to be of fibrous plaster. The lavatory walls to be covered with glazed tiles throughout—the divisions between closets being built of glazed bricks.

Floors.—The floors throughout to be of fireproof construction. The steel joists would be protected either by concrete or adamant blocks. The steel stancheons supporting the main girders would be encased with coke breeze concrete, finished with faience in the principal rooms. The surface of floors to hall, corridors, and lavatories to be finished with terrazzo or other similar material. The floors of offices to be laid with dovetailed maple-wood blocks.

Roof.—The roof, principals, and purlins would be constructed of steel encased in coke breeze concrete.

Foundations.—We propose to carry the foundations down to the rock in all cases by means of cement concrete piers, as shown on the sections.

Cost.

We estimate the cost of the building as follows :—

Foundations.—The cubical contents of the foundations measured from the surface of the rock to within 2 ft. of the basement floor amount to 1,700,000 ft. Pricing this at 2d. per cubic foot, the cost works out at 14,166*l.*, or about 2*l.* 12*s.* 6*d.* per superficial yard of the portion covered by the building. Towards this amount of 14,166*l.* a sum of at least 1,000*l.* could be obtained by charges bring made to contractors for permission to use the available space as a tip.

Superstructure.—The cubical contents of the whole of the superstructure measured from 2 ft. below the basement floor to half-way up the roof, including all towers, chimneys, and other features, amounts to 4,339,242 cubic feet. Pricing this at 1*s.* 1½*d.* per cubic foot—a figure at which we are of opinion the work could be executed—the cost is 244,080*l.*

The total cost is as follows :—

Foundations—		
1,700,000 cubic feet at 2d. per cubic foot.....	14,166*l.*	
Less amount obtained from contractors, say.....	1,000*l.*	
		13,166*l.*
Superstructure—		
4,339,242 cubic feet at 1*s.* 1½*d.* per cubic foot		244,080*l.*
Total cost		257,246*l.*

(Including areas and parapet walls.)

Referring to the suggestion made previously in the report as to the manner in which a portion of the spare offices could be built hereafter if this proposal were adopted, the cost of the building would be reduced by 47,000*l.*, making the first cost 211,246*l.* In regard to the clause in your conditions as to the economy to be borne in mind in designing the building, we have relied upon simple and straightforward methods of planning to bring about the desired result."

We think our readers, after inspecting the illustration, will agree with us that it promises, if carried out, to be an important addition to Liverpool architecture, and a building not unworthy of its exceptionally fine and effective site.

COMPETITION DESIGN FOR OLD BAILEY SESSIONS HOUSE.

WE give this week the elevations and plans of the design submitted by Mr. F. T. Baggallay in this important competition.

We have already made our comments on the designs. The following is Mr. Baggallay's description of his intentions in working out the design :—

"The considerations which more than any other affected the planning of this scheme were, the desire to avoid the inconvenient arrangements threatened by the restricted size and irregular shape of the site, and the fear evidently entertained by the promoters of difficulties as to rights of light over adjoining properties. The latter consideration, in particular, seemed to forbid any great height in

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the building and the introduction, except in the cell section, of any larger number of stories than the three contemplated in the particulars issued. This difficulty as to extra stories for some of the accommodation made it necessary in the end to abandon the intended great hall. The desire to concentrate the courts, the witnesses' rooms, and the prisoners' cells, and provide the readiest access to the first from the others, as well as to provide a dignified route for the Lord Mayor's procession to the bench of the principal court, together with questions of light and air, chiefly shaped the main plans. A little extra area was gained on the principal floor by projecting the Lord Mayor's parlour over the Sessions House yard, in accordance with permission conveyed in the circulated answers to competitors' questions, to build over the yard on the first floor if it did not interfere with light and air. A good deal of consideration was given to the ventilation of the courts and large witnesses' rooms, with the result that the plans are a good deal cut up and confused by flues. As regards external treatment, the question arose whether the long front should take the comparatively undignified form of a short building with a wing, as suggested by what seemed the best arrangement of plan, whether an inferior arrangement should be adopted to produce a long façade, or whether the latter should be treated to a large extent as a screen or mask; the latter course being eventually chosen. Regret at the loss of Newgate Prison as an architectural feature of London, and a wish to retain some reminiscences of it, largely affected the external architecture; but the recesses in the Old Bailey front, suggested by old Newgate, were chiefly welcomed for their value in giving depth and shape to the building."

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—The annual excursion of the Northern Architectural Association was held on Saturday last. The party travelled by the 9.30 a.m. train from Newcastle, arriving at Leyburn at 11.36. The following members were present, and lunched at the Bolton Arms Hotel: Messrs. W. Glover (President), Newcastle; F. Caws (Vice-President), Sunderland); H. G. Badenoch, J. Bruce, H.C. Charlewood, J. W. Dyson, C. S. Errington, J. Oswald, A. B. Plummer, W. Sheriff, W. R. Story, and C. Walker, Newcastle; G. T. Brown, Sunderland; G. Brumell, Morpeth; J. A. Lofthouse, Middlesbrough. After lunch the party drove to Spennithorne, where the rector conducted them over the church. They then proceeded to Jervaulx and Middleham. At Jervaulx the extensive ruins were inspected and numerous photographs and sketches were taken. At Middleham the rector explained the principal points of interest in connexion with the castle and church. After dining together in the evening the party left Leyburn at 7.28 p.m. At Northallerton an hour was spent on the return journey, and the church was visited.

Books.

The Law of Landlord and Tenant. By SYDNEY WRIGHT, Barrister-at-Law. London: F. P. Wilson, *Estates Gazette* Office.

THIS is a useful, clearly-expressed book, a little in danger, however, of being too extensive for the layman and not quite elaborate enough for the lawyer. As a matter of fact, we are inclined to think it will be found most useful to a lawyer who has a general idea of the law, and yet from time to time needs a handy but fairly full book for reference. The law is now well settled, and very few decisions are in these days given on this subject, which is one which should have the main principles and statutes which refer to it codified; but such work is apparently one which a Government will not take up. The work before us shows how comparatively easy it would be to formulate a code dealing with the law of landlord and tenant. However, until this is accomplished a book such as this of Mr. Wright must be useful to a large number of persons, though the price of it, 12s. 6d., is somewhat high if it is expected to sell among others than lawyers.

Inorganic Chemistry for Advanced Students. By SIR HENRY ROSCOE, F.R.S., D.C.L., LL.D., and ARTHUR HARDEN, Ph.D., M.Sc. (Vict.). London: Macmillan & Co. 1899.

THIS work is intended for the use of the student conversant with the elementary principles of chemistry as set forth in the "Inorganic Chemistry for Beginners," previously written by Roscoe and Lunt.

The greater portion of the book is written on lines long familiar in students' text-books, but it has evidently been brought thoroughly up to date since it describes argon and helium, the cyanide process of gold extraction, and calcium carbide manufacture.

An indication of the progress which is being made in the study of chemical science is afforded by the fact that one chapter is devoted to Thermo-chemistry and another to Electro-chemistry.

Compared with corresponding books of ten or fifteen years ago, the present work demonstrates that even the schoolboy's study of chemistry is becoming more and more a study of the industrial arts and of the laws which regulate both common and uncommon phenomena. Phenomena, which yesterday appeared marvellous or weird and uncanny even to the cultured adult, are to-day discussed and explained with happy confidence by every Board School urchin.

Exercises in Graphic Statics, with Examples of its Application to Practical Designing of Constructional Ironwork. By G. F. CHARNOCK, A.M.Inst.C.E. Part I. J. Halden & Co., Manchester. 1899.

ONE characteristic of the present day is that the chiefs of technical colleges and institutions are exceedingly apt to publish text-books of their own instead of adopting the standard works of other people. No doubt this practice has the recommendation that students are enabled to grasp more fully the views of their teacher if he has written the book or books which form the basis of their home-work. But there is always a possibility that the successful teacher may not be a successful author. So far as the exercise book now under consideration is concerned this reservation need not be made. Mr. Charnock has produced a very useful series of diagrams relative to simple stresses in framed structures, and although the accompanying letterpress is of rather scanty proportions, we presume the student is supposed to obtain such explanations as are necessary by attending lectures at the college with which the author is connected, or by studying some one of the many text-books on graphic statics. The diagrams appear to be carefully worked out, and an interesting sheet is one showing stress diagrams for the Ferris wheel erected in Chicago for the World's Fair in 1893, and of which the larger example at Earl's Court is sufficiently familiar to Londoners.

Hand-book for Gas Engineers and Managers. By THOMAS NEWBIGGING. Sixth Edition. London: Walter King. 1898.

"NEWBIGGING'S HAND-BOOK" has been the familiar friend of the gas manufacturer for so long a period that any recommendation of the book at the present date is superfluous. The present edition is the sixth, and is termed the "centenary" edition, because 100 years or rather more have now elapsed since Murdoch first lighted a building with gas obtained by the distillation of coal. Murdoch is here spoken of as the inventor of coal-gas, but although there is no doubt that his discovery was genuine and that he was really the founder of the gas industry, it must not be forgotten that more than one claim for priority of discovery has been made from the Continent.

The book has been brought well up to date, and contains full information concerning the table photometer recently introduced by the gas referees for official gas-testing. The only important fault we notice is one of omission. The information regarding water-gas is extremely poor. Although water-gas is now largely used throughout the country, this book merely refers to it in two pages devoted to the enrichment of coal-gas. No mention is made of the work of Humphreys and Glasgow, who may be said to have established water-gas manufacture on a successful commercial basis in this country, nor of the Dellwik-Fleischer process, which constitutes the most remarkable method of producing water-gas devised during the present decade. Even in the fairly copious index there is no entry under water-gas, although as "carburetted water-gas" we find one reference. We seek in vain for information regarding the specific gravity, chemical composition, and calorific value of water-gas.

The book is remarkably well printed and handsomely bound. Seldom, in fact, does technical literature appear in such a sumptuous garb.

Rownson's Iron Merchant's Tables and Memoranda, Weights and Measures, &c. London: E. & F. N. Spon, Limited. 1898.

ALTHOUGH prefaced by a few pages of memoranda, this book consists chiefly of tables giving the weight of iron in bars, rivets, bolts, and thin sheets. It is not quite clear why iron plates and solid and hollow half-round bars should be omitted, and bearing in mind the almost universal use of steel in the present day, we are somewhat surprised to find that the only mention of this material is in a table of angles and tees. This table, by the way, is excluded from the index. There is no need for the duplication of the whole of the tables to show the comparative weights of iron and steel, as a note could easily be made from which the differences could be calculated if required. The introductory memoranda might also usefully contain information as to the comparative strength of the two forms of metal. The troublesome variations of metal gauges, "B.G.," "S.W.G.," and "B.W.G." are clearly defined, and a series of tables dealing with equivalent measurements of various kinds is likely to be extremely handy.

The Practical Engineer Pocket-Book for 1899. Manchester: Technical Publishing Company, Limited.

THIS note-book deals principally with mechanical and electrical engineering. These branches of work are treated in a thoroughly practical manner, the different subjects are clearly explained, a large number of drawings are given, and examples of many rules are worked out so that their application may be thoroughly understood by the novice.

A considerable part of the book is devoted to steam boilers, engines, pumps, injectors, condensers, water-heaters, fuel economisers, steam-pipes, the transmission of power, and to various fittings required in conjunction with appliances of this nature. Some hints are also given as to the management and care of steam boilers, steam engines, gas and oil engines, &c. The sections devoted to electrical work are equally to be commended, and we consider the book is one which cannot fail to be extremely useful to architects who are concerned with the installation of mechanical features in public and other buildings, and who are frequently expected to be engineering as well as architectural experts.

Railway and Timber Trades' Measurer and Calculator. By M. B. COTSWORTH. London: McCorquodale & Co., 41, Coleman-street, E.C. 1899.

THIS book of 225 closely-printed pages, packed full of figures, was prepared by the author "at the request of the railway companies" in connection with the revised regulations for timber traffic, which came into operation seven years ago. The copy before us is the second and revised edition. The tables are very comprehensive, well conceived, well arranged, and printed in small but clear type. As far as we have checked them, they are accurate, with the exception of "40" instead of "50" in the first line of the table on page 95. A folding sheet of illustrations is supplied in a pocket in one cover of the book, and assists very much in explaining the author's methods. Three slide-rules are explained and illustrated. The book is about 9 in. high, but only 3¼ in. wide, and ⅝ in. thick, so that it can easily be carried in an "inside" pocket. To the timber merchant and builder it cannot fail to be of the greatest service.

BOOKS RECEIVED.

CARDIFF RECORDS: Edited by John Hobson Matthews. Vol. II. (Henry Sotheran & Co.)

THE ARCHITECTURAL ANNUAL. Edited by Albert Kelsey. (Philadelphia.)

THE ENGLISH DIRECTORY AND GAZETTEER FOR 1900. (W. Macdonald & Co.)

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TRADE CATALOGUES.

HUSSON'S SAFETY ACETYLENE SYNDICATE, Westminster, sends us a catalogue of acetylene generators, purifiers, and fittings. The syndicate supplies carbide in small or large quantities at from 23s. to 30s. per cwt., which is a great reduction upon the 6d. per lb., or 56s. per cwt., commonly charged to cyclists. As, however, the market price of carbide is from 18*l.* to 20*l.* per ton, a fair margin for profit is still allowed. Some useful details are given in a specification for fixing and connecting acetylene apparatus to be found in the catalogue; but we notice that the familiar but misleading legend, that acetylene "develops an illuminating power fifteen times greater than ordinary coal gas" and has the advantage of a "low cost of production," is repeated in the opening pages of the catalogue. Professor Lewes has in several of his lectures exposed the fallacy of these statements. Acetylene has a great field of usefulness before it, and is already much more extensively employed on the Continent than in this country; but the publication of exaggerated claims must frequently result in keen disappointment to the acetylene patron, and eventually check the progress of the industry. The illustrated list of acetylene burners, brackets, and gas stoves will be serviceable to builders and others desiring to provide a building with a complete acetylene installation.

Messrs. George Howson & Sons send us a large and finely got-up catalogue of their sanitary appliances in improved porcelain earthenware and porcelain enamelled fireclay. There are a number of pedestal closets each with a different name, though in some cases the difference seems principally to consist in the name; sections of nearly all are given; the best is the "Motolite," owing to the depth of water in the basin, but there are several good ones of this type. The type shown in the "Trent" and on the two following pages, with the shallow pan, is a bad one and ought to be discontinued; all these shallow basins are bad, as there is not enough water to cover the excreta. The basins in plain ware, shown further on, are good as far as the sections are shown. The catalogue includes also a number of wash-basins, urinals, fireclay lavatory ranges, &c. There is too much ornament on many of the articles; they would be more suitable if treated in a plainer manner; ornament is out of place in work of this kind. A separate price list is sent with the catalogue.

The Atmospheric Steam Heating Company send us a description, with numerous sectional drawings which are very useful, of their system of steam heating. The following extract from the preface describes what the company claim for their system:—

"A special and exclusive operation made possible by the Atmospheric Steam Heating Company, Limited, system is that the entire system of radiators, or any particular one or more that may be situated in any part of the building, can be heated to a temperature less than the initial temperature of the steam with which they are supplied. That is to say, any degree from 212 deg. Fahr. down to the temperature of the room may be obtained and held as long as desired, without waterlogging or hammering in the system. Thus the same advantages are obtained for steam heating as are derived from the hot-water system, in regulating the degree of warmth to that required for comfort according to the weather, a result in steam heating that cannot be accomplished by any other method. This is effected by maintaining a vacuum in the respective radiators to any degree that may be desired, by which means the tempera ure of the steam is reduced to that normal for the degree of vacuum in the radiator.

A uniform temperature is maintained and held until such time as the steam-valve to the radiator is changed either to a greater or reduced opening, so that the temperature comfort of each room (other conditions of heating surface, &c., being correct) is in direct control of the occupants by a single valve."

Messrs. Ross, manufacturing opticians (London and Paris), send us a catalogue and price list of their drawing instruments, theodolites, and telescopes and binoculars of various types. They show a form of prismatic field-glass in which focussing is done by adjusting the eye-pieces separately for each eye, a very useful arrangement in cases (more frequent than is generally supposed) when the two eyes differ in power or focus.

ALTAR, CHURCH OF THE MOST HOLY ROSARY, TULLOW, CO. CARLOW.—An altar, in memory of the late Bishop of Kildare and Leighlin, Dr. Lynch, was consecrated in this church on the 1st inst. It was designed by Mr. M. J. Buckley, of Youghal.

The Student's Column.

LESSONS IN MODERN ELECTRICAL ENGINEERING.

2.—THE CHOICE OF MOTIVE POWER FOR PRIVATE INSTALLATIONS, COAL, GAS, OIL, OR WATER.

IN attacking the problem of the electric lighting of a country house the most important question to be considered is how we are to get the motive power to drive the dynamo. We must first consider how much power is required. Suppose, for example, that the dynamo is to be able to supply 200 16 c.p. lamps at one time by itself. If it is used in conjunction with a battery of storage cells, then by keeping it running during the day, charging them, and by using them in addition to the dynamo at night, we could supply 400 lamps or even 600 at one time, provided they were not kept alight too long. Now, a 16 c.p. lamp takes 0·6 of an ampere at 100 volts, and therefore consumes $0{\cdot}6 \times 100$, *i.e.* 60 watts. The electrical output of the dynamo must therefore be at least 12,000 watts. Some of the electrical energy of its output will be wasted in heating the mains, and if the mansion is some distance from the power house and cheap power is available, it may be economical to allow a considerable percentage of the total power generated to be wasted in the mains, so as to save the great initial expense entailed by heavy copper conductors. We shall suppose, then, that the dynamo is to have an electrical output of 14 kilowatts. Such a dynamo can now be got which will be capable of giving this output for twelve hours continuously without sparking on the commutator or heating the armature or magnet coils more than 60 deg. Fahr. above the temperature of the surroundings. The mechanical efficiency of a modern dynamo at this load ought to be at least 85 per cent. Hence in the case considered the motive power required to drive the dynamo would be $\frac{100}{85} \times 14$ kilowatts—*i.e.*, 16·5 kilowatts, or 22·1 horse-power. Whatever prime mover we adopt, it must be capable of delivering 22 horse-power to the armature of the dynamo.

The next point to be decided is whether we are to use coal, gas, oil, or water as the source of the required power. In a few cases windmills have actually been employed to turn the dynamos, the energy generated being of course stored in accumulators until wanted. In America there is a private power plant of this description, devised by Mr. Brush, of Cleveland, and capable of supplying the 350 lamps in his house. Although many of the difficulties in utilising wind power have been overcome, yet in this country it is a very variable source of energy, and the initial cost of the necessary plant is very high.

The first cost of a steam-engine and boiler to work at a pressure of 80 lbs. and to give 22 brake horse-power would be between 200*l.* and 300*l.* The cost of a gas-engine of similar power, with all necessary appliances, would be about 200*l.*, and the cost of an oil-engine would be probably over 300*l.* When water-power is available a turbine can be used, but the cost in this case is not easily estimated, as the liability to floods, severe frosts, &c., is very different in different cases, and hence the cost of the necessary earthworks is a very variable quantity. In many cases the first cost of the necessary works is absolutely prohibitive.

The running expenses of a small steam engine and boiler are higher than those for the other methods considered. The constant need of stoking the furnace makes it necessary that an attendant should be always at hand. Again, if it be only used intermittently, as is generally the case in house lighting, it will be very uneconomical, as a great deal of fuel will be burned for very little work done. On the other hand, it runs very steadily when compared to either a gas or an oil engine, and hence is more suitable for driving a dynamo, as slight irregularities in the speed of the dynamo are painfully shown by the flickering of the light given out by the lamps it supplies with energy. When the boiler is in the house itself, the dirt from the coal and ashes is disagreeable all the year round, and the heat is unpleasant in summer.

Gas and oil engines are, as a general rule, the most suitable for small power plants. They work under very similar conditions, require practically the same attention, and occupy the same floor space. When gas is available, a gas engine is always preferable to an oil engine. The source of power in this case comes automatically through the pipes, and no expense is entailed in cartage. Again, it is safer from the fire insurance point of view, as there is always a risk of fire from the vaporiser of an oil engine. Neither gas engines nor oil engines are very suitable for the driving of dynamos which light the lamps directly, as, notwithstanding heavy fly-wheels, the explosions cause the speed to fluctuate slightly and the lights to flicker perceptibly. They are generally used to charge accumulators, which, by themselves, give an absolutely steady light, or, in conjunction with the dynamo, give a satisfactory light. Both kinds of engines are eminently suited for intermittent running, as there is no fuel used during idle hours. For small installations the running expenses of these engines are decidedly less than those of steam engines.

Water wheels and steam or water turbines all have a perfectly constant turning moment or torque, and are, therefore, much superior to the above for direct driving. This is due to the fact that there is no reciprocating action as in steam, gas, or oil engines. The weights of the reciprocating masses in steam engines, owing to their inertia, absorb pressure at the beginning of the stroke and give it up at the end, thus tending to equalise the pressure on the crank pin, provided, of course, that the engine has been well designed. Even, however, if it could be arranged that the pressure were absolutely constant the torque would vary very considerably, and hence the speed always fluctuates. The various forces also called into play strain the foundations considerably. With gas and oil engines the effects of the inertia of the reciprocating masses are much more serious. On the other hand, with turbines everything is balanced and the stresses on the foundations are practically zero.

Steam turbines require a boiler, and may, therefore, be put on the same level with the steam engine as far as floor space and fuel are concerned. They will, therefore, not be economical when used intermittently, but if by means of accumulators a constant load can be guaranteed they are often very useful.

The first cost of a water power plant is greater than in the other cases considered, as the labour of constructing the necessary earthworks is generally a very heavy item. To make even an approximate estimate in any given case is no easy matter, as one has to take into account spells of dry weather, floods, frosts, &c., which require an intimate local knowledge. Still, as the running expenses of a water plant are very small and the machinery is simple, it is always worth considering, and there are many successful plants of this description in this country.

To calculate the amount of horse-power obtainable from a given waterfall it is necessary to know the quantity of water flowing and the height of the fall. To measure the first accurately is difficult, but a useful approximation can easily be made as follows. Find some part of the stream where the section is fairly uniform and the current consequently constant. Measure the time a float thrown in the centre of the stream takes to go down a certain distance. If this be done several times the velocity of the surface of the water at the middle of the stream can be got accurately in feet per minute. The depth of the stream between the two banks should now be measured in feet at equidistant points and the mean taken. This mean depth multiplied by the breadth will give us the area of the cross section in square feet. If we make the assumption that the velocity of the water is the same throughout the cross section, then the flow in cubic feet per minute can be got by multiplying the area of the cross section by the velocity of the stream.

The following formulæ can be used to calculate the maximum horse-power obtainable from a given waterfall:—

$$\text{H.P.} = \frac{Q \times h \times 62{\cdot}4}{33{,}000} = \frac{G \times h \times 10}{33{,}000}$$

Where Q = the area of the cross section of the stream multiplied by the velocity of the stream in feet per minute.

G = the number of cubic feet of water that passes any cross section of the stream in a minute.

h = the height of the waterfall in feet.

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G=the number of gallons that flow per minute.

The numbers in the above formulæ come from the facts that a cubic foot of water weighs 62·4 lbs., and a gallon of water weighs 10 lbs. 33,000 foot pounds of work per minute, also, is defined as a horse power.

When the water has to be conveyed some distance to the turbine, pipes are necessary. So far as economy in first cost is concerned small pipes are advisable, but in this case there will be a considerable loss in the head (h) of water available owing to friction. Tables giving the loss of head due to friction at various velocities of flow will be found in text-books on hydraulics.

The efficiency of a modern turbine varies from 70 to 80 per cent., and of a water-wheel from 50 to 65 per cent. Suppose, for example, that the cross-section of a stream is 10 square feet, and that the velocity of flow in it is 80 ft. per minute. The flow is then 800 cubic feet per minute. Suppose that a head of 20 ft. is available.

$$\text{Then H.P.} = \frac{800 \times 20 \times 62{\cdot}4}{33000}$$

$$= 30{\cdot}3$$

Taking the efficiency of the turbine as 75 per cent., the brake horse power $= 30{\cdot}3 \times \frac{75}{100}$

$$= 22{\cdot}7$$

If a water-wheel had been used whose efficiency was 57·5, then the brake horse power $= 30{\cdot}3 \times \frac{57{\cdot}5}{100}$

$$= 17{\cdot}4$$

As a rule, the less the head of water the greater will be the cost, as turbines or water-wheels of the same power require more water as the pressure gets less, and hence larger machines are required for smaller pressures. A Pelton water-wheel of 48 horse power costs 40*l.* when the head is 200 ft. but if the head be only 80 ft. it will cost 90*l.* It will be seen that the price of a water turbine is small. It is the expense of the connecting-pipes, head and tail race, dam, &c., that make the initial cost of a water-power plant usually so heavy.

In private installations there is often an outhouse suitable for the electric power plant. It has to be remembered that gas and oil engines are often noisy, and if the power-house is too near the main building, or if it is actually in it, as in the case of many hotels, then the vibration they cause is sometimes very objectionable, and is often very difficult to cure. For this reason steam turbines are sometimes used, although gas engines would be a little more economical. If the power-house be at some distance away from the main building, then the expense of the main cables required to carry the whole current consumed by the lamps will be high. This expense can be lowered either by using 250-volt lamps and a three-wire system, or by allowing a considerable fraction of the total energy generated to be wasted in heating the mains.

OBITUARY.

MR THOMAS HARRIS.—We regret to announce the death, on the 10th instant, in his seventy-first year, of Mr. Thomas Harris, F.R.I.B.A., of No. 54, Carlton Hill, N.W., and No. 6, Southampton-street, Bloomsbury. Mr. Harris was elected a Fellow of the Royal Institute of British Architects in 1869. In 1868-9 he carried out some extensive decorations and a re-arrangement of the interior of St. Marylebone parish church, which was built, at a total cost of nearly 60,000*l.*, in 1813-7, after Thomas Hardwicke's revised designs, having been originally intended as a chapel of ease to the (old) parish church (by James Gibbs) in the High-street. Mr. Harris planned and designed the new choir, added the semi-circular apse at the south end of the church (which stands north and south), and built a new organ gallery. He was also the architect of the St. Marylebone Church Club and Institute, erected at a cost of 10,000*l.*, and opened last January. When a subscription fund had been opened for the alterations at the parish church Mr. Harris devoted considerable pains to the collection of views and engravings illustrative of the history of the Marylebone gardens and the bowling greens which stood on the site now occupied by Devonshire-place and the north end of High-street, close by the church. He superintended the construction of a successful reproduction of the principal walk, with its boxes and orchestra, for a bazaar in the Portman Rooms, and printed in 1887, for private circulation, a valuable account of the old gardens.

MR R. D. GOULD.—The death of Mr. Richard Davis Gould, architect, who for a considerable period was a borough surveyor at Barnstaple, occurred a few days ago at his residence in Commercial-road of that town. Deceased was 83 years of age. He leaves a widow, one son (Mr. Carruthers Gould, the cartoonist), and two married daughters. The late Mr. Gould designed the pannier market, Barnstaple, the Albert Clock Tower, the Bridge-buildings, and various private buildings. He also prepared the designs of several churches in North Devon. After filling the office of Borough Surveyor for 46 years Mr. Gould was laid aside by a severe attack of paralysis, which confined him to his bed for eight years.

GENERAL BUILDING NEWS.

ST. MARTIN'S CHURCH, UPPER KNOWLE, BRISTOL.—The foundation stone of St. Martin's Church, Upper Khowle, was laid on the 30th ult. The new church is to be built close to the present temporary church on the Wells-road. The style will be Early English, and the church is to be built of pennant stone, with Bath stone dressings, the chancel and altar steps being of red pennant. The completed building will be furnished to accommodate 700, but at present it is proposed to build the chancel, vestries, organ chamber, and two bays of the nave and aisles, to hold 400 people. The east end of the north aisle is to be arranged as a chapel for week-day services. The part now being built will cost over 3,000*l.* Mr. W. V. Gough is the architect, and Mr. Maton Durnford, of Knowle, is the builder.

CATHOLIC CHAPEL, KIRKBY, LIVERPOOL.—The foundation stone of a new building, to serve as a chapel-of-ease to Maghull, was laid on the 1st inst. The site is on the west side of Waddicar-lane, about half-a-mile from Kirkby station. The chapel will be a plain brick building, capable of being converted into a school, set back from the road to leave space for future buildings, and providing accommodation for a congregation of nearly 200. It will consist of a room 60 ft. long and 21 ft. 6 in. wide, a small sacristy, porches, and a covered entrance. The cost of the building will be about 1,000*l.* Messrs. Sinnott, Sinnott, & Powell, of Liverpool, are the architects, and Mr. James Pilkington, of Rainford, the contractor.

WESLEYAN CHURCH, MANSFIELD, NOTTINGHAMSHIRE.—The memorial stone has just been laid of a new Wesleyan Church at the corner of Rosemary-street and Byron-street. It is proposed at present to provide a building in the Early English style, to be built of Loughborough bricks with stone facings, to seat 300 people, but capable, when emergency arises, of being extended to accommodate 600 people, the initial cost, including the land, being estimated at 2,378*l.* Mr. J. E. Goodacre is the architect, and Messrs. Vallance & Blythe are the contractors.

WESLEYAN CHURCH, KENSAL RISE.—The opening of the new Wesleyan Church which has been built in Chamberlayne Wood-road, Kensal Rise, took place on the 5th inst. The church occupies a site close to Kensal Rise railway-station. It is built of pressed brick, with facings and tracery windows of Bath stone, and comprises nave, transepts, and choir, behind which is the organ. The entrance front faces Chamberlayne Wood-road, and there are separate entrances for the gallery, which extends round three sides of the church. The spire at the north-west corner rises to a height of 100 ft. The woodwork in the interior, including the roof, which is waggon-headed in shape, is all of pitch-pine. Seating accommodation is provided on the ground-floor and gallery for 750 persons, and the cost of the structure is about 6,000*l.* The architect is Mr. W. J. Morley, of Bradford, and the contractor for the whole works is Mr. W. Gibson, of Exeter.

CHURCH, SAVILE TOWN, BATLEY, YORKS.—The new church at Savile Town was consecrated recently by the Bishop of Wakefield. The architect was Mr. C. J. Ferguson, F.S.A., of South Kensington, London. The church, which is built of stone, consists of nave, north and south aisles, and minister's and choir vestries. The walls of the nave and aisles are lined internally with brick, the lower portion being covered with green stained pitch-pine boarding. The chancel is lined with Ashlar. Aisles are divided from the nave by arcades, having circular columns, and moulded stone arches. There is a morning chapel on the south side of the chancel, and an organ-chamber on the opposite side, which are separated from the chancel by arcades, the piers of which are ornamented with traceried and carved caps. The south side chancel wall is carried by double piers. The whole of the roofs are of pitch-pine, open timbered. The chancel ceiling is pitch-pine, worked in panels. All the permanent doors of the church, as well as the altar rails and the two altar tables, are of English oak, and the floors, except that of the chancel, which is of stone, have been laid with wood blocks. The heating of the church is on the low-pressure hot-water system; Messrs. Haden & Sons, of Manchester, having supplied the apparatus. The church is lighted by gas from pendants in the nave and chancel, and brackets in the aisles. There are two entrances, viz., the west and south, and also one on the north side for the vestries. The church, as at present finished, provides accommodation for 500 persons, but in erecting the west wall a further extension, at some future date, has been taken into account. Provision has been made for the addition of a square tower on the south side. The contract for the work was let to Messrs. W. & J. Milner, of Mirfield, and this firm sublet the following branches:—Joiners' work, Messrs. Fothergill & Schofield, of Batley Carr; plumber's, Mr. Henry Blackburn, of Dewsbury; tiling and plasterers' work, Messrs. Johnson & Son, of Mirfield; painting, Mr. Henry Roberts, Mirfield; gas fittings, Mr. F. Bottomley, of Savile Town. Mr. G. W. Swift has discharged the duties of clerk of works subsequent to the retirement of Mr. Adamson. The work has cost over 7,000*l.*

NEW WING, CROYDON GENERAL HOSPITAL.—The new wing at the Croydon General Hospital was opened on the 30th ult. It is to be called the Royal Victoria Wing, and was carried out from designs by Mr. Charles Henman at a cost of over 10,000*l.*

WESLEYAN SUNDAY SCHOOLS, BRIDLINGTON.—The foundation stones were laid on the 29th ult. of new Wesleyan Sunday schools, Princess-street, Bridlington. The architect is Mr. S. Dyer. The building will be of buff pressed bricks, with stone dressings, and the style will be in harmony with the adjacent church. Taking the Princess-street side of the block, there will be on the ground floor a minister's vestry and four class-rooms, three of which are convertible into one larger room. Above these there is a church parlour, 33 ft. by 21 ft., and three class-rooms, the largest of which is 21 ft. by 16 ft., with lavatory accommodation. On the Rope-walk side there will be a cellar for the heating apparatus, a kitchen, and two classr-ooms on the ground floor, and above a choir vestry and two class-rooms. There will be a corridor 7 ft. 6 in. wide between the church and the central hall, with a staircase at each end of the same giving access to the upper rooms. The central hall will be paved with wooden blocks set in concrete. Steam or hot water will be used for heating, and the central hall will have two large lantern lights in the roof besides four windows 6 ft. 6 in. wide and 16 ft. deep. Accommodation will be afforded for between 500 and 600 scholars, and there will be separate entrances for boys and girls. The Princess-street frontage is 84 ft., the Rope-walk 50 ft., and the width from one to the other 100 ft.

TEMPERANCE INSTITUTE, READING.—The Palmer Memorial Building in West-street, Reading, was opened on the 27th ult. The building was erected by Mr. Whiting, from plans by Mr. F. W. Albury. The contract price was 4,750*l.*

BUSINESS PREMISES, DUBLIN.—No. 39, Westmoreland-street, Dublin, has been converted into auctioneers' sale rooms and offices for Messrs. Battersby & Co. The structural work was carried out by Messrs. H. & J. Martin, from plans prepared by Mr. Farrell.——Messrs. James H. Webb & Company's premises at 56, Henry-street, have been entirely rebuilt from designs by Mr. George P. Beater, C.E. The shop has a frontage to Henry-street of about 33 ft. The contractors for the works were Messrs. E. & R. Warren.

RECTORY, CHAPELIZOD, DUBLIN.—The new parochial residence on Mulberry Hill, Chapelizod, was opened on the 23rd ult. The building was designed by Mr. A. E. Murray, and erected by Mr. Valentine Falkner.

LIBRARY AND INSTITUTE, BLACKLEY, MANCHESTER.—The Manchester Corporation are about to erect at Blackley, on a plot of land situate in Rochdale-road, buildings to be known as the Blackley Free Library and Institute. The scheme also includes a separate building about to be erected inside the recreation ground as a large covered shelter, 70 ft. by 50 ft., where children may play in wet weather. The library will occupy the front portion of the site, with the main entrance in Rochdale-road, and will contain a reading-room, 40 ft. by 27 ft.; a lending library of the same dimensions, with fittings for 10,000 volumes; and a boys' reading-room, with a separate entrance in the park entrance road, under the lending library, and of the same dimensions. Rooms will also be provided for a librarian and assistants. The institute will occupy the rear portion of the site, and will comprise a public hall 60 ft. by 32 ft., to accommodate about 400 persons, with a main entrance in the park entrance road, a separate entrance in the street overlooking the recreation ground, and an additional emergency exit, together with retiring-rooms. There will also be an adults' recreation-room, 48 ft. by 18 ft.; a games-room for boys, 40 ft. by 30 ft.; two fives courts; and a girls' play-room, 30 ft. by 15 ft. The exterior of the buildings will be faced with red stock bricks, relieved by buff bricks, buff terra-cotta entrances, strings, &c. The floors will be fireproof, and the rooms throughout will be warmed by hot water and lighted by electricity. Mr. J. Gibbons, Manchester, is the architect.

SHOPS, HALIFAX.—From the plans of Mr. W. C. Williams, architect, five shops are to be erected immediately adjoining the Post Office. Three of the proposed shops will have a frontage to Commercial-street, whilst the other two will face on a new street from Commercial-street to Southgate. The buildings will be four stories in height, the two upper floors over the shops being arranged for suites of offices. The entrance to the office section will adjoin the Post Office.

NEW RAILWAY BUILDINGS, INVERURIE, ABERDEENSHIRE.—As the new workshops at Inverurie, for the Great North of Scotland Railway Company

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are approaching completion, the company have just accepted the following tenders for the erection of a large number of workmen's dwellings on their ground there, viz. :—Mason work, John Smith, Kintore, and George Ogg & Son, Bankhead; near Aberdeen; carpenter work, Hendry & Keith, Aberdeen; slater work, S. & W. Christie, Dyce, near Aberdeen; plumber work, James Laing & Sons, Inverurie; plaster work, Jas. Seivwright, Inverurie, and Robert Moir, Inverurie; painter and glazier work, John Williamson and J. & S. Fyfe, both of Aberdeen. These dwellings have to be finished by May, 1901, after which as many more will be proceeded with. No exact figures have been published, but the section just contracted for will, it is supposed, cost from 18,000*l.* to 20,000*l.* The workshops have no architectural pretensions, but are of considerable size, with substantial granite walls, and the total cost will be large. They include :—Erection, fitting, and boiler shop, 289 ft. long by 270 ft. broad; paint shop, 222 ft. long by 122 ft. broad; smithy and foundry, 270 ft. long by 102 ft. broad; and carriage and waggon shop, 362 ft. long by 182 ft. wide, and block containing tyre furnace, &c. All the workshops have roof lights, and the electric light will be introduced. A new passenger station 227 ft. long, in reddish granite, with verandah platforms and goods shed, with siding and loading banks (530 ft. long), have also been constructed near the workshops, and a road has been formed from the new station to the centre of the borough of Inverurie. The architect for the whole scheme is Mr. Patrick M. Barnett, C.E., the company's engineer-in-chief.

NEW WORKHOUSE INFIRMARY AT MERTHYR.—The new workhouse infirmary at Merthyr fronts the south-west, and is built of Ebbw Vale yellow brick with stone dressings from Darbydale, in Derbyshire. On the left are the women's wards, which have two floors, and in which provision is made for forty-six beds, there being an allowance of ground for future extension. The administrative block—a three-floored building—occupies the central position. On the ground floor of this block are two rooms for the nursing staff, a room for the medical officer, a dispensary, and an operating-room. At the rear is the kitchen block, the kitchen being fitted up with steam cooking apparatus fixed by Messrs. Williams & Son, of Cardiff. On the first floor are lying-in and labour wards, containing ten beds, and on the second floor are the nurses' bedrooms. The men's wards, which, like those for the women, have only two floors, are situated on the right, and provide accommodation for seventy beds. The administrative block is connected on either side with the other two by a roofed open corridor. Each particular ward has its separate bath and lavatory facilities. The architect of the infirmary is Mr. E. A. Johnson, of Abergavenny and Merthyr; and the builders, Messrs. Thomas Watkins & Co., of Swansea. The original contract price for the building, apart from the kitchen block—which was the subject of a separate contract at 1,598*l.*—was 11,097*l.*, but this amount has been exceeded.

CONSTITUTIONAL CLUB, HULL.—A new Constitutional club house has been erected in the Carr-lane section of Anlaby-road, Hull. The architect of the building is Mr. B. S. Jacobs, the contractors are Messrs. E. Good & Sons, and the electrical and hot-water engineers Messrs. King & Co., all of Hull. The contract price will be about 5,000*l.*

NEW HOSPITAL, STOBHILL, GLASGOW.—A new hospital and offices are to be erected at Stobhill. The new buildings are to be built of brick, with stone lintels and sills. The principal entrance to the buildings will be from the south, and facing it is the official block. To the right of this the admission block is placed. In the centre of the site are located the general stores and the kitchen, which are connected with the various wards of the hospital by covered ways. A line of railway runs alongside. The hospital proper is on the east side of the site, and consists of fourteen wards arranged alternately on corridors. Each ward will accommodate twenty-six patients, with an allowance of 1,200 cubic feet per patient. Windows are placed between each of the beds. Between the turrets of the wards verandahs are placed. Sitting-rooms and a small day-room are placed at the end of the ward, and overlooked from the nurses' room. On the west side of the site are four wards for the aged and infirm. There are also four cottages for children under five years of age, and two adjacent cottages for aged married couples. The Nurses' Home is on the east side, with a frontage to Springburn Park. The isolation ward is to the north of the hospital, and here the nurses of this part are accommodated. The mortuary is at the extreme west, near to the existing bridge. The architects for the buildings are Messrs. Thomson & Sandilands.

DRINKING FOUNTAINS, MANCHESTER.—The four drinking fountains erected out of a bequest of the late Alderman Clay are being brought into use. They have been designed by Mr. J. W. Beaumont, architect, of Manchester. The fountains are erected in Crumpsall Park, Boggart Hole Clough, Birch Fields, and Queen's Park.

BUILDING IN LEEDS.—The annual report of Mr. Wm. Towers, Building Inspector to the Leeds Corporation, for the year ended March 24, has just been completed. It shows that during the twelve months 3,059 houses were built, including 10 villas, 59 semi-detached villas, 841 through houses, and 2,143 of the back-to-back description. There were also put up 1,423 buildings of a miscellaneous character. Among these were 1 church (Chapel-Allerton), an addition to a church, 1 chapel, 1 mission-room, 6 schools, 9 additions to schools, 1 hotel, 3 hotels rebuilt, 1 hotel, additions to the workhouse, one Corporation bath, and two additions to the Yorkshire College. The houses, erected in the various wards, range from two in the Central, three in the South, and six in the West, to 398 in the North-east, 352 in the North, 359 in Headingley, 430 in East Hunslet, 319 in West Hunslet, and 334 in the Armley and Wortley Wards. The total plans submitted numbered 2,784, of which 2,169 were approved, showing 9,439 buildings, of which 3,549 were houses. Among the buildings not yet completed are two churches, two additions to churches, two chapels, two mission-rooms, one addition to mission-room, four schools, four additions to schools, one institute (Emmanuel), new Leeds Guardian Offices, three banks, two temperance hotels, two hotels rebuilt, one Masonic hall, and one bodega.

BUILDING IN YORKSHIRE.—The Calverley School Board are about to erect a new school in Wesley-street, Farsley. The plans have been prepared by Mr. W. Bailey, Market-street, Bradford.—A new market is to be erected at Bury on the Fair Ground. Mr. Archibald Neill, of Leeds, is the architect.—What will be known as the Victoria Almshouses are to be erected in the village of Ardsley, near Barnsley. Mr. J. P. Kay, architect, Leeds, has prepared the plans.—Clayton Hospital, Wakefield, is to have a new Nurses' Home. Messrs. Simpson & Richardson, Wakefield, are the architects.—New premises for the Yorkshire Banking Company are about to be erected at Ripon. Messrs. Bedford & Kitson, Leeds, have prepared the plans.—The Leeds Industrial Co-operative Society are going to erect a new store in Gay-lane, Otley.—A new rectory house at Keighley, for the Rev. H. J. Palmer, is to be erected from plans by Messrs. J. B. Bailey & Son, of that town.—*Leeds Mercury.*

METROPOLITAN ASYLUMS BOARD NEW OFFICES.—The new offices on the Thames Embankment for the Metropolitan Asylums Board have just been formally occupied by the Board. The building, the architect of which was Mr. E. T. Hall, was illustrated and described in our issue for June 11, 1898. It is constructed of Portland stone and red brick. Two circular turrets, surmounted by copper domes, flank the main entrance, situated at the angle of the Embankment and Carmelite-street, and similar turrets terminate the front elevation. Mr. Felix was entrusted with the carving. It consists of two main panels around the angle turrets. One represents the Angel of Death, arrested by Esculapius, by whom the sick are conducted to the City of Hygeia; the other the convalescents carried to the City of Hygeia amid rejoicings. On the summit of the central gable is the figure of Mercy; beneath it is that of St. Luke; and on either side stand Hebe and Fate. The entrance floor is 7 ft. above the level of the pavement, and, together with the ground floor, is used as offices, the second and third floors being devoted to committee-rooms and the board-room respectively. These are reached by the main staircase, which is of white marble, with mahogany balustrading. The board-room is octagonal in form, 52 ft. long by 42 ft. in width; to the base of the lantern the height is about 40 ft. Clearstory windows light the room on six sides, while the Press and public galleries occupy the remaining sides. The fittings are of dark oak, and the ceiling is divided into eight compartments by moulded ribs. The clerk of works was Mr. A. Turner. Messrs. J. Shillitoe & Son, of Bury St. Edmunds, were the contractors, and made all the seats and fittings of the board-room.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, BURNHAM, SOMERSETSHIRE.—A Local Government Board inquiry into an application by the Burnham Urban District Council for sanction to borrow 4,500*l.* for purposes of water supply was held by Col. R. W. Slack, R.E., at the Town Hall, Burnham, on the 28th ult. The works were explained by Mr. W. J. Press, Surveyor to the Council.

BOROUGH ENGINEER APPOINTMENT.—Mr. H. Gilbert Whyatt, A.M.Inst.C.E., the newly appointed Borough Engineer and Surveyor of Grimsby, enters upon the duties of the position on Monday, the 16th inst.

THE APPROACHING PUBLIC HEALTH CONGRESS IN ABERDEEN (AUGUST 2 TO 7).—Mr. John Honeyman, R.S.A., architect, Glasgow, will be President of the Architecture and Engineering Section, the Secretaries of which are Messrs. William Kelly, architect, Aberdeen; A. M. Williamson, M.D., B.Sc., Chief Sanitary Inspector, Edinburgh; and Banister F. Fletcher, London. Mr. Fletcher will read a paper on "The Architecture of the Twentieth Century." There will also be papers on "Architecture and Hygiene," by Mr. James Souttar, architect, Aberdeen; "Housing of the Working Classes," by Mr. W. Malcolm Ormiston, architect, Edinburgh; "An Ideal Workman's Cottage," by Councillor William Cooper, Aberdeen; "Some Suggestions on Fever Hospital Construction," by Mr. R. Morham, City Architect, Edinburgh; "The Design and Testing of House Drainage," by Mr. Gilbert Thomson, C.E., Glasgow; and "Dangers to Public Health from Railway Carriages and Stations," by Mr. E. Durant Cecil, M.Inst.San.Eng., London. In the Municipal and Parliamentary Section Councillor Dunlop, Glasgow, will read a paper entitled "A Plea for More Space In and Around Town Dwellings," and in the Chemistry and Meteorology Section two of the papers to be read will deal with the treatment of sewage.

NEW PIPE FROM THIRLMERE TO MANCHESTER.—The Waterworks Committee of the Manchester Corporation held a meeting on the 5th inst., when the laying of a second pipe from Lake Thirlmere to Manchester was considered, which work has been sanctioned by the City Council. Mr. G. E. Hill, C.E., was appointed consulting and advising engineer, and Mr. Barnett, C.E., as engineer for the undertaking. Mr. Barnett was engaged as engineer under Mr. Hill when the first pipe was laid. These gentlemen were instructed to prepare the specifications and conditions of contract for the material which will be required, and when this has been done tenders will be invited.

WATER SUPPLY, SEWERAGE, &C., LINSLADE.—The Linslade Urban District Council have applied to the Local Government Board for sanction to a loan of 18,000*l.* for works of water supply, sewerage, and sewage disposal in accordance with the estimates and plans prepared by their engineers, Messrs. Sands & Walker, Nottingham.

FOREIGN

FRANCE.—Last week the statue of Lafayette, an offering by Americans to France, was inaugurated in one of the squares of the Carrousel. The statue, by Mr. Bartlett, is however only a temporary one in "staff"; the permanent monument will be cast in bronze *à cire perdue.*——The interior decoration of the new terminal station of the Orléans railway company is now completed. In the interior of the station are some fine paintings by M. Cormon, representing Biarritz and Amboise. In the entrance portico are fourteen oval panels painted by MM. Joubert, Dameron, and Bourgeois, representing the most picturesque sites traversed or served by the Orléans line. The great central hall, with an arched ceiling in which panels with rosettes alternate with glass panels, suggests the nave of an Italian Renaissance church. M. Lalou, the architect, has succeeded in combining the practical requirements of a railway station with a fine artistic effect.——The immense building proposed for the Conservatoire of Music at Lyons is to be commenced almost immediately.——The Municipality of Biarritz is about to build a new Town Hall, at an estimated cost of 240,000 fr.——A new Casino has been erected at Malo-les-Bains (Nord).——The jury in the competition for the construction of a museum at Clermont-Ferrand has awarded the first premium to M. Dionnet, of Paris; the second to M. Adams, of Conflans; and the third to M.M. Clement-Josso and Pradier, of Paris.——The municipality of Oran are about to open a competition for a new theatre.——The jury in the competition for the building of the Church of Saint Joseph at Grenoble have awarded the first premium to M. Vinay, of Paris; the second to M. Calinaud (Paris); a third premium to MM. Wable & Zohel (Paris); a fourth to M. Beutz (Nancy); and a fifth to MM. Chas. Deville (Paris) and Chas. Meysson (Lyons).—— The Government has deposited in the Luxembourg a number of studies by Rosa Bonheur, which have been presented to the State by her legatee Madame Klumpke.—— On the 27th the statue to Lavoisier, by M. Barrias, will be unveiled on the Place de la Madeliene, on the axis of the Rue Tronchet. The statue stands on a pedestal decorated with two bronze basreliefs illustrating events in the life of the great chemist.——A monument to the memory of Henri Litolff, the musical composer, has been unveiled at Colombes, near Paris. The monument, of which M. Pallez is the sculptor, consists of a bust of Litolff placed on a stele, against which leans a figure representing the genius of music lamenting the composer.

INDIA.—It is a little amusing to note that the Europeans at Darjeeling are under the impression that the "electric light" attracts thunderstorms; they allege that since the electric light has been established at that station thunderstorms have not only been more frequent but more violent.——The new Bhandar waterworks in the central provinces was opened recently by the Chief Commissioner. The source of supply is the river Weingunga, in the bed of which a large well has been sunk. The distribution system comprises four miles of pipes.——We learn that the Buddist architectural remains discovered in Chinese Turkestan and on the borders of Tibet are to be investigated for the Indian Government by Dr. Mastein, and that he has already started on the journey.——The Municipality of Bangalore has decided to establish a sewage farm as a means of getting rid of much difficulty in connexion with the sanitation of the city.——The secretarial offices at Barnsdale, Naini Tal, have recently been completed from designs by Mr. H. S. Wildeblood, of that place. The work includes

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water-supply and fire protection. The floors are of concrete resting on corrugated sheet iron. An additional block of Departmental offices is also in course of erection near by from designs by the same architect.

UNITED STATES.—Considerable interest has been excited by the action of Mr. Frederick Dellman, an artist who sued for an injunction in the United States Circuit Court to prohibit a Boston firm from selling photographs of a mosaic panel designed by him now in the Congressional reading-room at Washington. American architects have expressed themselves pretty freely on the case, as the artist was employed at the public expense to decorate the public building wherein the panel is exhibited, and the panel itself formed part of the work. The point to be resolved was whether the artist has any copyright in a work executed under the circumstances mentioned, and the Court has decided that he has not.—A Bill has been introduced into the Senate for appropriating 20,000 dols. for the purchase of a replica of the bronze equestrian statue of Washington, designed by Messrs. D. C. French and E. C. Potter, recently presented to the French Government by the women of the United States.——The Hudson River Tunnel is nearly completed; when finished this will give not only land communication between Long Island and New York, but between that city and the country beyond.

MISCELLANEOUS.

APPOINTMENT OF SANITARY INSPECTORS.—The Local Government Board have sanctioned the appointment or reappointment of sanitary inspectors as follows:—Mr. H. Callow, in Islington; Mr. A. Bennett and Mr. W. Freeman, in Holborn.

KING'S COLLEGE AND THE CARPENTERS' COMPANY.—The Architectural Evening Classes at King's College, under the joint auspices of King's College and the Carpenters' Company, continue to be held with success. The following are some of the results of the recent examination held by Professor Elsey Smith and Mr. James Bartlett:—*Building Construction.*—F. Hartnoll, silver medal and 3*l.* in books; F. J. Jones, bronze medal and 2*l.* in books; C. Collyer, certificate of distinction and 1*l.* in books; R. G. Ballatine, H. G. C. Brewer, and A. Bradburn, certificates of distinction; E. H. Wheeler and P. B. Sands, certificates of merit. *Sanitary Science.*—Sir George Faudel-Phillips "medal," G. H. Spears. *Quantities.*—A. Bradburn, certificate of distinction and 2*l.* in books; J. D. Robertson, certificate of distinction and 2*l.* in books; A. Miles, certificate of distinction and 1*l.* in books; F. C. Moon and W. S. Wilson, certificates of distinction; F. Davies, W. Fenn, and H. Byron, certificates of merit. *Constructional Drawing.*—F. J. Jones, certificate of distinction and 3*l.* in books; E. H. Wheeler, certificate of distinction and 2*l.* in books; A. Bradburn, certificate of distinction and 1*l.* in books; H. Spicer, certificate of distinction; F. J. Cox, E. J. Gee, and R. G. Ballatine, certificates of merit.

BIRKBECK BUILDING SOCIETY.—The forty-ninth annual report of this well-known Society shows that, though generally prosperous, it has suffered, like most other institutions, from the influence of the war, and special steps have been taken to meet the conditions arising from this cause. We quote the following from the Report:—"The Society was established in the year 1851 at 29 and 30, Southampton-buildings. Very early in its history it was realised that there were large classes to whom banking facilities were of the greatest value, but for whom no provision, or very inadequate provision, had hitherto been made. As year by year the banking department became more and more appreciated, the need for increased accommodation became absolutely imperative. The business was accordingly removed on January 1, 1900, to the present new freehold building. The directors are gratified to think that the new premises have already proved of great advantage and convenience to the members and depositors. The final portion of this block, having an extensive frontage to Holborn, is now in course of construction; and on the completion, when the various suites of offices and shops are available for tenants, a remunerative and valuable asset will have been created."

ALEXANDRA PARK.—The Bill for the purchase and maintenance of the Alexandra Park and Palace passed through Committee, being unopposed, in the House of Commons last week, and was read a third time on Tuesday, the 10th inst. Contributions towards the purchase moneys are made by the Local Authorities of Islington, 14,000*l.*; Finchley, 3,000*l.*; Barnet, 3,500*l.*; and Wood Green, 35,000*l.*; the Middlesex County Council, 49,000*l.*; and Hornsey Urban District Council, 35,000*l.* The total cost of the scheme is estimated at 150,000*l.*, in respect of the Palace (which cost more than 300,000*l.*), the organ that cost 20,000*l.*, the enfranchisement of twenty-eight acres of leasehold land, and about 160 acres, whereof 138 acres are, by an Act in that behalf, at present preserved from being taken for building purposes. The calculated cost of maintenance and management is 10,000*l.* per annum, against which are set 2,500*l.*, rent of the racecourse, and 500*l.* from the refreshment contract. The Palace, which as a place of entertainment has seen a somewhat chequered career, was originally designed by John Johnson (see the illustration in the *Builder* of August 15, 1874). In its construction were used much of the materials, including one of the two domes, dodecagonal at base, and 100 ft. in diameter, of the Great Exhibition building of 1862, of which Captain Fowke, R.E., was the architect. The Palace, opened on May 24, 1873, was destroyed by fire a fortnight afterwards; it was speedily rebuilt, and again opened on May 1, 1875.

SPITALFIELDS MARKET.—We learn that the House of Lords' Committee, presided over by Lord Erne, after hearing Mr. Littler, Q.C., as counsel on behalf of the Corporation of London, have declined to sanction the acquisition by the London County Council of Spitalfields Market. The Council's Bill, which had been passed by a Committee of the House of Commons, proposes to enable them to take over the market, at a cost of 177,500*l.* for the freehold, from its present owners, and to purchase in addition, by arbitration, the interests of the leaseholders. The Corporation, who are the sole opponents of the Council's measure, and promoted a scheme of their own for acquiring the market and its traffic, represented that, in virtue of a charter *temp.* Edward III., they enjoyed the exclusive rights of establishing and carrying on markets within seven miles distance from the City, yet it was alleged by counsel for the Bill that in the history of as many as thirty-five new markets within that limit there is no record of consent given or protest made by the Corporation.

BRISTOL MASTER BUILDERS' ASSOCIATION.—On the 3rd inst. the members of the Bristol Master Builders' Association had their annual excursion, to Brockley Coombe. The members dined at the Royal Pier Hotel, the chair being taken by Mr. George Humphreys (President of the Association). After dinner the President proposed the health of "The Queen," and the toast having been honoured, Mr. W. Church submitted the health of the "Ministers of Religion," coupled with the name of the Rev. H. Dening, who replied. Mr. E. Walters proposed "Kindred Associations." Mr. A. Krauss (National Association) and Mr. E. J. Mercer (Bath Association) acknowledged the toast. Mr. J. Bastow gave "The Ladies," and Mr. Frank Cowlin responded. Mr. G. H. Perrin proposed "The Bristol Master Builders' Association." He said that their president presided over one of the most important industries in the United Kingdom, and long might Bristol be prosperous and their Association exist and have such pleasant gatherings as that one. The President returned thanks, saying that he had been between thirty-five and forty years a member of the Bristol Master Builders' Association, and for the second time he was President. He thought in the future building operations would become more costly; and their Association, after several meetings with the artisans, had established a code of rules which he hoped would be satisfactory. At the present time organisation features seemed to be subservient to the times, and it behoved them to uphold their trade without being obnoxious to those they had to do business with. They hoped to conduct their trade in a fair and equitable manner, and obtain a contract fair to their customers and themselves. Mr. W. H. Brown (solicitor to the Association) also responded. The President submitted the health of their secretary (Mr. H. J. Spear), who responded. This brought the toast list to a termination, and soon after the party were conveyed back to Bristol.

NEW POLICE BUILDINGS, KIRKCALDY.—Messrs. Williamson & Inglis, architects, Kirkcaldy, have been, on the suggestion of Colonel M'Hardy, of the Prison Commission, appointed architects for the new police buildings at Kirkcaldy. Dr. Rowand Anderson, Edinburgh, who was appointed adjudicator on the sixteen plans submitted, placed the plans of Messrs. Scott & Campbell, Edinburgh, first; Mr. Alexander Cullen, Hamilton, second; and Messrs. Williamson & Inglis, third. Colonel M'Hardy, who was asked to look at the three plans and make suggestions, stated that the plan of Messrs. Williamson & Inglis was the one which, in his opinion, most nearly met his views in regard to internal arrangements. The new buildings, which are estimated to cost 16,000*l.*, are to be erected in St. Brycedale-avenue.—*Glasgow Herald.*

TELPHERAGE BY ELECTRIC POWER.—We have received from the Consolidated Telpherage Company, of 20, Broad-street, New York, several illustrated leaflets describing new systems of telpherage which use electricity for their motive power. The details of the various systems seem to have been worked out most successfully. In the aerial system, for example, the electric machinery is kept quite apart from the carrier buckets, and hence the risk of accidental injury is considerably diminished. The motors are ironclad and waterproof, and all the switching devices are completely enclosed. If the speed of the car has to be altered, it is done either by connecting up the motors in different ways or by varying the size of the driving-wheel. Hence there is no gearing, and the operation is, therefore, noiseless. The Telpherage Company has also elaborated an electric tubular despatch system, in which mail matter or parcels can be sent in miniature railways inside underground iron pipes. It is stated that a speed of fifty miles an hour can be obtained by the trucks running inside these pipes, but a speed of twenty or thirty miles an hour is recommended for economical working. Branch lines can be arranged to run into one main trunk line, and the cars are so controlled that a collision is impossible. The method by which each car is made to stop at any desired station on its route is very simple and ingenious. For sending merchandise or mail bags it seems as if these systems might be adopted with advantage in several places in this country.

CAPITAL AND LABOUR.

DISPUTE IN THE NEWCASTLE BUILDING TRADE.—A meeting of the members of the Newcastle, Gateshead, and District Building Trades' Association was held on the 3rd inst., at the offices of the Association, Northumberland-street, Newcastle, to consider the dispute in the building trade. The following decision was come to:—"By a unanimous ballot of the Tyneside District Master Builders' Association and the Gateshead Master Builders' Association, it has been decided that the time has now arrived, considering the state of trade and the fact that they are facing a falling market, before work can be resumed a reduction of 1d. per hour, from 10d. to 9d., shall be made in the wages of operative bricklayers, and a new code of working rules be adopted."

LEGAL.

ACTION FOR INJURIES.

AT the Clerkenwell County Court, before his honour, Judge Edge, Charles Hall, builder's labourer, of Upper Holloway, claimed from William Hall, builder, Upper Holloway, the sum of 50*l.* damages for personal injuries, under the Employers' Liability Act.

Mr. Powell was counsel for the plaintiff and Mr. Ellis Hill, barrister, represented the defendant.

In this action a jury was empanelled, and counsel for the plaintiff mentioned that the defendant was the brother of the plaintiff. It was the duty of the plaintiff to take pieces of wood by a ladder to the scaffolding above. He took up several pieces, one at a time. The man above cried out "Right," and took the pieces of timber from him. While taking up one of the pieces the man cried, "High enough," caught hold of the wood, and then plaintiff commenced to descend the ladder. He found himself knocked off, and fell about 7 ft. to the pavement below, falling on his right wrist, which was broken. He was taken to the Great Northern Central Hospital, but was not detained there. He had not been able to sleep well until the last two or three weeks, owing to the great pain which he had suffered. He had not been able to work since, and he was previously earning 7½d. an hour, or 35s. a week.

Dr. Frank Barnes, of the Great Northern Central Hospital, said he found the plaintiff suffering from a broken wrist, and there was a dislocated middle finger. They were painful injuries, and it would be two months before the hand would be quite right.

Mr. Hill submitted to the Judge that no case had been made out under the Act. There might be some evidence of negligence on the part of Della (the workman who called "All right!"), but he was not a person authorised to give orders, or to whose orders the plaintiff was bound to conform or had been in the habit of conforming.

After some protracted legal discussion, the Judge held that there was no evidence of negligence, and that the man in question was not a person contemplated by the statute. He was sorry to withdraw the case from the jury, and entered a non-suit. He would stay execution for twenty-eight days, pending an appeal.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

5,051.—A CIRCULAR-SAW GUARD: *N. Tailby.*—The top guard is clamped with a set-screw upon a horizontal arm that carries a bracket for holding the riving-knife, and also has a socket which may be clamped at any height by means of a set-screw, and slides upon a rod, the rod being pivotted to a bracket upon the table and clamped upon a slotted arc at any angle desired.

5,088.—DRAWING-SQUARES: *P. Farini.*—The drawing-squares are made of such dimensions as will enable one to make various calculations of measurement both graphically and practically. It is graduated as a protractor and has a scale marked along its hypothenuse; for example, it may be used for describing a square whose area shall equal that of a given circle, or for finding the length of a straight line that shall be equal to the circumference or arc of a circle, by making the projections of the sides upon the hypothenuse as $2r$, and $\frac{r\pi}{2}$, respectively, so that the perpendicular $= r\sqrt{\pi}$, and is therefore equal to the side of a square whose area is equal to that of a circle of which the diameter $= 2r$, whilst $\frac{r\pi}{2}$ = the length of a quadrant of that circle: π being calculated correctly to five decimal places in making the drawing-square.

5,140-1.—MANHOLE-COVERS, FOOT-PLATES, &C.: *H. M. Bigwood and G. A. Hancher.*—Three projecting lugs that are formed upon the cover, which has a

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bevelled edge, engage with a gated ring when the lever is turned round; any dirt that passes through the three-slot key-way is collected in a box beneath, and a chain prevents the cover from being removed. Spring-plates bolted on to the cover may be substituted for the lugs. The cast-iron foot-plate has no opening other than one at its end for the down-pipe; a channel—made of stoneware, earthenware, cement, &c.—is fastened to the foot-plate with straps (which are attached to the plate whilst it is being cast), and by a Lewis bolt or an in-turned end, which is cemented or leaded into openings; the connexion is made with the over-lapping flanges, and fillets or lugs and ledges that are to be leaded or cemented, or may be shaped so that they shall become fixed by a wedge-like action.

5,174.—SAWING AND DRESSING OF STONE: *F. McLachlan.*—The inventor has devised a combined machine for both sawing and making straight or curved mouldings. The cross-heads of the frame carry the saws, the frame being reciprocated by means of a connecting rod, and working in guides which can be lowered or lifted by means of four vertical screws, curved or straight guides are used for the moulding cutters, which can be lifted or lowered independently by means of other screws, whilst vertical guides attached to the saw-frame cause the moulding cutters to be reciprocated together with the saws; bevel and spur gearing upon the framework's top drives the feed-screws, and recesses in the edges, together with grooves in the sides of the saws, serve to pass the grit from the hollow faces of the cutters, and therefrom through suitable orifices and recesses in the cutters.

5,177.—DRESSING OF TILES, SLATES, &C.: *T. Adamson.*—The base of the apparatus comprises two side bars having a hook or feet or perforated lugs by which it may be held, and upon the base is pivotted a lever having a cutting edge which may be set at any desired distance from the base by means of a screw and nuts.

5,188.—A REGULATING VALVE FOR SERVICE PIPES: *H. L. Doulton.*—A piston moves within an oil cylinder whose two ends are joined with a passage to a time-screw, and the flushing valve's spindle is joined to the cylinder; when the flushing valve is opened the piston's downward motion is effected by the rising of a disc which covers perforations in the piston, but as the valve becomes closed the disc falls and so enables the piston to rise slowly upwards.

5,201.—LIFT VALVES: *T. W. Scott.*—The handle is formed in one piece with the conical plug of a screw-down tap, and a cap holds the plug securely in its position; the engagement of a screwed nut upon the cap with the spindle serves to screw the plug down upon its seating, or the plug may be made to engage with a screwed pin within it; in a variant arrangement the tap is opened by being screwed downwards, the plug being reversed.

5,204.—CONSTRUCTION OF FLOORS: *F. C. A. Bremer.*—A temporary centering or framework is hung, by means of angular holders fitted with swivelling cranked arms, from the girders, and is freed by turning the cranked arms back from beneath the wedges and cross-bars; one of the holder's prongs is bent at an obtuse angle in order that it may be hooked over the girder's lower a nge, whilst the other prong is utilised as a strut.

5,226.—SKYLIGHTS: *H. G. Bedell and F. Welsby.*—The upstanding frame has drainage-channels, and its sides and upper end are pierced for providing ventilation; the glass is fixed with caps bolted on to the frame's upright flanges, extending beyond the frame so as to exclude water from the ventilation-holes; the glazing bars are formed of sheet metal, a vertical web is made by bending their edges upwards, whilst one edge is bent over the other; for strengthening large skylights cross-bars are set angle-wise in a zig-zag manner between the astragals or longitudinal bars, the glass panes are cut at the same angle, and are fastened with leaden strips which are soldered on to the webs of the cross-bars.

5,295.—WINDOW SASH-BARS: *Aldam, Heaton, & Co. and F. Croft-Smith.*—The sash-bars consist of metal strips or bars, which are of T, +, plain or channelled section, in combination with wooden bars into which they are sunk, being fastened with lugs or screws—a bead is inserted in a channel-shaped bar.

5,328.—METHOD OF CLOSING GATES AND DOORS: *G. R. Goodfellow.*—At the rear of the gate is mounted a mitre-wheel which gears with a similar wheel upon the post; to the latter wheel's spindle or axis is attached an arm that bears an adjustable weight; the weight and arm act as a lever which, working automatically, closes the gate.

5,344.—SCAFFOLDING, &C.: *F. J. Carr.*—Poles, the sides of ladders, beams, planks, and similar materials are strengthened and stiffened with tension wires which are secured to hooks and screws when the planks, &c., are in a bent condition. As the plank is liberated the wires become tightly stretched, and are then fastened in grooves in the planks with staples; metal bands are used for joining two planks, the one sliding upon the other, their length of slide being determined by means of stops or studs.

5,349.—A RANGE-FINDER: *A. B. Brown.*—The angles subtended by distant objects whose heights are either known or assumed are read off with an ordinary sextant; upon the index-arm of the instrument is an adjustable pointer joined to a cam; a projection of a pivotted arm, which is pressed with a spring and carries a mirror that reflects the distant object in a fixed mirror, bears against the cam, and between the cam and the pivotted arm is placed a micrometer adjustment; the plate is graduated by a calculation of the angles subtended by objects whose heights and distances are known; the angular ratio of the reflecting mirror increases each of the angles thus found, the arm and the pointer are then swept through the calculated angle, whereupon the range from which the angle has been computed is represented by the point at which the arm cuts the corresponding "range" arc; when many of the points have been found by those means curves are drawn through them, for the reading-off of the ranges required.

5,405.—APPLIANCE FOR EXTINGUISHING FIRE: *L. Bertling.*—An explosive agent, which may be fixed in the building, and is to be ignited by a fuse, consists of a container made, say, of india-rubber, which is filled with some highly explosive material, mixed, it may be, with a substance—such as sodium carbonate or alum—that is inimical to the production of fire. The holder is placed within a covering case, and the contrivance can be used as a grenade, the fuse being lighted by the flames.

5,456.—BREAKWATERS, BRIDGE PIERS, MOLES, AND OTHER MARINE STRUCTURES: *N. R. Feckel.*—Vertical grooves are fashioned in concrete blocks for taking the hooked ends of embedded iron bars in such a manner as to join each block to a series of vertical iron bars having double channels, and to let the block slide into its place, the bars being held with frames as the blocks are laid. Thin sacks containing cement are placed between the blocks, whose weight bursts the sacks, but waste of the cement is prevented by ribs which are made upon the edges and grooves of the blocks. When the blocks have been laid, pads, fastened to frames, are used to close the interstices, and cement is poured into the openings. For building bridge-piers an iron framework, to be afterwards taken away, is employed, and the blocks are fixed around it.

5,477.—KILNS FOR BURNING CEMENT: *P. O. von Krottnaurer.*—The shaft comprises two parts—a firing portion above a cooling portion made in the shape of a basket, with rings and bars; through the shaft's axis is inserted a tube joined at each end to a reservoir of water; the draught is increased by the escape of steam from the tube. In the coned top of the kiln are doors for the charge, which, when cooled, is broken by a cone at the shaft's base.

5,502.—GAS BURNERS: *A. Heller.*—The inventor's object is to produce atmospheric flames which shall issue in a solid or compact state from the tops of the burners; from the bottom of the gas chamber short air tubes project into the lower ends of the tubes, which hang downwards from the chamber's top, so that an annular gas-way is formed between the overlapping ends of the two sets of tubes.

5,509.—SAWS FOR WORKING STONE: *G. T. Harris.*—The blade of the saw is made in the shape of a wedge, its thicker end being punched out so as to produce teeth which shall be deep enough to include a portion of the taper; at the side on which the dogs hold the blade is rivetted a strengthening plate.

5,530.—PLUG COCKS: *D. F. McOsker, O. F. Garvey, & G. E. Palmer.*—Projections upon a key engage with radial recesses arranged within a gas or other kind of cock; the key is pressed out of engagement with the closed cock by means of a spring which embraces a sliding pin fitted with a collar, and the key is drawn out along a guide which is recessed to correspond with the projections upon the key, and sustains a split-ring spring. The key's movement is restricted with stops; for a non-detachable key its projections are replaced with a pin that is to be forced into radial slots formed in the guide when the valve is closed.

5,544.—DOMESTIC WATER SUPPLY: *R. G. Ballantine and F. Stott.*—The mixing chamber is supplied with hot and cold water through two pipes, the flow being controlled with screw-down valves, whose stems are geared together with bevel wheels; the two valves may be opened at one and the same time by the turning of a hand-wheel. If it be desired to admit the cold water first, different pitches are given to the valve-screws, or the numbers of the teeth in the two bevel wheels are varied.

MEETINGS.

FRIDAY, JULY 13.

Architectural Association of Ireland.—Annual excursion, Kilkenny.

SATURDAY, JULY 14.

Architectural Association.—Third summer visit, to Mr. C. E. Kempe's house (Old Place, Lindfield), and Cuckfield Park.

British Institute of Certified Carpenters.—Visit to Royal Naval College, Greenwich. Boat at Old Swan Pier, 3.30 p.m., London Bridge.

Architectural Association of Ireland.—Annual excursion (concluded). A visit will be paid to Jupoint Abbey, about fifteen miles distant.

MONDAY, JULY 16.

Victoria Institute.—Annual address, by Professor Hull, F.R.S. 4.30 p.m.

WEDNESDAY, JULY 18.

Builders' Foremen and Clerks of Works' Institution.—Half-yearly meeting of the members. 8 p.m.

THURSDAY, JULY 19.

Incorporated Association of Municipal and County Engineers.—Twenty-seventh annual general meeting Westminster Town Hall.

FRIDAY, JULY 20.

Incorporated Association of Municipal and County Engineers.—Annual meeting (continued).

SATURDAY, JULY 21.

Incorporated Association of Municipal and County Engineers.—Annual meeting (concluded).

SOME RECENT SALES OF PROPERTY

ESTATE EXCHANGE REPORT.

June 19.—By WALTON & LEE (at Uttoxeter).

Uttoxeter, Staffs.—Church-st., &c., f.g.r.'s 62*l.* 7s. 6d., reversion in 74 yrs.	£1,835
Various enclosures of land, 59 a. 2 r. 37 p., f.	5,860
Highwood Farm, 68 a. 2 r. 31 p., f.	2,900
The Crakemarsh Hall Estate (parts of), 230 a. 0 r. 30 p., f.	11,640
Cauldon, Staffs.—Various enclosures of land, 33 a. 1 r. 28 p., f.	1,125
Millwich, Staffs.—Garshall Green Farm, 130 a. 0 r. 12 p., f.	4,100

June 22.—By WALTON & LEE (at Buckingham).

Thornborough, Bucks.—Enclosures of land, 18 a. 0 r. 21 p., f.	570
A freehold beerhouse and 4 a. 0 r. 23 p., r. 20*l.*	550
The Manor Farm, 330 a. 0 r. 28 p., f.	10,000

June 28.—By HARPER & SONS (at Malvern).

Malvern, Worcester.—Abbey-rd., The Malvern Promenade Gardens, area 3,438 yds., f.	2,300
Turnpike-rd., Rose Bank, and 3 a. 3 r. 23 p., lifehold, g.r. 9*l.* 5s. 6d., with policies for 1,000*l.*	2,150
The Pale's Farm, 52 a. 3 r. 38 p., f.	6,400

June 29.—By WATERS & RAWLENCE (at Shepton Mallet).

Ditcheat, Somerset.—A freehold dairy farm, 45 a. 1 r. 25 p.	1,950

July 2.—By CHANCELLOR & SONS.

Richmond Hill.—4, Park Hill, u.t. 57 yrs., g.r. 1s., r. 45*l.*	500
Wimbledon.—13 to 16, The Broadway, f., r. 262*l.*	6,650

By G. B. HILLIARD & SON.

Finchingfield, &c., Essex.—A freehold estate, area 601 a. 3 r. 0 p.	4,000
22 freehold cottages, r. 90*l.*	950

By HOLCOMBE, BETTS, & WEST.

Dalston.—St. Mark's-rd., l.g.r. 23*l.* 2s., u.t. 55¾ yrs., g.r. 1d.	430
Sandringham-rd., i.g.r. 29*l.*, u.t. 65½ yrs., g.r. 1d.	540
Camden Town.—17, Rochester-ter., u.t. 44 yrs., g.r. 6*l.*, e.r. 50*l.*	465

By MAPLE & CO.

Finchley.—Holden-rd., a plot of building land, f.	120
Woodside-av., a freehold building site	1,300
Woodside Grange-rd., a freehold building site	300

By W. B. MASON.

Windsor, Berks.—Thames-st., The Theatre Royal, and a shop adjoining, f.	3,000

By MULLETT, BOOKER, & CO.

Portman-sq.—No. 13, Portman-st., u.t. 21 yrs., 12*l.* 12s., r. 200*l.*	1,680
Hyde Park.—7, Southwick-pl., u.t. 35 yrs., g.r. 2*l.*	805

By TOWERS, ELLIS, & CO.

Edgware-rd.—40 and 41, John-st., f., r. 121*l.*	2,120
Clapham.—Wirtemburg-st., f.g.r.'s 71*l.* 3s. 6d., reversions in 51 and 53 yrs.	2,030
Hyde Park.—236, Gloucester-ter., u.t. 49 yrs., g.r. 2*l.*, r. 100*l.*	1,075

July 3.—By CHINNOCK, GALSWORTHY, & CO.

Westwood, Worcester.—The Westwood Park Estate, 3,077 a. 0 r. 5 p., f.	70,000

By BRACKETT & SONS.

Heathfield, Sussex.—Holme's Hall Farm, 24¾ a., f.	2,800
Mayfield, Sussex.—Stonehurst Estate, 91 a. 2 r. 15 p., f.	7,200
Wadhurst, Sussex.—Two freehold cottages and 1 r. 14 p.	315

By DEBENHAM, TEWSON, & CO.

City of London.—16, Old Change, area 2,000 ft., u.t. 36½ yrs., g.r. 85*l.*, r. 725*l.*	4,000
Chatteris, Cambs.—High-st., freehold residence with factory and workshops, area 10,900 ft., f., r. 60*l.*	1,150

By LEOPOLD FARMER.

Bayswater.—9, Porchester-pl., u.t. 35½ yrs., g.r. 8*l.*, r. 100*l.*	910
St. John's Wood.—37, New-st., u.t. 27 yrs., g.r. 5*l.*, r. 38*l.*	340
27, Townsend-cot., u.t. 17 yrs., g.r. 2*l.*	155
8 and 74, Cochrane-st., u.t. 19 yrs., g.r. 6*l.* 10s.	640
31, Barrow Hill-rd., u.t. 27 yrs., g.r. 5*l.* 10s.	335
Marylebone.—10, 10A, 11, and 12, Weston-pl., u.t. 49 yrs., g.r. 11*l.* 10s.	765
20 and 21, Byron-st., u.t. 41 yrs., g.r. 7*l.* 10s.	430
Paddington.—1, 3, and 5, Waverley-rd., u.t. 47 yrs., g.r. 6*l.* 6s. 2d.	915
Kilburn.—69, 71, and 73, Netherwood-st., u.t. 97 yrs., g.r. 30*l.*	700

By KNIGHT, FRANK, & RUTLEY.

Stoke Trister, Somerset.—Horwood Well House, and 30 a. 2 r. 11 p., f.	1,460

By NOTT, CARTWRIGHT, & ETCHES.

Pimlico.—16, Lupus-st., u.t. 33½ yrs., g.r. 10*l.*, e.r. 75*l.*	640

By ROBINSON & SONS.

Harmondsworth, Middlesex.—Uxbridge-rd., &c., a freehold house and 2¼ a.	910

By PHILIP STOCK.

Camberwell.—58a, Hinton-rd., u.t. 73 yrs., g.r. 1*l.* 10s.	200
Peckham.—69, Waghorn-st., u.t. 76 yrs., g.r. 8*l.*, r. 28*l.*	270

By THORNBORROW & CO. (at Penrith).

Ousby, Cumberland.—Shire Hall and Jardine's Farms, 165 a. 1 r. 18 p., f.	5,000
Watermillock, Cumberland.—Grove Foot Estate, 89 a. 1 r. 36 p., f.	1,500

By VIDLER & CLEMENTS (at Ashford).

Wittersham, Kent.—Glyndes Cottage, f.	150
Glyndes Meadow, 5 a. 0 r. 18 p., f.	170

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By CRUSO & WILKIN (at King's Lynn).
East Winch, Norfolk.—East Winch Hall Estate, 489 a. 2 r. 24 p., f. £12,050
Lynn-rd., "The Crown Inn," and 5 a. 2 r. 15 p., f. 2,100
Lynn-rd., six cottages and 1 a. 0 r. 15 p., f. 460
Wiggenhall St. Mary the Virgin, Norfolk.—Six enclosures, 48 a. 0 r. 31 p., f. 2,570
A freehold farmhouse and 5 a. 2 r. 37 p. 660
By ALFRED PRESTON (at Ipswich).
Crowfield, Suffolk.—Gostling's Farm, 44 a. 0 r. 22 p., f. 780
Stonham, Suffolk.—The Brewery Farm, 102 a. 3 r. 39 p., f. and c. 1,525
By G. H. MASTERMAN & Co. (at Chichester).
Sidlesham, Sussex.—Keynor Farm, 325 a. 3 r. 2 p., f. ..... } 7,550
Earnley, Sussex.—Marsh Farm, 268 a. 3 r. 3 p., f. }
By FLEURET, SONS, & ADAMS (at Mason's Hall Tavern).
Stratford.—High-street, "The Harrow" p.-h., with goodwill, and nine houses and shops adjoining, u.t. 36 yrs., r. 200*l.* 6,000
July 4.—By BATCHELAR & SON.
Addiscombe.—Lower Addiscombe-rd., The Chestnuts, and two acres, f. 2,000
Chelsea.—3, 10, and 12, Leveret-st., u.t. 8½ yrs., g.r. nil 155
By FOSTER & CRANFIELD.
Broadwater, Sussex.—Broadwater Cottage, f., r. 18*l.* 255
By H. DONALDSON & SON.
Silvertown.—5 to 15 (odd), Constance-st., u.t. 68½ and 70½ yrs., g.r. 25*l.* 4s. 1,200
17 to 25 (odd), Constance-st., u.t. 41¾ yrs., g.r. 20*l.* 725
27 to 35 (odd), Constance-st., f. 1,195
1 to 33 (odd), Andrew-st., u.t. 82½ and 80½ yrs., g.r. 44*l.* 10s. 1,520
2 to 34 (even) Andrew-st., u.t. 82 yrs., g.r. 42*l.* 10s. 1,410
4 to 26 (even) Gray-st., u.t. 82 yrs., g.r. 35*l.* 1,220
28 to 38 (even), Gray-st., u.t. 70½ yrs., g.r. 40*l.* 1,140
North Woolwich.—90 to 96 (even), Albert-rd., f. 1,460
2, 4, 6, 18, and 20, Storey-st., f. 980
By HUMBERT & FLINT.
Rickmansworth, Herts.—Scots Hill, Highfield, and 5 a. 0 r. 26 p., f. 5,600
Copthorne-rd., a plot of building land, 2 a. 1 r. 10 p., f. 1,310
Bishop's Stortford, &c., Herts.—Wickham Hall Estate, 501 a. 1 r. 37 p., f. 8,250
Little Hadham, Herts.—The Atthouse Farm, 137 a. 3 r. 36 p., f. 2,400
Green Street Farm, 109 a. 0 r. 22 p., f. 1,050
The Acreman Street Farm, 79 a. 0 r. 9 p., f. 875
By FRANK JOLLY & CO.
Mile End.—100 and 102, Bridge-st., u.t. 59 yrs., g.r. 12*l.*, r. 72*l.* 665
By D. SMITH, SON, & OAKLEY.
Ealing.—Birch-grove, three plots of building land, f. 555
By J. J. HILL & WEAVER (at "Horseshoe Hotel").
Kingsland.—High-st., "The Castle," p.-h., u.t. 668 yrs., g.r. 80*l.*, with goodwill 27,000
By Messrs. SPELMAN (at Norwich).
Norwich.—26, London-st., area 1,560 ft., f. 3,900
Chapel Field-rd., Gothic House, f. 730
1 to 8 and 12 to 18, Howard-st., f. 1,585
72, 74, and 76, Dereham-rd., and workshop in rear, f. 722
July 5.—By F. J. BISLEY & SONS.
New Cross.—59, 61, 63, and 65, Bousfield-rd., u.t. 59 yrs., g.r. 21*l.*, r. 122*l.* 1,290
Bermondsey.—8, 10, 12, 15, and 17, Linsey-st., u.t. 35½ yrs., g.r. 31*l.* 10s. 1,295
By Messrs. CRONK.
Sevenoaks, Kent.—High-st., The Chantry House, and 3 r. 23 p., f. 2,500
Battersea.—29 to 35 (odd), Savona-st., u.t. 53 yrs., g.r. 14*l.* 470
By R. W. DENYER & CO.
Knockholt, Kent.—The Hawthorns and ¼ an acre, f. 900
By FAREBROTHER, ELLIS, & CO.
Norwood.—99, Central Hill, f., r. 75*l.* 900
Shenley, Herts.—Well End Lodge Farm, 71 a. 2 r. 32 p., f. 3,500
Buckett's Land Farm, 86 a. 1 r. 28 p., f. 4,020
Aldenham, &c., Herts.—Enclosures of land, 13 a. 0 r. 8 p., f. 600
By C. C. & T. MOORE.
Spitalfields.—86 and 88, Brick-lane, and 2, Boothst., u.t. 84 yrs., g.r. 110*l.*, r. 335*l.*; also freehold land tax of 5*l.* 19s. 2d. 3,000
Limehouse.—6, Cayley-st., c. 385
By NEWBON, EDWARDS, & SHEPHARD.
Islington.—42 and 44, Brooksby-st., u.t. 8½ yrs., g.r. 10*l.* 10s. 180
Harringay.—Allison-rd., f.g.r. 26*l.*, reversion in 94 yrs. 725
71 to 84 (even), Allison-rd., f., r. 256*l.* 4,010
14 and 18, Vale-rd., u.t. 83 yrs., g.r. 12*l.*, r. 78*l.* 510
Finsbury Park.—14, Endymion-rd., u.t. 77 yrs., g.r. 9*l.*, r. 60*l.* 575
Stoke Newington.—35, Hawksley-rd., u.t. 73½ yrs., g.r. 6*l.* 6s. 220
Dalston.—192, Queen's-rd., u.t. 14 yrs., g.r. 5*l.*, r. 42*l.* 190
Holloway.—23, Drayton Park, u.t. 63 yrs., g.r. 10*l.*, r. 52*l.* 510
By STIMSON & SONS.
Peckham.—151, Chadwick-rd., u.t. 68 yrs., g.r. 7*l.* 380
76 to 86 (even), Grenard-rd., u.t. 64 yrs., g.r. 30*l.* 1,390
25 and 27, Graylands-rd., u.t. 64 yrs., g.r. 10*l.* 10s. 480
129, Chadwick-rd., u.t. 66¾ yrs., g.r. 7*l.* 7s. 400
Lewisham.—6, Albion Hill, f., r. 20*l.* 365
Forest Hill.—Honor Oak Park, Meadow Lodge, u.t. 65¼ yrs., g.r. 17*l.* 10s., r. 100*l.* 555
Camberwell.—8, Cleveland-st., and 1 and 2, Cleveland-cottages, area 2,725 ft., f., r. 70*l.* 10s. 690
Rotherhithe.—Paradise-st., a freehold building site, area 2,400 ft. 275
By FRED VARLEY.
Holloway.—43, Durham-rd., f., r. 40*l.* 430
53 Campbell-rd., f. 430
By JOHNSON, DYMOND, & SON (at Gracechurch-street).
Bethnal Green.—331, Cambridge-road, f. 1,500

By T. LAVINGTON (at Marlborough).
West Kennett, Wilts.—A water meadow, 8 a. 2 r. 0 p., f. £380
A tithe rent charge of 82*l.* per annum 1,200
July 6.—By DEVERILL & HILL.
Rayleigh, Essex.—Station-av., &c., 40 plots of land, f. 513
By HARDS & BRADLY.
Dulwich.—East Dulwich Grove, u.t. 64 yrs., g.r. 5*l.*, r. 50*l.* 580
Greenwich.—34, Burney-st., u.t. 25 yrs., g.r. 8*l.*, e.r. 35*l.* 160
By MAY & ROWDEN.
Pall Mall.—No. 20, f.g.r. 500*l.*, reversion in 44 yrs. 15,100
Piccadilly.—No. 46, u.t. 36½ yrs., g.r. 200*l.*, r. 900*l.* 10,400
Pimlico.—62 and 63, Hindon-st., u.t. 24 yrs., g.r. 10*l.* 10s., r. 140*l.* 1,475
By REYNOLDS & EASON.
Acton.—Mill Hill Grove, two blocks of building land, f. 925
Thornton Heath.—85 and 90, Beulah-rd., u.t. 67 yrs., g.r. 8*l.* 14s., r. 80*l.* 1,000
Peckham.—28, 30, and 32, Hooks-rd., u.t. 53 yrs., g.r. 2*l.* 540
36 to 46 (even), Sunwell-rd., u.t. 52½ yrs., g.r. 9*l.* 1,015
Old Ford.—231, Roman-rd., u.t. 59 yrs., g.r. 4*l.* 10s. 370
Kingsland.—42, Mortimer-rd., u.t. 14 yrs., g.r. 4*l.* 10s. 135
Kensal New Town.—51, 53, and 55, Appleford-rd., u.t. 66 yrs., g.r. 21*l.* 765
By WINDRUM & CLEAVE.
Mile End.—70 to 76 (even), Bridge-st., f. 1,200
33, Streatfield-st., u.t. 72½ yrs., g.r. 4*l.*, e.r. 36*l.* 350
12, Edwards-rd., u.t. 46½ yrs., g.r. 6*l.* 230
Poplar.—8, Market-st., u.t. 30 yrs., g.r. 2*l.* 15s. .. 180
265 to 271 (odd), and 277, East India Dock-rd., u.t. 22 yrs., g.r. 15*l.* 1,580
Clapton.—121, Rendlesham-rd., f., r. 28*l.* 505

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

WOOD.*

Per Petersburg standard hundred.

	£	s.	d.	£	s.	d.
White Sea: first yellow deals	18	0	0	23	0	0
Second do.	16	0	0	18	10	0
Third do.	13	0	0	15	0	0
Battens, 40s., 30s., and 15s. less respectively.						
Petersburg: first yellow deals	15	10	0	19	0	0
Second do.	13	0	0	14	0	0
Battens, 30s. and 20s. less respectively.						
Petersburg, white deals	12	0	0	15	0	0
Do. white battens	11	0	0	12	0	0
Riga, white deals	10	0	0	11	10	0
Swedish mixed yellow deals	16	10	0	21	0	0
,, Third do.	14	10	0	17	0	0
,, Fourth do.	13	0	0	14	10	0
,, Fifth do.	12	0	0	13	10	0
Battens, 30s., 20s., and 10s. less respectively.						
Whitewood, 10 to 20 per cent. less.						
Finnish unsorted yellow deals	11	10	0	12	10	0
Battens, 10s. and 5s. less respectively.						
Whitewood, 5 to 10 per cent. less.						
Norwegian second yellow battens	8	10	0	9	0	0
Third do.	8	0	0	9	0	0
Fourth do.	8	0	0	8	10	0
Whitewood, 10s. less.						
Danzig, Crown Deck deals, per 40 ft. 3 in.	0	15	0	1	5	0
Brack	0	12	0	1	0	0
St. Lawrence Pine deals, &c., per P.S.H.:—						
1st, Bright and Dry, regular sizes	22	0	0	29	0	0
,, ,, oddments	15	10	0	23	0	0
2nd ,, regular sizes	17	10	0	20	0	0
,, ,, oddments	12	0	0	16	10	0
3rd, ,, regular sizes	11	0	0	12	0	0
,, ,, oddments	9	10	0	10	10	0
4th ,, regular sizes	10	0	0	11	0	0
,, ,, oddments	9	0	0	10	0	0
St. Lawrence Spruce deals, &c.						
First, regular sizes	13	0	0	15	0	0
Second ,,	10	10	0	11	0	0
Third ,,	10	5	0	10	10	0
Fourth ,,	9	15	0	10	5	0
Oddments and battens at 20s., 10s., 7s. 6d., and 5s. less respectively.						
New Brunswick Spruce deals, &c.	10	0	0	12	0	0
Oddments, battens, and fourths	9	10	0	10	0	0
United States pitch pine planks and boards	11	10	0	15	0	0
Prepared Boards, per square						
1¼ by 6½ and 7 in. 1st yellow		11	6		16	6
,, ,, 2nd ,,		11	0		13	6
1 by 6½ and 7 in. 1st ,,		10	6		12	6
,, ,, ,, white		9	6		10	6
,, ,, 2nd yellow		9	6		11	6
,, ,, ,, white		8	6		9	6
⅞ by 6½ & 7 in. 1st & 2nd yellow		8	6		9	6
,, ,, ,, white		8	0		9	0
¾ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)		9	0		10	0

* The prices named are for the wood as imported and landed in the docks. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

PRICES CURRENT (*Continued*).

	£	s.	d.	£	s.	d.
⅞ by 6½ and 7 in. 2nd yellow and white (ditto)		8	0		9	0
⅞ by 6½ and 7 in. 1st yellow and white (ditto)		7	0		8	0
⅞ by 6½ and 7 in. 2nd yellow and white (ditto)		6	6		7	6
Narrower widths at 10 per cent. less.						
3rd quality at 15 per cent. less than 2nd.						
Danzig and Memel Fir Timber—per load						
Best middling	3	10	0	3	15	0
Good middling and Second	3	0	0	3	5	0
Common middling	2	15	0	3	0	0
Undersized	2	15	0	3	0	0
Swedish and Norwegian Balks	2	5	0	2	10	0
Baltic Oak Timber—						
Danzig and Stettin—Large	3	17	6	4	10	0
Small	3	2	6	3	15	0
Quebec Timber per load						
Yellow Pine	4	15	0	6	5	0
Oak	4	0	0	6	0	0
Elm	5	5	0	6	5	0
Ash	3	5	0	4	0	0
Birch	3	17	6	6	5	0
New Brunswick, &c., Birch	3	12	6	4	10	0
American Pitch Pine Timber	2	17	6	4	5	0
Wainscot, per log, 18 cubic ft.—						
Crown (Eng. & Dutch) nominal	3	0	0	4	0	0
Brack nominal	2	7	6	3	0	0
Lathwood, per cubic fathom—						
Petersburg	4	0	0	6	10	0
Riga and Danzig	4	10	0	5	10	0
Norway Poles, per ft. run	0	0	1	0	0	1½
Oak Staves, per mille full size pipe						
Memel, Crown	220	0	0	230	0	0
Brack	190	0	0	200	0	0
Danzig	165	0	0	175	0	0
Bosnia, single Barrel (nominal)	28	0	0	30	0	0
United States, Pipe	37	10	0	45	0	0
Hogshead, extra heavy and double extra	30	0	0	35	0	0
Indian Teake per load	10	10	0	16	0	0
British Guiana Greenheart	0	0	0	8	0	0
Mahogany, per foot superficial—						
Honduras, cargo average	0	0	4½	0	0	5½
Nicaragua, do.	0	0	4½	0	0	5½
Tabasco, do.	0	0	4½	0	0	6
Mexican, do.	0	0	4	0	0	4½
Panama, do.	0	0	3½	0	0	4
African, do.	0	0	3½	0	0	5
Cuba, do	0	0	6	0	0	8
St. Domingo, do.	0	0	5	0	0	7½
Do. Curls (good to prime)	0	0	9	0	1	3
Walnut, American (logs)	0	2	9	0	4	9
Do. do. (planks and boards)	0	2	0	0	7	0
Italian, per foot superficial	0	0	3	0	0	7½
Black Sea, per ton	6	0	0	12	0	0
Satin Walnut (logs) per foot cube	0	1	0	0	1	6
,, (planks and boards)	0	1	9	0	3	0
Sequoia (Californian redwood), per foot cube	0	1	9	0	2	0
Whitewood, American (logs)	0	1	4	0	1	9
,, ,, (planks and boards)	0	1	9	0	2	9
Quartered oak ,, ,,	0	2	3	0	4	0
Kauri pine (logs)	0	1	9	0	2	0
,, ,, (planks)	0	2	3	0	2	0
Jarrah (planks)	0	2	0	0	2	6
Lancewood spars each, fresh and large	0	5	0	0	7	0
Lancewood spars, ordinary to fair	0	3	0	0	4	0
Degame spars	0	8	0	0	10	0

METALS.

IRON—Pig, in Scotland ton	3	9	6	0	0	0
Bar, Welsh, in London	9	0	0	9	15	0
Do. do. at works in Wales	8	10	0	9	0	0
Do. Staffordshire, in London	9	15	0	11	15	0
COPPER British cake and ingot	75	0	0	76	0	0
Best selected	76	0	0	77	0	0
Sheets, strong	83	0	0	0	0	0
Chili bars	71	15	0	72	0	0
YELLOW METAL lb.	6½d.			7d.		
LEAD—Pig						
Spanish ton	17	10	0	-	-	-
English Com. Brands	17	15	0	-	-	-
Sheet, English, 6 lbs. per sq. ft. and upwards	19	5	0	-	-	-
Pipe	19	15	0	-	-	-
ZINC—						
Vieille Montagne ton	25	0	0	-	-	-
Silesian	25	0	0	-	-	-
Spelter	19	12	6	-	-	-
TIN—Straits	141	0	0	-	-	-
Australian	143	0	0	-	-	-
English Ingots	145	0	0	-	-	-
Banca	-	-	-	-	-	-
Billiton	-	-	-	-	-	-

ENGLISH SHEET GLASS IN CRATES.

1 oz. thirds	2½d. per ft. delivered.
,, fourths	2d. ,, ,,
21 oz. thirds	3d. ,, ,,
,, ,, fourths	2¾d. ,, ,,
26 oz thirds	4d. ,, ,,
,, ,, fourths	3½d. ,, ,,
32 oz. thirds	5d. ,, ,,
,, ,, fourths	4½d. ,, ,,
Fluted sheet, 15 oz.	2½d. ,, ,,
,, ,, 21 ,,	3½d. ,, ,,

OILS, &c.

	£	s.	d.	£	s.	d.
Raw Linseed Oil in pipes, per ton	36	10	0	-	-	-
,, ,, ,, in drums, per gal.	0	3	2	-	-	-
Boiled ,, ,, in pipes, per ton	38	10	0	-	-	-
,, ,, ,, in drums, per gal.	0	3	5	-	-	-
TAR—Stockholm barrel	1	6	6	-	-	-
Archangel	1	0	0	-	-	-
Turpentine, in barrels, per cwt.	2	0	0	-	-	-
,, in drums, per gal.	0	3	3	-	-	-
Genuine Ground English White Lead	26	10	0	-	-	-
Red Lead	22	10	0	-	-	-
Best Linseed Oil Putty, per cwt.	0	9	0	-	-	-

[See also page 45.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Reconstruction and Enlargement of Town Hall, &c...	Musselburgh Town Council	25 guineas and 15 guineas	Sept. 30

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Kerbing, Tarpaving, &c., Ballina-street, Forest Hill...	Lewisham Board of Works	Surveyor's Department, Town Hall, Catford, S.E.....	July 17
*Kerbing, Tarpaving, &c., Lamos-road, Anerley	do.	do.	do.
*Cottage at their Depôt, Home Park, Lower Sydenham	do.	do	do.
Two Houses, Allerton Bywater	Mr. B. Clayton	R. M. McDowall, Architect, Carlton-street, Castleford	do.
Additions to Farm Buildings, Gordonstown, N.B.....	.....	J. Duncan & Son, Architects, Turriff, Aberdeen	do.
Rebuilding Victoria Hotel, Maesteg, South Wales ..	Messrs. Stiles	P. J. Thomas, Architect, Bridgend	do.
Five Houses, Peak Forest, Derbyshire	Buxton Lime Firms Co.	W. R. Bryden, Architect, 1, George-street, Buxton	do.
Additions to Reformatory, Little Mill, Pontypool.....	.....	D. J. Lougher, Bank Chambers, Pontypool	do.
Building Work, Brassey Institute	Hastings Corporation	P. H. Palmer, Civil Engineer, Town Hall, Hastings	do.
Business Premises, Queen-street, Barnsley	.....	H. Crawshaw, Architect, 13, Regent-street, Barnsley	do.
Boiler House, Shaft, &c., at Workhouse	Watford Guardians	C. P. Ayres, Architect, 14A, High-street, Watford.....	do.
Earthenware Pipe Sewers.....	Guiseley U.D.C.....	H. A. Johnson, Civil Engineer, 15, The Exchange, Bradford	do.
Reservoir, Strichen, Old Deer, N.B.....	....	Jenkins & Marr, Civil Engineers, 16, Bridge-street, Aberdeen	do.
Cast-iron Gas Mains and Laying, Lowfield Heath, Surrey	Horley District Gas Co., Ltd.	H. Webber, 147, Dashwood-house, E.C.....	do.
*Footpaths	Kingston-on-Thames Corporation	.....	July 18
Incubator House, Home Farm, Whitehouse, N.B.....	.....	Jenkins & Marr, Civil Engineers, 16, Bridge-street, Aberdeen.....	do.
Pipe Sewers, House, &c., High Royd Farm	Luddenden Foot Jt. Sewerage Bd.	J. Waugh, Civil Engineer, Sunbridge Chambers, Bradford	do.
Culvert, Maindy	Glamorgan County Council	T. Lloyd Edwards, Surveyor, Bridgend	do.
Alterations to Union Offices	Stoke-upon-Trent Guardians.....	E. E. Scrivener, Howard-place, Shelton	do.
Bridge, near Stowmarket.....	East Stow R.D.C.	G. Harrison, Surveyor, Market-place, Stowmarket	do.
Granite, Quartzite, &c.....	Rochester Corporation	W. Banks, Civil Engineer, Rochester.....	do.
Car Sheds, Thornton Heath and Brighton-road	Croydon Corporation	Borough Engineer, Town Hall, Croydon	do.
Cement	Wimbledon U.D.C.	R. H. S. Butterworth, Council Offices, Broadway	do.
Banking Premises, Ripon.....	Yorkshire Banking Co., Ltd.	Bedford & Kitson, Architects, Greek-street, Chambers, Leeds.....	July 19
Portland Cement...	Newmarket U.D.C.	S. J. Ennion, Deva Chambers, Newmarket	do.
Additions to School, Oxhill, Durham	.....	G. T. Wilson, Architect, 121, Durham-road, Blackhill.....	July 20
Stone Walling, St. Philip's	Birmingham Corporation	J. Price, Civil Engineer, Council House.....	do.
Wall at Sewage Works	Nelson Corporation	B. Ball, Civil Engineer, Town Hall	do.
Store Buildings, Flushdyke, Ossett	.....	J. Kirk & Sons, Architects, Dewsbury	do.
Almshouses, Ardsley, near Barnsley	.....	J. P. Kay, Architect, 34, Prudential-buildings, Leeds	do.
Large Shed, Caledonia Wireworks, Halifax	.....	W. H. D. Horsfall, Architect, Tower Chambers, Halifax	do.
Septic Tank Installation, Limpsfield and Oxted	Godstone R.D.C.	T. C. Barralet, Surveyor, New Oxted	do.
Dispensary Buildings.....	Arklow Guardians.....	B. Manning, Board Room, Workhouse, Arklow	do.
Surveyor's Materials	Middlewich U.D.C.	W. W. Morris, Surveyor, Council Offices	July 21
Hotel Buildings, Truro	Messrs. Mallett & Co.....	W. Swift, Architect, 38, Lemon-street, Truro.....	do.
Alterations to Refuse Destructor Buildings.....	Wrexham U.D.C.	Borough Surveyor, Guildhall, Wrexham	do.
Artizans' Dwellings, Great Passage-street.....	Hull Corporation	J. H Hirst, Architect, Town Hall, Hull	July 23
Sewerage and Drainage Works	Newmarket U.D.C.	Beesley, Son, & Nicholls Engineers, 11, Victoria-street, S.W.....	do.
Granite Road Metal	Stevenage U.D.C.	W. O. Times, Council Offices	do.
*Paving Works	Limehouse District Board of Wks.	Offices, White Horse-street, Commercial Road East, E.....	do.
Widening Railway, Mirfield to Horbury	L. & Y. Railway Company.....	R. C. Irwin, Hunt's Bank, Manchester	July 24
Widening Railway, Brighouse to Heaton Lodge Junctn.	do.	do.	do.
Two Cottages at Sewage Farm	Tunbridge Wells Town Council ...	do.	do.
Light Railway (7½ miles), Southend-on-Sea	.....	W. H. Maxwell, Borough Surveyor, Town Hall.....	do.
Engine House, &c., London-road	Southend-on-Sea Corporation	A. Fidler, Civil Engineer, Town Hall.....	July 25
Electric Light Buildings	Epsom U.D.C.....	do.	do.
Laundry Buildings, Pulham Market, Suffolk	Depwade Guardians.....	A. E. Pridmore, Architect, 2, Broad Street-buildings, E.C.	do.
*Stables, &c.	Fulham Vestry	A. Clarke, Architect, 126, London-road, Lowestoft	do.
Police Court, &c., Fenny Stratford	Bucks County Council...	Surveyor's Office, Town Hall, Walham Green	do.
Dispensary and Residence, Crumlin, Ireland	Antrim Guardians.....	R. J. Thomas, Surveyor, County Hall, Aylesbury.....	July 26
Chimney Shaft, Refuse Destructor Buildings, &c.....	Leicester Corporation.....	J. Clark, Union Office, Antrim	do.
*Water Pipes, &c.	Epsom R.D.C.....	E. G. Mawbey, Civil Engineer, Town Hall	July 27
Sewerage Works	Beaconsfield U.D.C.....	See Advertisement...	do.
Additions to Schools, Exhall, near Coventry	.....	G. H. Charsley, 11, Mackenzie-street, Slough	July 28
Bandstand, Hillmorton-road	Rugby U.D.C.....	T. F. Tickner, Architect, 7, Bishop-street, Coventry	do.
Building Works, Oak Hill	Rawtenstall Corporation	D. G. Macdonald, Surveyor, Council Offices	do.
Sewage Disposal Works, &c., Whittingham, nr. Preston	Lancs. Asylumn Board	D. Bird, Architect, 7, Brazennose-street, Manchester.....	July 30
*Alterations to Sewers	Frimley U.D.C.	J. P. Muspratt, County Offices, Preston	do.
*Hospital	Bury Corporation	W. J. Hodgson, Surveyor, High-street, Camberley	do.
Two Steel Bridges, Park-street	Aylesbury U.D.C.	Borough Engineer, Bank-street, Bury	July 31
Church Restoration, Tullyallen, nr. Market Hill, Ireland	.....	J. H. Bradford, Surveyor, 2, Rickford's-hill, Aylesbury	Aug. 1
*Electric Light Station, &c.	Grays Thurrock U.D.C.	J. Brown, Architect, 41, Kilmorey-street, Newry	Aug. 4
*Steam Heating and Cooking	Rochdale Guardians.....	Preece & Cardew, 13, Queen Anne's Gate, Westminster.....	Aug. 9
Twelve Houses, Clay Cross, Derbyshire	.....	Butterworth & Duncan, Architects, Rochdale	No date
Part of New Road, Hillsborough, Yorks.	.....	E. Oxley, Architect, Clay Cross.....	do.
School, Wesley-street, Farsley, Yorks.	.....	Fowler & Son, St. James'-street, Sheffield	do.
Church, St. George, Darwen	.....	W. Bailey, Architect, 9, Market-street, Bradford.....	do.
Shops and Auction Rooms, Market-street, Keighley...	.....	Woods & Thackeray, Darwen	do.
Two Villas, Knottingley, near Leeds	.....	J. Judson & Moore, Architects, Bogthorn, near Keighley.....	do.
House and Shop, Park-lane, Leeds	.....	Tennant & Bagley, Architects, Pontefract	do.
Asphalting, Queen's Park	Manchester Corporation.....	D. Dodgson, Architect, 86, Albion-street, Leeds	do.
Residence, Boreham-road, Warminster.....	.....	W. H. Talbot, Town Hall	do.
Six Cottages, Mill End, Waterfoot, Lancs.	Mr. R. Barcroft.....	H. F. Price, Architect, Weston-super-Mare	do.
Two Houses, Rosemount-lane, Letterkenny, Donegal	.....	S. Taylor, Architect, Baltic, Waterfoot.....	do.
Seven Houses and Shop, Blythe-st., &c., Wombwell	.....	M. Gallagher, The Store, Letterkenny	do.
	.....	J. Robinson, Wombwell, Barnsley	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Assistant.....	Willesden District Council	85*l.* per annum.....	July 17
*Inspector of Works.....	Lewisham Board of Works	2*l.* 2*s.* per week	do.
*Teacher of Building Construction.....	Middlesex County Council.....	.....	July 21
*Architect's Assistant	Hull Corporation	110*l.* per annum	July 23
*Surveyor and Inspector of Nuisances.....	Heysham U.D.C.	120*l.* per annum	do.
*Surveyor and Inspector of Nuisances	Frimley U.D.C.	175*l.* and 90*l.* per annum	No date
*Clerk of Works.....	Barnes U.D.C.....	.....	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xx. Public Appointments, pp. xvii. & xx.*

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PRICES CURRENT (*Continued*).

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 6
Knotting	0 10 0
Best French and Brush Polish	0 10 0

BRICKS, &c.

	s. d.	
Hard Stocks	33 0	per thousand alongside, in river.
Rough Stocks and Grizzles.....	30 0	" " " "
Smooth Bright Facing Stocks..	38 0	" " " "
Shippers	42 0	" " " "
Flettons.....	30 0	" " at railway depôt.
Red Wire Cuts ..	34 6	" " " "
Best Fareham Red	71 6	" " " "
Best Blue Pressed Staffordshire ..	87 0	" " " "
Best Stourbridge Fire Bricks	84 0	" " " "
Best White Glazed Stretchers.....	260 0	" " " "
Headers	240 0	" " " "
Quoins and Bull-nose	340 0	" " " "
Double Headers..	320 0	" " " "
Best Dipped Salt Glazed Stretchers and Headers ..	240 0	" " " "
Quoins and Bull-nose	280 0	" " " "
Double Headers..	280 0	per thousand at railway depôt.
Seconds Quality White and Dipped Salt Glazed	40 0	per thousand less than best.

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered
Thames Ballast	6 9	" "
Best Portland Cement	35 0	per ton "
Best Ground Blue Lias Lime..	23 6	" "

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard, delivered.
Sourbridge Fire-clay in sacks, 32s. 6d. per ton at rly, dpt.	

STONE.

	s. d.	
Ancaster in blocks	2 0	per ft. cube, dald. rly, depôt
Bath "	1 7	" "
Beer "	1 6½	" "
Grenshill "	1 10	" "
Brown Portland in blocks	2 2	" "
Dudley Dale "	2 1½	" "
Red Corsehill "	2 5	" "
Red Mansfield "	2 4½	" "
Hard York "	2 10	" "
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super at rly. depôt.
" " 6 in. Rubbed Ditto..	2 10½	" "
" " 3 in. sawn both sides slabs (random sizes)	1 3	" "
" " 3 in. self-faced Ditto	0 9	" "

SLATES.

in. in.	£ s. d.	
20 x 10 best blue Bangor..	12 5 0	per 1000 of 1200 at rly. dep.
" best seconds "	10 15 0	" "
16 x 8 best "	6 2 6	" "
20 x 10 best blue Portmadoc	10 18 0	" "
16 x 8 " "	6 0 0	" "
20 x 10 best Eureka unfading green.....	12 2 6	" "
16 x 8 " "	6 15 0	" "
20 x 10 Permanent green and Sea-ton green	10 0 0	" "
16 x 8 " "	5 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles..	41 0	per 1,000 at rly. depôt.
Hip and valley tiles....	3 7	per doz. " "
Best Broseley tiles	48 0	per 1,000 " "
Hip and valley tiles....	4 0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 " "
Do. ornamental Do.	60 0	" " "
Hip tiles.....	4 0	per doz. " "
Valley tiles.....	3 9	" " "
Best Red or Mottled Staffordshire Do. (Peakes) .	50 9	per 1,000 " "
Hip tiles	4 1	per doz. " "
Valley tiles.....	3 8	" " "

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABBEYDORE (near Hereford).—For the erection of new infirmary, receiving wards, and tramp wards at the workhouse. Mr. E. H. Lingen Barker, architect:—

W. Phillips	£2,660 0	Lewis & Co., Hereford*	£2,460 0
A. J. Howell	2,625 0		
C. Cooke.....	2,494 10	H. Smith.....	2,357 0
W. Gibson	2,480 0		

ABERDEEN.—For the erection of a cottage, Bridgend, Ballogie, for Mr. W. E. Nicol. Messrs. Walker & Duncan, architects, 3, Golden-square, Aberdeen:—

Masonry.—Littlejohn Brothers, Ballater*	£74 15 6
Carpentry and Joinery.—James D. Brebner, Tarland*	108 0 0
Slating.—George Merson, Banchory*	37 19 0
Plastering and Cementing.—George Merson, Banchory*.....	30 9 0

BISHOP AUCKLAND.—For the erection of St. Chad's Roman Catholic School Chapel, Witton Park. Mr. H. T. Gradon, architect, 22, Market-place, Durham:—

Thos. Walton	£1,250 0 0	A. Manley....	£1,133 7 3
G. H. Bell....	1,192 9 0	Geo. Scott* ..	1,070 0 0
Thos. Hilton..	1,136 0 0		

CUPAR (N.B.).—Accepted for additions, &c., to Boston (U.P.) Church, for the managers of the Boston (U.P.) Church, Cupar Fife, N.B. Mr. Henry Bruce, C.E., architect, County-buildings, Cupar Fife. Quantities by architect:—

Heating.—David Honston, Cupar	£72 13 0
Masonry.—James Stark, Cupar-Muir..	68 7 6
Joinery.—H. J. Black, Cupar	22 12 7
Plumbing.—Robt. Bell, Cupar.....	18 1 0
Slating.—Francis Batchelor, Cupar ..	4 14 11
Plastering.—Francis Batchelor, Cupar	2 10 0
Glazing.—Chas. C. Edmond, Cupar ..	4 0 2

DISTINGTON (Cumberland).—For the erection of reading-room, &c. Mr. Thos. Wilson, architect, Distington, Cumberland:—

J. T. Harrison, Distington £300

FARINGDON (Berks).—For the construction of a service reservoir, engine-house, laying cast-iron pipes, &c., for the Rural District Council. Mr. G. Winship, C.E., Abingdon. Quantities by engineer:—

W. Coker ..	£5,666 10 0	H. Roberts, Ludlow*‡ ..	£3,990 0 0
G. H. Tucker	5,648 0 0		
J. Peattie	4,837 0 0	Meredith & Co., Ltd. ..	3,797 4 6
J. Jameson ..	4,750 0 0		
A. Woodhouse	4,451 12 4		

‡ Amended.

Oil Engines and Pumps (in duplicate).

Crossley Bros., Ltd.	£551 10 0
Hornsby & Sons, Ltd., Grantham* ..	497 0 0
Hugh Campbell	485 0 0

HAMPTON (Middx.).—For the execution of street works, Station-road, &c., for the Urban District Council. Mr. J. Kemp, surveyor, Park House, Hampton:—

Mowlem & Co.	£8,644 14 3	Fry Bros., Greenwich*	£7,922 11 5
T. Adams	8,047 11 2		

HANDSWORTH (Birmingham).—For making a new road, with sewer and storm-water drain and accessories, for Mr. J. W. Newcombe. Mr. C. H. Wiltshire, architect:—

J. White, jun.* £3,382 10 0

HANDSWORTH (Birmingham).—For the erection of shoppings and casting-shop, for Messrs. W. Probert & Son. Mr. C. H. Wiltshire, architect:—

A. Mason* £382

LETTERSTON (S. Wales).—For the erection of Congregational Chapel, for Ford Congregational Church, Wolfecastle. Mr. Griffiths, architect, New England, Cambrose, R.S.O.:—

W. Rowlands.....	£486 14	D. Thomas, Letterston, Pembroke*	£243 0
Davis & Williams..	323 0		

WALSALL.—For additions to schools, Elmore-green, Bloxwich, for the School Board. Messrs. Bailey & McConnal, architects, Bridge-street, Walsall:—

J. W. Smith	£1,839	W. Wistance	£1,754
J. Dallow	1,822	S. Wootton	1,643
J. Mallin	1,806	Hickin & Sons	1,640
T. Tildesley.....	1,805	T. Mason, Hednesford*	1,512
Brockhurst & Wood.	1,772		

WEST HARTLEPOOL.—For the erection of business premises, for Messrs. M. Robinson & Co. Messrs. Barnes & Coates, architects, Scarborough-street, West Hartlepool:—

G. Leeder*a* ..	£14,084 18 0	Howe & Co., Whitby-st., West Hartlepool * ..	£10,478 0 0
T. Dickinson	12,849 18 0		
Atkinson & Co.	12,067 13 9	Perks & Son*b*	9,783 11 3
J. Davison ..	11,268 5 8		
Watt Bros. ..	10,666 2 2		

a Exclusive of painting, glazing, plumbing, and iron-founding.

b Exclusive of plumbing, glazing, and ironfounding.

LONDON SCHOOL BOARD TENDERS.

AT the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect:—

BROOMSLEIGH-STREET.—Providing glazed partition to divide Class-room E, girls' department, also new air-shafts:—

Bristow & Eatwell	£124 0	Marchant & Hirst..	£98 10
F. T. Chinchen....	107 0	G. Neal*	87 0

CAMDEN-STREET.—Providing sliding glazed partitions to divide Class-room C in boys' and girls' departments, including new class-room doorways in connexion with same, also a skylight in boys' and window in girls' departments:—

T. Cruwys	£427	General Builders, Ltd.*	£349
Marchant & Hirst....	385		

FLEET-ROAD.—Removing present partition wall and providing two sliding glazed partitions, in order to divide Class-rooms A and B, senior mixed school, into three rooms; and providing new buttress and doorway in connexion therewith, &c.:—

T. Cruwys.....	£272 0	Bristow & Eatwell	£251 10
F. T. Chinchen....	261 10	Marchant & Hirst*	243 10
Wake & Dean, Ltd.	252 3		

GALLEYWALL-ROAD SCHOOL.—Improvements:—

Boys' Department.—Providing new hall, about 55 ft. by 30 ft., re-dividing, re-stepping, and improving the lighting of three centre class-rooms; providing new staircase, cloak-rooms, lavatory, stock-rooms, and teachers' room.

Girls' Department.—Providing new hall, about 55 ft. by 30 ft., re-dividing, re-stepping, and improving the lighting of three centre class-rooms; providing new staircase, cloak-room, lavatories, stock-room, and teachers' room; and providing drawing class-room, about 47 ft. by 20 ft.

Infants' Department.—Providing new hall, 55 ft. by 30 ft., re-dividing, re-stepping, and improving the lighting of three centre class-rooms; providing new cloak-room, lavatories, stock-room, and teachers' room, and one internal teachers' water-closet; providing lift for coals. Revised accommodation—boys, 352; girls, 354; infants, 400; total, 1,106; net loss of 16e places:—

F. & F. J. Wood ..	£13,498	W. H. Lorden & Son	£12,449
Martin, Wells, & Co.	13,182	Lathey Bros.	12,368
C. Cox	13,177	Johnson & Co. Ltd.	12,202
F. & H. F. Higgs..	12,528	A. White & Co.* ..	11,740

GEORGE-STREET (Boys' and Girls' Departments).—Providing sliding glazed partitions to divide class-rooms E:—

J. C. Chalkley	£212 0	B. E. Nightingale	£165 0
W. V. Goad	198 0	General Builders, Ltd.	149 0
London School Furniture Company	179 14	H. Line	149 0
J. Garrett & Son ..	176 0	J. Marsland	145 0
		Wake & Dean, Ltd.*	133 0

GOODRICH-ROAD.—Altering position of an existing partition and providing an additional sliding glazed partition to divide Class-rooms A and B, in boys' and girls' departments, into three rooms. Also a sliding glazed partition to divide Class-room F, infants' department:—

W. V. Goad £350		E. Proctor £270	
G. Kemp	330	Bulled & Co.	249
J. & C. Bowyer	323	Black & Son*	240
H. Line.....	277		

KENMONT-GARDENS SCHOOL.—Enlargement—Boys', 112; girls', 112; infants', 100; total, 324. Providing one sixty and one fifty-six class-room in each department; providing new entrance for infants; providing one additional staircase for the girls' department, re-stepping one class-room on each floor; providing additional water-closets for girls, and one each for boys' and girls' teachers:—

McCormick & Sons	£7,438	Johnson & Co., Ltd.	£6,836
Smith & Sons, Ltd.	7,329	J. Appleby	6,752
Wall & Co.	7,268	Lathey Bros.....	6,750
Garrett & Son	7,183	Lorden & Son	6,666
Miskin & Sons.....	6,946	Treasure & Son, London and Shrewsbury*	6,472
Leslie & Co., Ltd...	6,944		
Stimpson & Co.	6,910		
O. Craske	6,895		

LONDON FIELDS.—Providing glazed partitions to divide class-rooms D and F, infants' department; also new doorways and stoves in connexion therewith:—

Johnson & Co.....	£250	Barrett & Power	£195
W. Martin	228	F. Bull*	173
Stevens Bros.	218		

LYHAM-ROAD.—Rebuilding offices (all departments), further away from school building; providing separate pans and traps with connexions to existing drainage; adapting present girls' offices for infants' urinal; removing old covered playground adjoining Brandon-street entrance, including infants' old offices:—

Martin, Wells & Co.	£2,215	E. Triggs	£1,626
W. Downs	1,930	Whitehead & Co., Ltd.	1,625
Falkner & Sons	1,847	W. Hammond*.....	1,595
H. & G. Mallett ..	1,667		

MORNING-LANE.—Providing sliding glazed partition to divide babies' room, and replacing the present kindergarten gallery with a new pattern gallery, &c.:—

G. Barker.....	£290 0 0	Barrett & Power	£214 0 0
London School Furniture Co.	267 10 0	F. Bull	213 0 0
Bruce, Croom, & Co.....	266 16 9	Stevens Bros...	208 0 0
		J. Stones, Ulverston*	186 2 6

OLDFIELD-ROAD.—Altering the position of an existing glazed partition and providing a new sliding glazed partition, in order to divide two class-rooms in girls' department into three rooms, including a lobby in connexion therewith:—

F. Britton	£188 0	Barrett & Power ..	£143 0
Stevens Bros.....	154 0	F. Bull*	124 0
W. Martin	149 10		

See also next page.

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PRINCESS-ROAD (Boys' and Girls').—Providing sliding glazed partitions to divide Class-room F, &c.:—

J. W. Dixon	£230 0	Marchant & Hirst	£165 0
Spencer & Co.	198 0	Stevens Bros.	149 0
Bristow & Eatwell	127 10	Wake & Dean, Ltd.*	141 10
F. T. Chinchen	178 0		

SAFFRON HILL.—Replacing kindergarten gallery in babies' room with a new pattern gallery:—

Spencer & Co.	£78 0 0	London School Furniture Co.	£65 14 6
Johnson & Co.	72 10 0	Wake & Dean, Ltd.*	64 10 0
W. Martin	66 10 0		

SHILLINGTON-STREET SCHOOL.—Enlargement of school for the blind. Providing one new class-room for fifteen children, re-arranging cloak-rooms, lavatories, and stock-room, and providing additional lavatory fittings:—

Bristow & Eatwell	£1,054 5	General Builders, Ltd.	£679 0
Garrett & Son	769 0	Stevens Bros.	678 0
Maxwell Bros., Ltd.	769 0	F. Bull	627 0
Rice & Son	757 0	E. Triggs*	598 0
W. Hammond	703 0		

SIDNEY-ROAD.—Altering girls' entrance doorway and forming an additional entrance for infants adjoining same, &c.:—

Gibb & Co.	£93	Barrett & Power	£62
Stevens Bros.	67	F. Bull*	60
J. Kybett	65		

SURREY-SQUARE.—Replacing old kintergarten gallery in babies' room with a new pattern gallery, providing stepping to remainder of room, and providing a sliding glazed partition to divide Class-room A, girls' department:—

J. Appleby	£248 0	W. Martin	£165 0
J. C. Chalkley	241 0	Lathey Bros.	159 0
H. Line	199 0	J. Marsland	148 0
London School Furniture Co.	180 0	Wake & Dean, Ltd.*	133 12

TRAFALGAR-SQUARE.—Providing working benches fitted with sinks in the science room of P.T. Centre:—

Unsigned	£176 0	Wake & Dean, Ltd.	£98 10
B. E. Nightingale	171 0	Bruce, Croom, & Co.	97 5
Johnson & Co.	140 0	General Builders, Ltd.	89 0
London School Furniture Co.	101 5		

WOODLAND-ROAD.—Refitting the boys', girls', and female infants' offices with separate pans and traps, removing and rebuilding the male infants' offices, including coal store for schoolkeeper, adapting the present offices for urinal, refitting water-closet for infant teachers adjoining cloak-room, new fixed lavatories for teachers, channels to lavatories, &c., and new drainage scheme:—

Martin, Wells & Co.	£3,010 0 0	J. & C. Bowyer	£2,581 0 0
W. Downs	2,705 0 0	Johnson & Co.	2,522 0 0
Falkner & Sons	2,587 0 0	R. P. Beattie	2,514 6 3
		H. Leney*	1,859 0 0

Cleaning and painting.—The work at the following schools will be done during the summer holidays—July 26 to August 25, 1900. Where exterior as well as interior work has to be done, an additional week will be allowed for the former:—

BERESFORD-STREET.—Painting interior and exterior (all buildings on site):—

Maxwell Bros., Ltd.	£754	E. Triggs*	£550
W. V. Goad	734		

CLIFTON-ROAD.—Painting interior and exterior (old portion and enlargement):—

W. J. Howie	£794 0	S. Musgrove	£564 17
H. Groves	679 0	E. Proctor*	520 0
G. Kemp	598 0		

CREED-PLACE.—Painting interior:—

W. J. Howie	£390 0 0	C. Foreman	£286 0 0
Martin, Wells, & Co.	350 0 0	W. Banks	285 19 6
Thomas & Edge	320 0 0	S. Musgrove	279 12 0
Hayter & Son	293 0 0	C. G. Jones	262 0 0
		E. Proctor*	225 0 0

EGLINTON-ROAD.—Painting interior:—

Thomas & Edge	£445 0	E. Proctor*	£290 0
C. Foreman	407 0	W. Jolly	207 15
Hayter & Son	384 17		

HACKNEY DIVISIONAL OFFICES, MORNING-LANE.—Painting exterior:—

Heard & Co.	£58 10	Silk & Son	£37 10
Barrett & Power	41 0	G. Wales*	33 0

HAWLEY-CRESCENT.—Painting interior:—

T. Cruwys	£392 0	J. W. Dixon	£320 0
Stevens Bros.	372 0	Hodgson & Co.	289 5
Wall & Co.	365 0	W. Chappell*	265 0
Marchant & Hirst	324 0		

LAMB-LANE.—Painting interior (special school):—

Barrett & Power	£81	Collis Willmott	£74
Silk & Son	77	G. Wales*	73

PRINCESS-ROAD.—Painting exterior:—

Hodgson & Co.	£232 10	Wall & Co.	£175 0
R. S. Buckeridge	207 0	Marchant & Hirst	150 0
T. Cruwys	189 13	W. Chappell*	125 0
Densham & Sons	185 0		

SHILLINGTON-STREET.—Painting interior:—

Rice & Son	£567	Garrett & Son	£498
Maxwell Bros., Ltd.	505	Williams & Sons	450
Bulled & Co.	502	E. Triggs*	422

WILTON-ROAD.—Painting interior (old and new portions):—

McCormick & Sons	£597 0	Silk & Son	£487 0
M. Pearson	580 0	G. Wales*	413 10
Barrett & Power	497 0		

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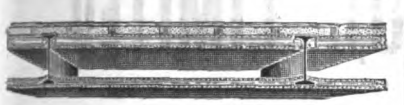

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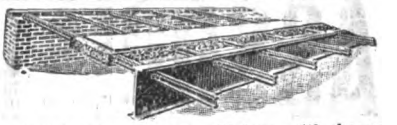

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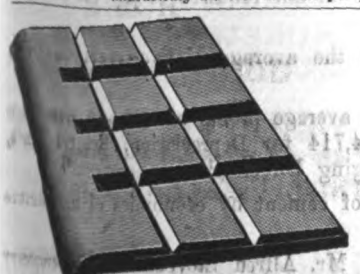

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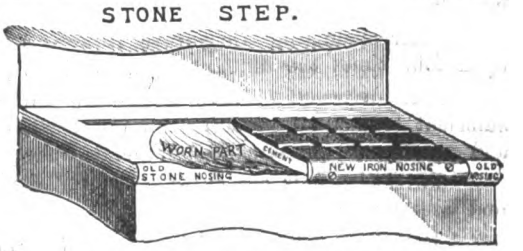

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SHARE CAPITAL—

250,000 5½ per Cent. Cumulative Preference Shares of £10 each £2,500,000
250,000 Ordinary Shares of £10 each 2,500,000

£5,000,000

First Mortgage 4¼ per Cent. Debenture Stock ... £3,000,000

PRESENT ISSUE—

Preference Shares	**£2,450,000**
Ordinary Shares	**£2,450,000**
Debenture Stock	**£2,475,000**

£210,000 of Debenture Stock, £364,770 in Preference Shares, and £248,900 in Ordinary Shares have already been applied for, and will be allotted in full. Further applications for £215,800 Ordinary Shares have also been received, making in all £1,039,470.

The Balance, as follows, will be offered for subscription at par, viz.:—

Debenture Stock.	**Preference Shares.**	**Ordinary Shares.**
£1,440,000.	**£1,268,570.**	**£1,168,640.**

The remaining one-third of Debenture Stock and Shares will be issued to the Vendors as part of the purchase-money.

The Debenture Stock will be secured by a mortgage on the Freehold and Leasehold Properties to be acquired, and by a floating charge upon the other assets of the Company.

Messrs. Farebrother, Ellis, & Co. have valued the properties to be acquired (less Mortgages) at £4,642,000
And the Company will have a Working Capital of 930,000

£5,572,000

While the present Debenture Issue is limited to £2,475,000

The average profits of three years have been certified at £561,103
" " " two " " " 639,652
Last year's profits have been certified at 658,356

The average profits of the last two years were more than six times the amount required to pay the Debenture interest.

After deducting Debenture Interest of £105,188 the surplus profits on the average of two years were close upon four times the amount required to pay the Preference Interest.

After payment of both Debenture Interest and Preference Dividend the average profits of the two years were sufficient to pay 10 per cent. on the Ordinary Shares, with a margin of £154,714 for Depreciation, Reserve Funds, and payment of General Management Charges, including Directors' and Managing Directors' remuneration.

Further profits are anticipated without unduly raising the selling price of cement by economies of manufacture and distribution.

Full Prospectuses will be posted to applicants who write or telegraph to Mr. Alfred Stevens at the temporary offices of the Company, 3, Tokenhouse-buildings, London, E.C., or on personal application to Bankers, Brokers, &c., on Saturday next. Telegraphic Address, "Sitfast," London.

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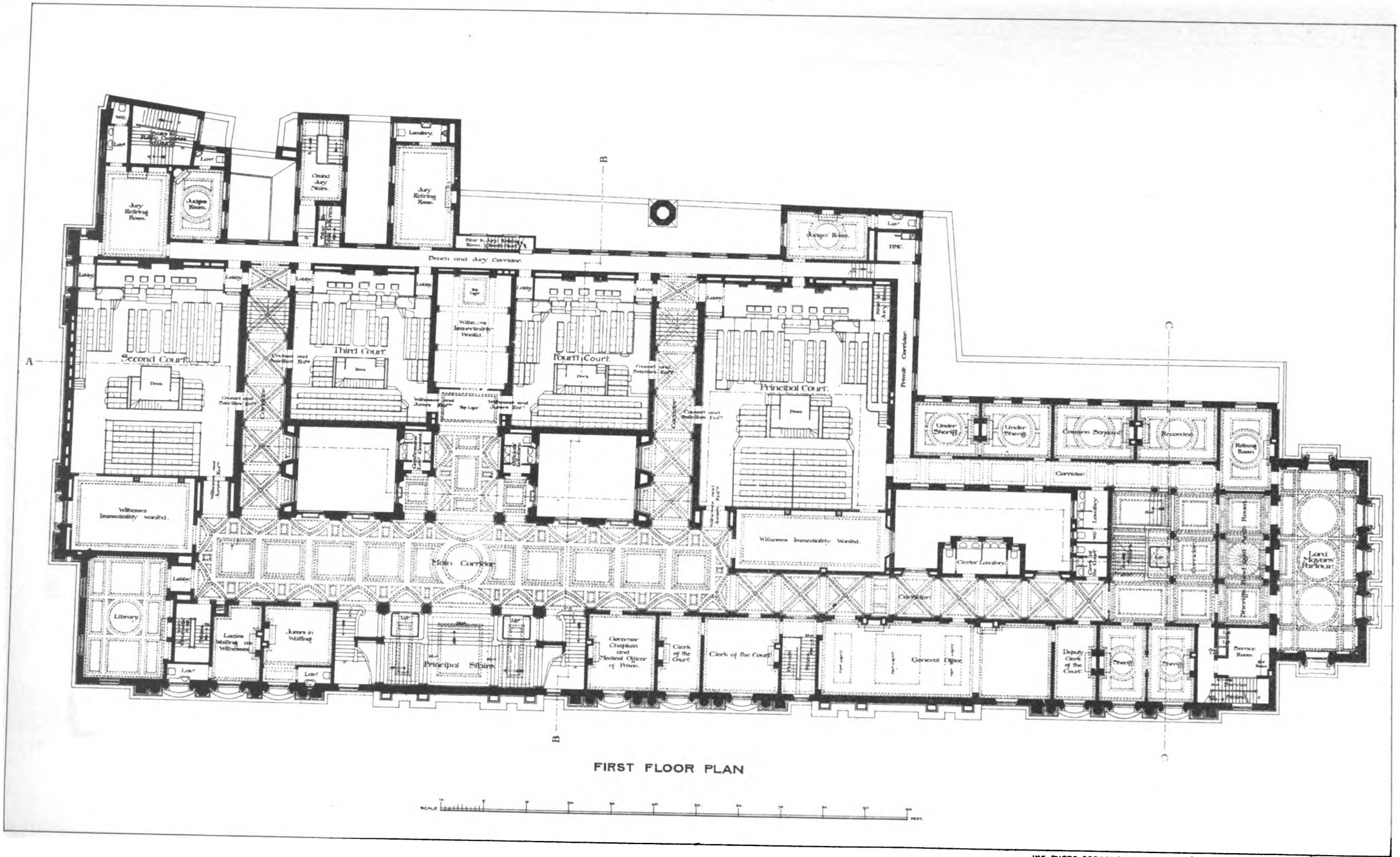

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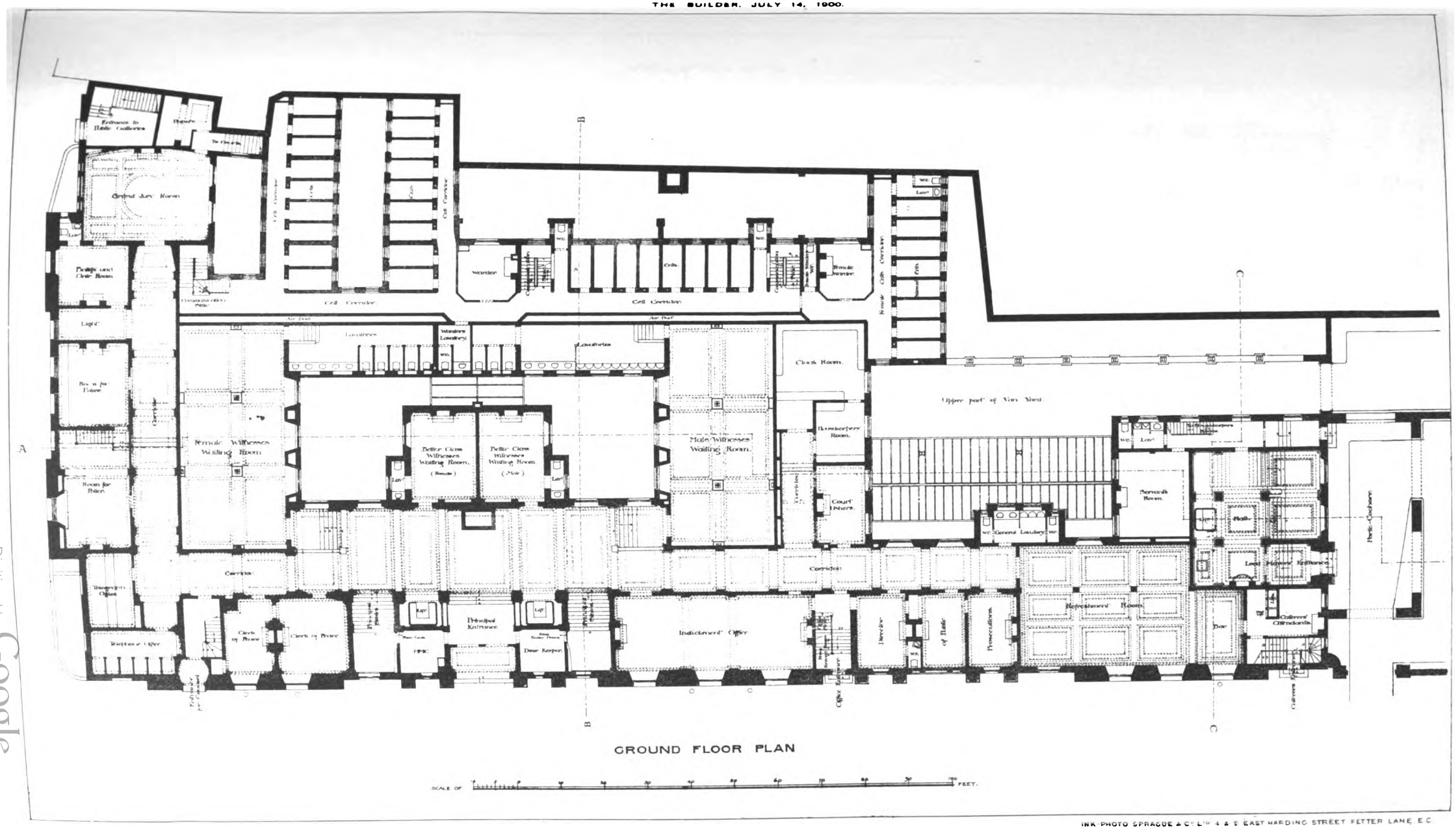

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OLD BAILEY SESSIONS HOUSE COMPETITION.—Design submitted by Mr. F. T. Baggallay, F.R.I.B.A.

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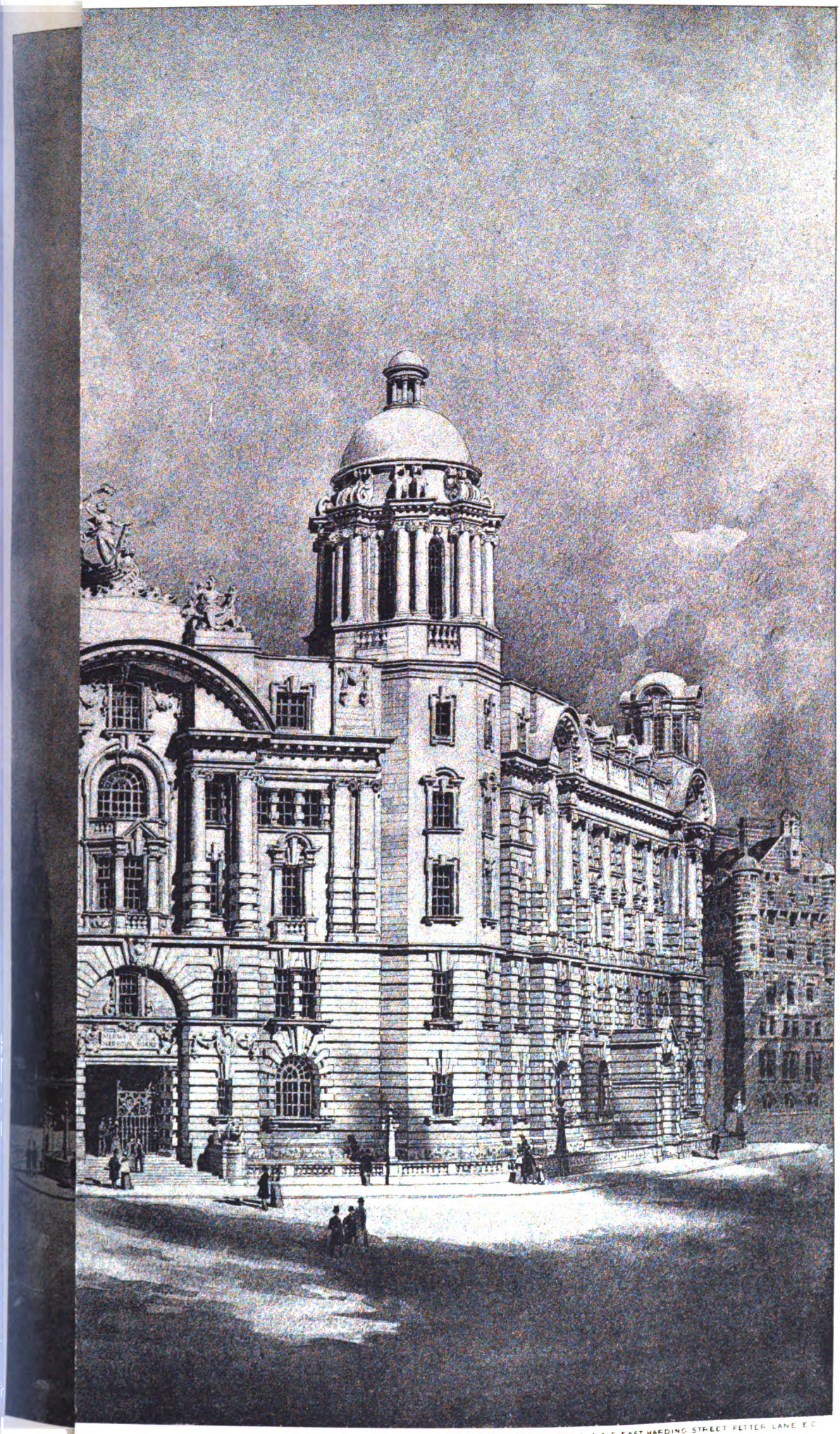

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SPECTIVE VIEW.

, A.R.I.B.A., ARCHITECTS.

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The Builder.

VOL. LXXIX., No. 2998. JULY 21, 1900.

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Liverpool Dock Offices Competition: Detail of N.-W. Angle, First Premiated Design.—Messrs. Briggs & Wolstenholme, FF.R.I.B.A., F. B. Hobbs, A.R.I.B.A., and Arnold Thornely, A.R.I.B.A., Architects.... *Double-Page Ink-Photo.*

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Venetian Remains in Cyprus.

A CERTAIN amount of public interest has recently been aroused in the fate of the very interesting Gothic and Renaissance buildings which remain in the island of Cyprus. The island has been in English possession for more than twenty years, yet hardly any English architects or archæologists seem to have been attracted towards its shores. Shortly after the first occupation of the island by the British Government a paper was read on its architecture at the Royal Institute of British Architects by Mr. Sydney Vacher, and this was published in the "Proceedings" of the Institute, but is now out of print. Since then nothing has been done by Englishmen to draw public attention to the great value of the artistic treasures existing all over this somewhat neglected province of the British Empire.

Thanks, however, to the munificent encouragement offered by the French Government, a most magnificent and scholarly book has recently been published in Paris, due to the labours of a young French architect, M. Enlart. This book leaves very little more to be said on the subject of the splendid French-Gothic remains scattered all over the country; but as M. Enlart has taken up the matter from an exclusively specialist point of view, he has omitted almost entirely to mention the equally interesting relics of the Italian occupation during the fifteenth and sixteenth centuries.

To partially supplement this defect in M. Enlart's book we give a complete plan of the great fortifications still surrounding the city of Nicosia (see pp. 58 and 59), and also a description and two sketches of those at Famagusta, of which latter we may be able to give the plan in a future number. The fortifications of Famagusta were remodelled by the Venetians. Those of Nicosia are due entirely to the Italian engineers of the latter part of the sixteenth century, and were hastily completed to withstand the invasion by the Turks in the year 1570.

The curiously-planned *enceinte* of Nicosia was designed by Giuliano Savorgnano, a Venetian Government engineer sent out for that special purpose in 1560. Called away by similar work in Dalmatia, he does not appear to have personally superintended the building of this very original fortress. The execution of the work seems to have been confided to a sort of committee of officers, each of whom carried out a portion and had the honour of giving his name to a bastion. The principal gateway was called Porta Giuliana, in memory of Savorgnano. In its present condition, it is masked by a clumsy Turkish aqueduct. An elevation is given of it as originally designed (fig. 1). Old descriptions mention coats of arms and decorations on it, which have either been destroyed or are now covered up.

The monumental column on a hexagon base (fig. 2) is of the Venetian period. It is decorated with well-known Venetian coats of arms, and a much-abbreviated inscription is inscribed on the pedestal, which appears to mean "not as a mere decoration, but as a memorial of the good faith of the citizens." It has no date. It was probably one of the columns carrying a Lion of St. Mark, always found in old Venetian colonial cities. The small coats of arms have recently been restored to it, after being purloined by some dealer in antiquities.

The fortress of Nicosia was intended to be defended by a very limited number of guns, judging from traces of the gun-carriage platforms; only two cannon were provided for between each pair of bastions. There were no guns on the bastions, but only on the curtains; each pair of guns enfiladed each other as well as the neighbouring pair at the angles of the bastions. The practical result of this very economical system was a failure. The city of Nicosia was captured by the Turks after only a fortnight's siege, notwithstanding the desperate heroism of the unfortunate garrison.

The grand old fortress of Famagusta, the destruction of which seems imminent, is of far older foundation than that of Nicosia. The fortifications are of a much older type, and in some places they belong to a period preceding the use of siege artillery. They stand within an enormous rock-hewn ditch, 50 to 70 ft. wide and 30 ft. deep, which at one time seems to have been filled by sea-water. This fortress was very much remodelled by the Venetians, and several types of early artillery defences may be studied in its construction. As an example of a large fortress of the later Middle Ages Famagusta remains unique, and in a most marvellous state of preservation. The Turks preserved it as a memorial of their prowess in capturing it. On the plea of using its materials for a work of public utility, the British Government proposes to destroy what the Turks had left untouched for three centuries. The fortifications of Famagusta appear to have been remodelled under the direction of a son of the celebrated Venetian architect and military engineer, Michael Sammicheli. The Turks carefully restored them after the great siege of 1571, and since then they have remained in a state of perfect preservation. Even the curious chain gate closing the harbour is untouched; only the chain is missing.

The once populous and flourishing city of Famagusta has shrunk to a mere collection of mud huts, with about fifty inhabitants. The domestic buildings have been destroyed during the last twenty-five years, and their materials have been transported over to Port Said, which may be said to be built out of Famagusta. The land within the ancient fortress is now turned into pasture for a few goats; only the ruins of the ancient churches are to some extent preserved, in consequence of their being considered Government property. There is a small modern police-station within the walls, and the ancient French cathedral is still used as a mosque.

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The two sketches (figs. 3, 4) give a general idea of the picturesque aspect of this ancient fortification.

These two old fortresses are excellent examples of the earliest form of modern military engineering. They are of a size which renders them important, and their present state of preservation is quite remarkable. It is a pity they cannot be preserved in an intact condition for the appreciation of a future age, when examples of such historical monuments will be even more difficult to find. Very few cities nowadays retain their ancient fortifications. The French Government has recognised the value of retaining such memorials, and in the case of Carcassone has declared the town to be a national monument, to be respected as such. But in the case of Carcassone the remains are not so complete of their period as at Famagusta, and although a most interesting archæological study, the French town displays a little too much "restoration." Famagusta requires no restoration. It should merely be left alone in its desertion and solitude, a place of pilgrimage for the artist and antiquary.

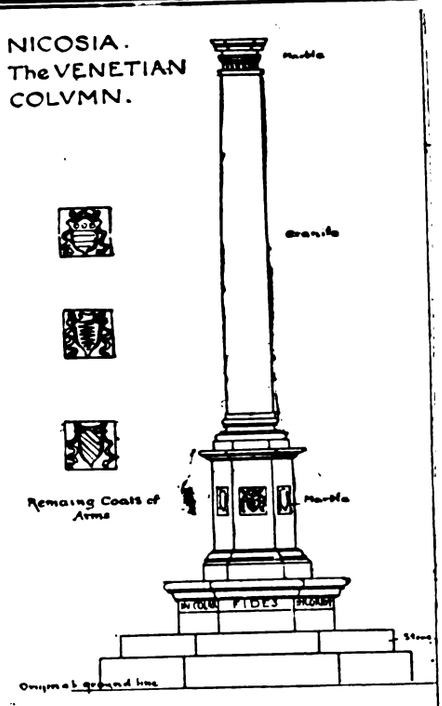
It is worth while to notice, in connexion with this subject, that it is evident that the fortification work done by the Venetians in Cyprus was matter of common notoriety in Europe at the time, from the manner in which Shakspeare refers to it in "Othello." In that short and significant scene (iii., 2), the last in which we see Othello in his character of an able and energetic commander, before Iago's poison had begun to work upon him, his mind is evidently full of the business of the fortifications. After giving Iago letters and a message to the pilot, he says:—

> "That done, I will be walking on the works,
> Repair there to me."

and then immediately afterwards, to the other officers—

> "This fortification, gentlemen—shall we see 't?"

Shakspeare did not indeed get the name of the place—he names his scene merely "a seaport-town in Cyprus"; but it is evident that Othello's remarks are suggested by Shakspeare's knowledge of the doings of the Venetians at Nicosia and Famagusta—a fact which gives the places an additional interest for Englishmen. One or other of them may be regarded as the scene of the later Acts of Shakspeare's great tragedy.



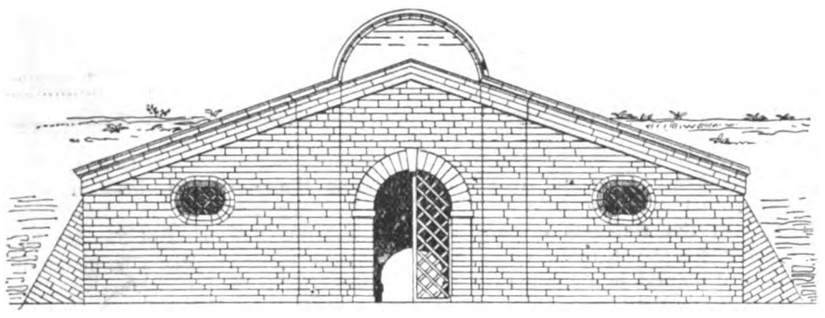


Fig. 1.

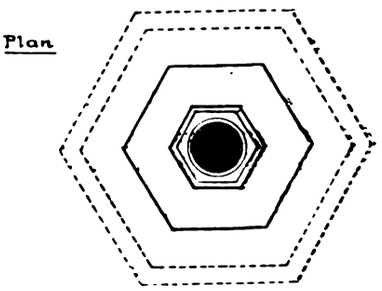


Fig. 2.

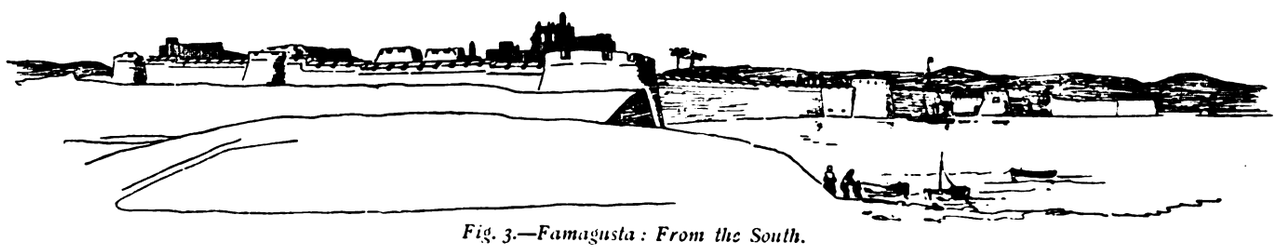


Fig. 3.—Famagusta: From the South.

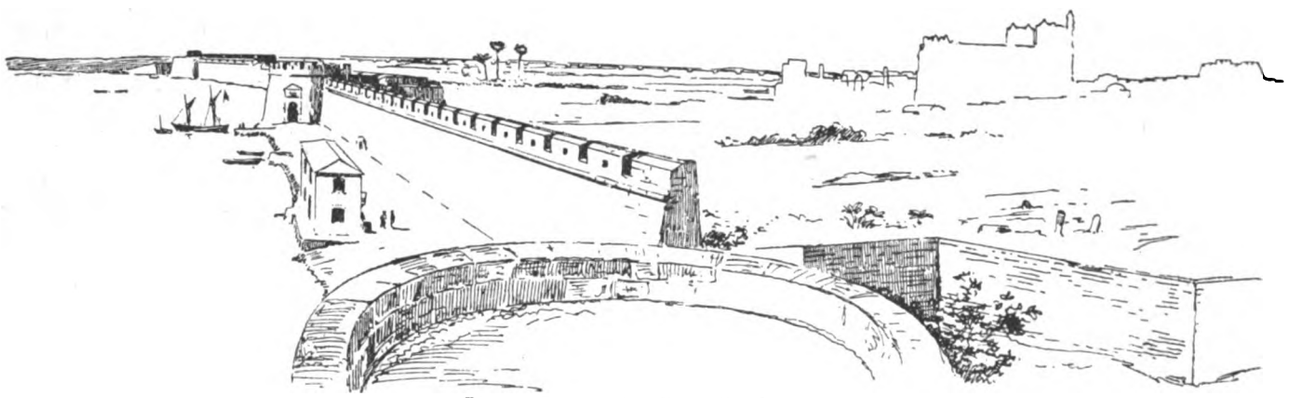


Fig. 4.—Famagusta: From the Castle.

EXTERNAL PULPITS AND PREACHING CROSSES.

THERE cannot be much doubt that external or "open-air pulpits" and "preaching crosses" are historically connected with the idea of pilgrimages; perhaps their very existence arises from the necessities of out-of-door services and religious practices.

If the intention had been simply to address an ordinary congregation, every end could have been reached by preaching in the church; but if the intention was to address a vast number of people, which was too great to be contained in the church, the idea of out-of-door pulpits is intelligible enough.

At Schwäbisch-Gmünd, in Würtemburg, there is a curious rock-cut church called the

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Fig. 1.—Salvator's-Kirche, Schwäbisch-Gmünd, Würtemburg.

"Salvator's-Kirche." It is evidently a building of great antiquity, but what its date may be it is quite impossible to conjecture. A local tradition dates it back to Pagan times. The building, if *building* it can be called, is an excavation in a limestone rock or cliff, and was evidently originally perfectly plain and thoroughly irregular in plan. It consists of two churches or chapels, one above the other, of which the lower is far more ancient, and consists of a kind of grotto. The pillars are square, of different sizes and heights. They are not equi-distant, and support a vaulting, which is neither barrel nor lunette. The plan is an exceedingly irregular nave and aisles. The windows are splayed outwards so as to bring the gratings flush with the inner side of the walls. In later times the windows have been glazed, the glass being fixed outside the gratings. The interior is almost dark but for the glimmering of the lamps suspended in front of the three altars.

The upper chapel has either been re-carved and altered at the latter end of the fifteenth century, or is entirely of that date. It is vaulted from wall columns, and lighted by square-headed windows. Everything is cut out of the living rock, even a large life-sized group representing the "Agony in the Garden." The walls are covered with tracery panels, which have unfortunately been so mercilessly scraped during a late restoration as to be deprived of much interest. What is singular is that the walls of this upper chapel are very thin. Over the altar is an interesting old picture of the "Mater Dolorosa," but I think this part of the chapel has been much tampered with. Near the altar is a small doorway, which gives access to an external pulpit supported upon a column and having a large sounding-board over it; very boldly-projecting wooden eaves protect the rock, which is here and there carved with rude sculpture. A spring of water discharges itself into a marble basin of Renaissance work, over which is a statue of Moses striking the rock. There is a curious rather tall octagonal tower capped by a bell-shaped spire. This church is approached from the town by a flight of stone steps, which terminate in a narrow platform in front of the church.

The town of Schwäbisch-Gmünd is a most interesting one. The principal church is the burial place of the two illustrious architects, Henry and Peter von Arler, the builders of Milan and Prague Cathedrals; and it is supposed that one or both of them designed the great church at Gmünd.

The minster church at Aschaffenberg possesses an external pulpit of a design not uncommon in Germany. The parapet which runs round the churchyard is at one corner made to project upon a semi-circular corbel. A somewhat similar external pulpit exists at Bamberg.

External stone pulpits were not uncommon in England. A very good example exists in the first court of Magdalen College, Oxford. It is said that Archbishop Laud preached from this pulpit. This pulpit formed a portion of the Hospital of St. John, which formerly stood upon the site of Magdalen College. Some parts of the building were incorporated by Waynflete when he built the present College, 1473-1481.

There is an external pulpit at Shrewsbury

Fig. 2.—External Pulpit, Aschaffenberg.

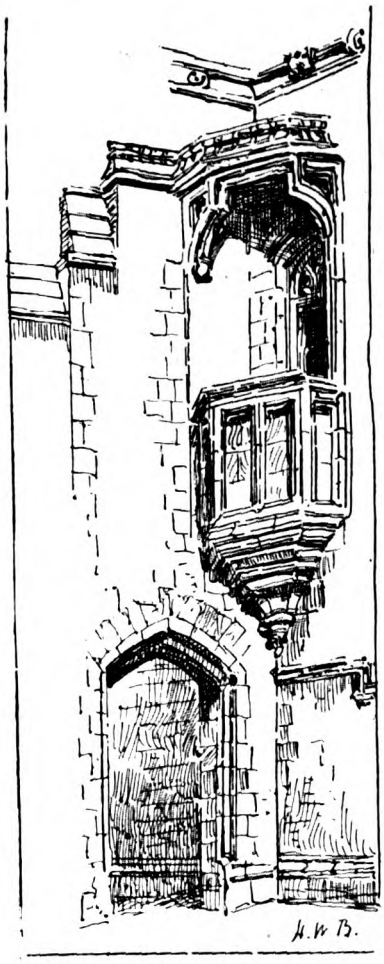

Fig. 3.—Magdalen College, Oxford.

Abbey, but it has been doubted whether it was always external, and it has been suggested that it might have been the refectory pulpit, and has simply been rendered external by the destruction of the roof and other portions of the surrounding buildings. Preaching crosses were common in England. That of St. Paul's and St. Mary's Spital are well known. There were cemetery pulpits, several examples of which exist in Germany. A remarkable and singularly picturesque one is to be seen at Mainbernheim, in Bavaria, and as the cloisters of the ceme-

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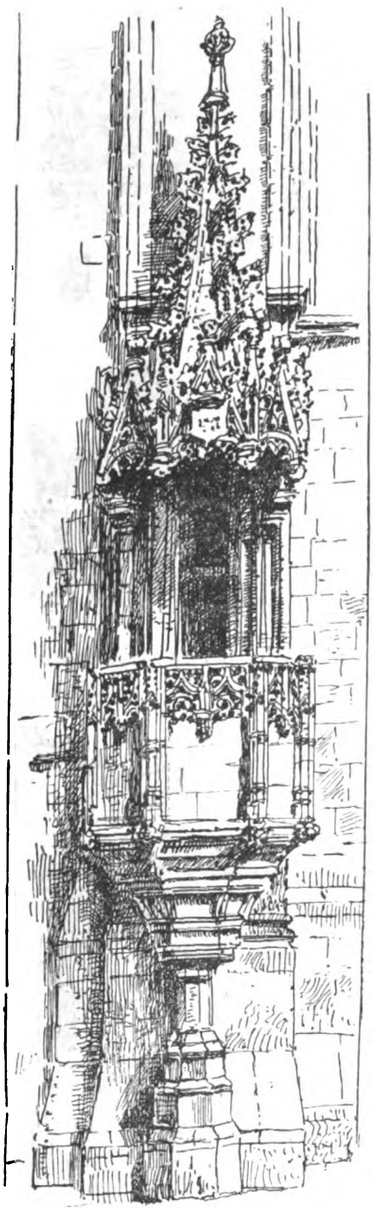

Fig. 4.—Parish Church, Vitré.

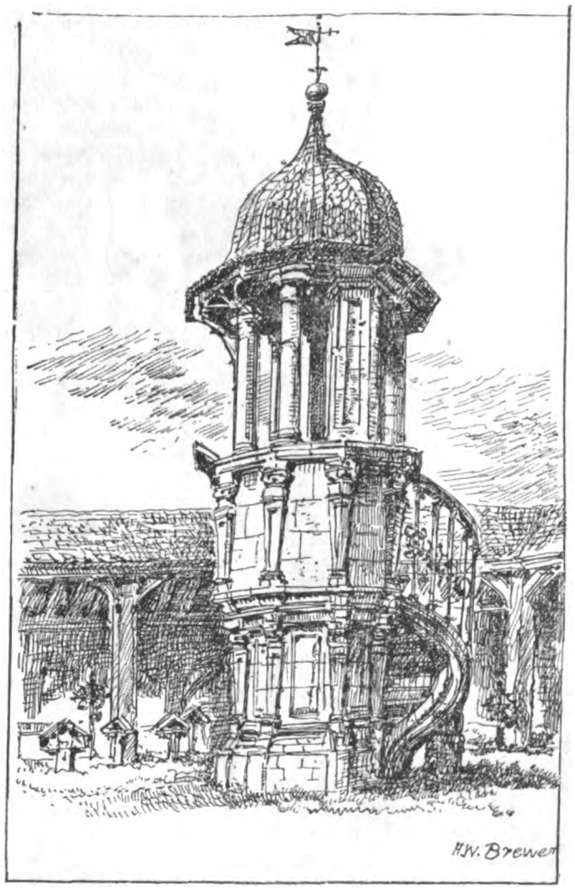

Fig. 5.—Mainbernheim, Bavaria.

tery also remain it is one of the most characteristic "God's Acres" in Germany. The pulpit is quite isolated, and capped with an ogee roof. Perhaps one of the finest attached external pulpits is to be seen at the Church of Vitré in France; it has a beautiful stone canopy, and richly carved corbel and parapet. A very similar one, though rather plainer, is to be seen at St. Lô, outside the walls of the Cathedral. Remains of an interesting example are to be seen at Hedingsfeld, near Würzberg. It evidently had a cemetery lantern and alms-box attached. The most interesting external pulpit in Germany is that projecting from the north wall of the choir at Vienna; it is of very similar design to the one at Vitré. It is said that St. John Capristan preached from it a crusade against the Turks in 1451.

At Leighton Buzzard, in the butter market, is a very good example of a preaching cross. Unfortunately the statues which originally adorned it were replaced by poor imitations when the cross was restored some years back. Fortunately the originals were preserved, and may be seen outside the Market Hall, and it requires little knowledge of art to see how immensely superior they are to the modern works which have ousted them. The Rev. J. J. Stevenson, a former Vicar of Leighton Buzzard, discovered documents which proved that the banns of marriage used to be published from this cross, and in the days of the Commonwealth the marriage ceremony usually took place here. There are many other preaching crosses existing up and down the country in a more or less perfect state. They ought to be sketched before destruction or careless restoration destroys them.

H. W. B.

NOTES.

The Housing of the Working Classes Bill.

THE Housing of the Working Classes Bill has now passed through the House of Commons. On the third reading last week it was "damned with faint praise" by the Opposition, and timidly defended by the Government. It is necessary to go by steps in social reforms, but the steps should be longer than those taken in this measure. The effect of the measure can only be very limited. The empowering of Local Authorities to purchase land outside their districts for working men's dwellings obviously depends for its efficacy on the amount of facilities for locomotion between outlying and central districts. In the rural districts whatever good may result from this statute will depend on the action of the County Councils, which in its turn depends largely on the state of local feeling. But the passing through the House of Commons of this Bill again points to the desirability of a codification of the law in regard to the housing question.

The Liverpool Cathedral Question.

WE learn from the Liverpool papers that the question of a cathedral for Liverpool is again being mooted, and that as the fine site originally contemplated, behind St. George's Hall, is now unattainable, the present site of St. Peter's Church and churchyard (the church which now serves as pro-Cathedral) is under consideration; and that a design by the late Mr. T. D. Barry, of Liverpool, is on view in the vestry of the church. The site is but a circumscribed one for a cathedral; but in any case we think that architects, and those who take an enlightened interest in architecture, would naturally expect that Mr. Emerson, who gained the great cathedral competition a good many years ago, and who is now President of the Institute of Architects, should be invited to make a design for a cathedral for the proposed site, instead of taking the work of a local architect who, whatever his merits, was not concerned in the original competition, and had little reputation beyond Liverpool. If Mr. Emerson has no absolute claim to be consulted, he has certainly a very strong moral claim. He won the original competition by a design of exceptional merit and originality, and this fact ought to be kept in mind in connexion with any new scheme for a cathedral for Liverpool.

Memorials of Greater London.

THE fourth Report of the Committee for the survey of the Memorials of Greater London recapitulates the objects with which the Committee was formed, viz., to take up certain areas in London, and in them to register and record, with drawings, photographs, and other records, whatever may be deemed to be of historic or æsthetic interest.

"The work is not confined to buildings only; any valuable open space, any remnant of an old village green, any beautiful tree, any object of local life or custom that may have a definite external embodiment, or any interesting piece of handicraft,

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even if it be but a signboard or a wrought-iron gate, comes within the Committee's survey."

It is hoped by this means to draw attention to these things, and encourage their registration and preservation, whether they are in private or in public hands. A large collection of drawings, photographs, sketches, measured work, &c., has now been compiled by different members of the Committee, and is mounted and arranged in albums according to the parishes of London, and when completed will form a unique collection of what the Greater London at the close of the present century still retained of historic interest or beauty. The County Council has undertaken to print the register free of cost to the Committee; but they wish to form a large body of honorary and subscribing members, and also to enlist the sympathies and practical co-operation of architects and artists who may have the opportunity to make sketches of buildings or other objects of interest and add them to the Committee's collection. The Committee believe that there are many who, if they had the opportunity of having their work issued free of risk to themselves, would be willing to aid in this manner.

The Gas Light and Coke Company.

A NUMBER of London gas consumers and representatives of various Local Authorities and societies met last week at the Memorial Hall, Farringdon-street, and passed a resolution condemning the action of the Gas Light and Coke Company in raising the charge for gas to 3s. 5d. per 1,000 cubic feet, or to 4s. 2d. for gas supplied through prepayment meters. The resolution referred to the inequality in the charges made by the different metropolitan companies, and urged that active steps should be taken to prevent the Gas Light Company obtaining any further Parliamentary powers until the management of the company has been thoroughly reformed. However natural and even justifiable is the feeling elicited by the action of the gas company, we do not know that much benefit can accrue from these indignation meetings until the leaders of the agitation acquire a more intelligent grasp of the situation. That the business of the Gas Light Company is less successfully managed than that of the other metropolitan companies was proved in detail last year before a Select Committee of the House of Commons. But who is to tabulate the details of the reform to be demanded? Consumers of to-day are suffering for costly errors made in past years, and the refusal of Parliament to grant the company power to raise more capital (justifiable though it may be under the circumstances) is injuring the consumers as much as the shareholders, because it prevents the introduction of that modern machinery and plant without which economical working is impossible. Compared with many Continental gasworks, those of England are dirty and slovenly in the extreme. Every year the distillation of coal and manufacture of illuminating gas is becoming more and more a chemical process—a process to be carried out with cleanliness, skill, and precision, without the formation of "waste" products. Yet comparatively few English gas companies keep a skilled chemist upon the works; and, while the utility of the engineer is found in the numerous labour-saving machines to be seen upon the modern gasworks, the absence of the chemist is indicated by the fact that the carbonisation of coal is effected in the same crude, wasteful, and unscientific manner as a hundred years ago.

The Increased Charges for Gas.

IN reference to the subject of the foregoing note, we understand that the London County Council propose to convene a conference of representatives of the various metropolitan public bodies to discuss the question of London gas charges. In the meantime we may observe that a new light is thrown upon one aspect of the question by a Special Report of the General Purposes Committee of the London County Council. In this Report it is shown that the result of the recent proposed increase in charges for gas, if there is no consequent diminution in the sale of gas, will amount to an additional charge of 788,942*l.* to the consumers of gas in London, while only 141,247*l.* will be withdrawn from the shareholders. On the basis of those figures it would appear that the increase in the charges means a large increase in the receipts of the gas companies, and is not a mere "hedge" to meet increased cost of manufacture. In regard to the disparity of charges for gas in the districts north and south of the Thames, we quote the following from the report of the General Purposes Committee:—

"Whether the above increases in the price of gas are fully, or only partly justified by the rise in the price of coal, their effect is to bring into greater prominence than ever the disparity between the charges for gas north and south of the Thames.

The record of the South Metropolitan Company shows an almost uninterrupted succession of reductions in the price of gas since 1876, and the result is that the recent large advance of 7d. only brings the charge to 2s. 8d., which, although high as compared with the company's prices during the last few years, is not excessive.

On the other hand, the tendency of the Gas Light and Coke Company's charges has been to increase in recent years. Whereas in 1889 they were selling gas at 2s. 6d., they were last year charging no less than 3s. (the reduction from 3s. to 2s. 11d. for the six months to midsummer last may for the present purpose be left out of account). The recently announced increase of 6d. comes, therefore, on top of what had been condemned as a high price. It is more than twenty years since such a price as 3s. 5d. had been charged for gas by any of the metropolitan companies, and its imposition is naturally creating much dissatisfaction among the consumers of gas throughout the company's district north of the Thames, which comprises a population of upwards of 2¼ millions of persons.

The difference between the two prices north and south of the Thames is now 9d., or, making an allowance of ¼d. per 1,000 cubic feet for meter rents charged by the South Metropolitan but not by the Gas Light, 8¼d. per 1,000 cubic feet."

Incandescent Gas and the Welsbach Co.

MR. JUSTICE BUCKLEY intended to deliver judgment on the Kern burner revocation case, which was recently fought out at great length before him, on Wednesday last; but at the request of Mr. Fletcher Moulton, who acted for the Welsbach Company, he has agreed to postpone judgment until the 30th instant, as the competing companies have come to an agreement to settle all litigation. For years past there has been ceaseless litigation between the Welsbach Incandescent Company and the Sunlight Incandescent Company, and immense sums of money have been expended in the contests. It is now announced that the New Sunlight Company is to be absorbed by the Welsbach Company, and all further litigation thus rendered unnecessary. In view, however, of the fact that the Welsbach 1885 and 1886 patents have expired, we do not consider it probable that the amalgamated companies will be able to obtain entire control of the incandescent mantle market. Both companies, however, still hold some useful patents, and it is to be feared that some few years will yet elapse before the British public will be able to procure good mantles and burners at the low prices which obtain on the Continent.

The River Lea.

IN his annual Report on the sanitary condition of the Parish of Hackney, Dr. King Warry observes that the River Lea continues to maintain its reputation as a highly-polluted stream, and a source of nuisance to the district of Hackney. "During the hot months of the year its evil odour is perceptible at long distances." Dr. Warry adds the following report by Mr. Leo Taylor, Public Analyst, on a sample of the Lea water, taken from "Lead Mill Stream (Lead Mill Point)" on July 5 of last year:—

"Total solid residue	55·6 grains per gallon.
Saline ammonia	3·36 " "
Organic ammonia	0·42 " "
Chlorine	8·0 " "
Oxygen required to oxidise the organic matter	2·149 " "
Nitrates and Nitrites	Strong traces.
Sulphuretted Hydrogen ...	Absent.

The sample possessed a distinct sewage odour, and was brownish-yellow in colour.
It is practically diluted sewage."

How long is this state of things to continue?

Nuisance from a Refuse-Destructor.

DR. DUDFIELD'S last monthly Report on the sanitary condition of Kensington contains an account of a singular nuisance discovered in active operation on the premises of the Earl's Court Exhibition. The existence of offensive effluvia on the ground had often been noticed but could not be traced to its source, until the medical officer "received information" (like a police officer, he does not say from whom) of the existence, on a remote part of the Exhibition grounds, of a refuse-destructor, which turned out to be a brick bee-hive structure with a very low chimney, in which refuse of all kinds was undergoing slow combustion—including bones, sawdust from the lions' den, &c.; the whole smouldering continuously. The Fulham Medical Officer, within whose precinct the "refuse-destructor" was legally located, had it pulled down, and issued an edict for the removal of all refuse from the Exhibition premises. The story may give a hint where to look for the originating cause of a nuisance in other similar cases, and also serve to emphasise the point that there are different kinds of "refuse-destructors."

London Squares.

THE *Spectator* last week printed an article on the subject of the gardens in the London squares, showing how greatly they might be improved. There is no doubt that London would in appearance be greatly improved if more care were given to the gardens in the squares. During the last few years much more skill and taste has been shown in the management of the parks and public gardens of London. The squares, however, have stood still. The dingy houses and monotonous architecture of many of our squares have a dismal appearance; gardens filled with flowers and flowering shrubs and

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carefully-tended stretches of green turf would make an astonishing difference in the summer appearance of London. Some organised movement should be commenced with a view to the improvement of the gardens in the London squares.

Nevill's-court, Fetter-lane.

IN the sale by auction on July 9 of some freehold building sites in Nevill's-court and the east side of Fetter-lane were included some interesting old houses which it is believed had escaped from injury by the Great Fire. They consist of Nos. 13, 13A, 14, and 15, and Nos. 11-2, Nevill's-court. The two properties, which cover areas of 4,050 feet superficial and 2,250 feet superficial, were bought for 3,500*l.* and 3,600*l.* respectively. The houses, rented for the most part on weekly tenancies, retain their old forecourts and gardens, and constitute uncommon examples of the domestic architecture of their time. The premises opposite No. 10 used to be the Excise Office: No. 10, not comprised in the sale, is a large house belonging to the Moravians (United Brethren). It was bought in 1738 with the adjacent chapel, wherein Turner and Baxter preached, *temp.* Charles II., for the Moravian community when they first settled in England. The house was used as a missionaries' hostel during a long period, and formed the home of the Reverend C. Ignatius La Trobe, secretary to the mission and friend of Haydn. The court may, perhaps, have been named after Ralph Neville, Bishop of Chichester, who died 1244, in the house he had built next to the inn which the Black Friars conveyed in 1286 to Henry de Lacy, Earl of Lincoln. The bishops' house, however, stood on the west side of Chancery-lane, giving names to Bishop's-court and Chichester-rents, though it seems that they owned some property on the east side of Chancery-lane as well. We gather that it is proposed to lay out a new street, on the site of Nevill's-court, which will extend from Fetter-lane to Great New-street, in which most of the land belongs to the Goldsmiths' Company.

City and Guilds Institute.

IN the Report, dated March of this year, of the City and Guilds of London Institute, Mr. Sparkes draws attention (Appendix D) to the work done by the Technical Art School, which was first formed, twenty years ago, by taking over three classes of the Lambeth School of Art. M. Dalou started the sculpture class, which was carried on, on the same lines, by Mr. Frith. In proof of the excellency of its methods it is only necessary to say that it turned out from among its students Mr. Harry Bates, Mr. Frampton, Mr. Pomeroy, and Mr. Goscombe John, who respectively gained the Royal Academy Gold Medal in four successive years. Mr. Sparkes adds:—

"I venture to think the gold medal record would have been unbroken even until to-day, if the action of the Royal Academy had not put our students out of the running by imposing an age limit on their admission to the schools of sculpture. This unfortunate limitation excluded men, as promising as those who had preceded them, from the advantages of the Royal Academy schools, and caused, no doubt, much difficulty in the careers of several gifted men who were turned aside from the road to distinction and deprived of the various encouragements the Schools of the Royal Academy had previously offered them.

I think it may be a question worthy of consideration whether another effort should be made to induce the Council of the Royal Academy to reconsider the question as to the imposition of any time limit whatever in the case of sculptors."

We are glad to learn from a further page of Mr. Sparkes's Report that the Fishmongers' Company have commissioned Mr. Turner, the last gainer of the R.A. Gold Medal in Sculpture, to model and carve in marble two figures, a fisherman and a fisherwoman, for the decoration of the staircase in that Company's Hall. It is to be hoped that this example may be followed by other Companies: in giving such commissions to gifted young sculptors who have satisfied the best judges, they would not only be giving an important encouragement to the art of sculpture, but also decorating their own Halls with works which would probably be of permanent value.

Architectural Association School of Design.

THE designs made by students of the Architectural Association, in the classes of Elementary and Advanced Design, have been on view at 56, Great Marlborough-street, from the 13th to the 19th of this month. In the Elementary class the subject of a stone doorway has resulted in two or three excellent drawings by Mr. Geoffrey Morland, Mr. M. Dawson, Mr. R. H. Butterworth, and Mr. C. C. Makins, and there is a clever design for a wrought-iron gate by Mr. A. A. Carder. In the Advanced class the design for a garden house appears to have been the most popular subject. Some of the designs show a great amount of care, but appear too elaborate and on too large a scale for the subject. Those by Mr. Edwin Forbes and Mr. E. Shepherd have more the appearance of a mausoleum. In the detail drawings, Mr. H. M. Cautley has a spirited drawing for a stained-glass medallion, which for freedom is quite one of the best things in the room. Among a great number of drawings which occupy a portion of the walls in four rooms of the Association's headquarters are designs for a forecourt by Mr. E. Shepherd and Mr. H. Comyn, a cottage hospital by Mr. E. Forbes, and a mortuary chapel by Mr. H. Munro Cautley. The detail drawings in many cases appear to have been carefully worked out, and the exhibition is a very creditable one, and shows in one or two cases distinct originality in design.

CERAMICS AT THE PARIS EXHIBITION.

THE French exhibit of pottery of all kinds is very extensive, and there is much shown that is manufactured for internal and external decoration, though French architects very rarely introduce faïence or terra-cotta into their buildings, preferring to obtain their decorative effect with carved stone and sculpture to the employment of other accessories. On the Palais des Beaux-Arts can be seen, on the side flanking the street, some large panels in modelled glazed faïence, in a light, warm scheme of colour, and on the front of the building some long panels in ceramic mosaic; but this is quite an innovation, and one hardly knows where to point to another building in Paris where similar works are introduced. The absence of smoke in their city, and the universal employment of stone, seems to prevent French architects departing from the well-established order of things; at all events, every visitor is struck by the want of anything like an original note in their street architecture, and that makes the use of modelled faïence in the Art Palace, just finished in time for the present Exhibition, the more notable. Seeing what excellent sculptors and modellers the French are, it is the more astonishing that they have not turned their attention to the class of work which so often passes under the name of "Della Robbia," because the work associated with the Robbias is familiar to every one. There are plenty of specimens of modelled glazed pottery scattered over the Exhibition, but a good deal of it is Della Robbia but in name. Great dexterity appears to be a more fatal gift than anything with which an artist can be dowered; it is worse even than a private income, for that may only make its owner lazy, while dexterity leads the possessor to live to display it at every turn, very often in quite a wrong way. The Italians are most skilful carvers, but a display of their sculpture is merely a monument of misdirected, misapplied skill. And the same is true of much of this modelled faïence. Too much is attempted; there is a want of restraint and reserve which makes the work common and obtrusive. The attempt to be such a copy of nature just destroys the repose and dignity that would fit the work for being the decoration of a building, and if the producers were less skilful, they might learn how to treat their material instead of using it to exploit their skill. A fountain in the grounds, with nude children in full relief in highly-glazed pottery, is skilful to the last degree, and yet the whole work offends in the matter of taste.

Messrs. Doulton exhibit their architectural stoneware, and the colour, a pale celadon green, and semi-dull surface makes it a most pleasant material. One of the new bridges in the exhibition has a balustrade of a greenish French stoneware, very charming in colour. There can be no doubt that there is an objection to a very shiny glaze in architectural faïence, for the glitter is not pleasant, and on a large scale has a tendency to look cheap. Stoneware is without that fault, and being excessively hard is one of the most durable of all materials to use in a building.

The ordinary earthenware tile, such as is associated with the name of Minton, has the same fault of being too shiny as well as hard in colour, and with a mechanical perfection which is far from agreeable. The surface of a glazed white earthenware is unpleasant, except for sanitary work, and the beauty of Della Robbia pottery is owing not a little to the choiceness of the surface given to it by the tin glaze. Persian tiles again owe much of their charm to the slip which covers the body, and is given a rich thick coating of glaze which is free from that "varnishy" look of so many makes of tiles.

The tiles used in the Algerian pavilion and in the Tunisian courts are very good of their kind, and should be noticed, for, given the right tiles, there can be nothing against the use of them in a building; the objection arises only when the tiles themselves are at fault, as is too often the case in England. The repetition, for instance, of most mechanically-produced tiles when combined in large panels is most unpleasant, and the aim with the more artistic potters is to introduce a certain amount of variety into the tiles by putting coloured glazes in by hand into the pattern produced by lines in relief.

Another grave objection to many makes of tiles is that they will not stand weather but crack and flake in a severe winter. This is almost universally the case with tiles produced from dust under hydraulic pressure. The only body that should be used is a hard one of properly mixed clay—such as Mr. De Morgan & Mr. Dressler, for instance, employ—covered with slip and glazed with a good coating of alkaline glaze of a similar nature to that used in Moorish tiles. Unfortunately, price is studied before quality or artistic worth, and the result is that machinery turns out a mechanical-looking article which is entirely without charm. The difference between a moulded tile and a machine-made one is very considerable, for the uneven surface of the hand-made tile is so much pleasanter when seen in large panels than the undeviating surface of the machine-made article. These are all small matters in themselves, but most important ones in the aggregate, for all art is, after all, only a difference "'twixt tweedledum and tweedledee."

Mr. Conrad Dressler, the sculptor, was to have exhibited at the Paris Exhibition, but his new kilns were not ready in time to get up a representative display, but it is his endeavour to produce tiles for outside and interior decoration which shall be reasonable in price, and with the requisite artistic qualities to fit them for their place in the architectural scheme. His models are the Persian and Moorish tiles as to glaze and colouring, and no one can have

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better examples to work to than these eastern faiences. The way they manipulate the few colours they employ, as well as the beauty of the colours themselves, due to the quality of the glaze, affords the best possible lesson to all tile-makers, but the make of the tile must be similar, as it is a sham to attempt a sort of Persian effect without adopting Persian means to obtain it. Nothing so sets back the adoption of any kind of work as for that work to be on wrong lines at the outset, and the ugliness of so many Staffordshire tiles coupled with the bad body has much lessened the use of faience for architectural purposes, and it is to be regretted that of the English tiles shown so few of them are what one can recommend, for reasons already given.

Of modelled glazed pottery the Italian pavilion contains many examples, among which may be seen several reproductions of old work. Meretricious and trivial as they are in their sculpture and painting, their modern faience is worth studying, for much of it is good technically and some of it satisfactory from the point of view of art. It is always an astonishment how a nation once so pre-eminent in all departments of hand-cunning should have fallen into such a contemptible position in these days, for when it comes to workmanship the Italian is uncommonly nimble. A glance at a vast amount of the so-called "art pottery" at the Exhibition suggests, however, that the public for whom the manufacturers cater must be restaurant or tea-garden proprietors.

Germany displays an immense figure panel of painted porcelain tiles, which, while it is astonishing as workmanship and endeavour, is a wasted opportunity, for the effect is merely vulgar; at all events, quite incommensurate to the outlay. Speaking in general terms, almost all the ceramic work met with in the Exhibition in the foreign sections is too florid, too much like the valentine and twelfth-cake ornamentation. The tawdriness of much of it is so offensive that one is driven away from investigating because of the low standard of taste displayed in most of the productions, and possibly those few works one could enjoy are passed by. Londoners are familiar with the common Viennese faience, and work of about this level is shown wholesale, and one can only assume that the market for it is great on the Continent. We may not be great ceramists, but certainly nothing we show is as offensive as much that is contributed by Continental countries. The really satisfactory works are articles like closed-in stoves, so largely used on the other side of the channel.

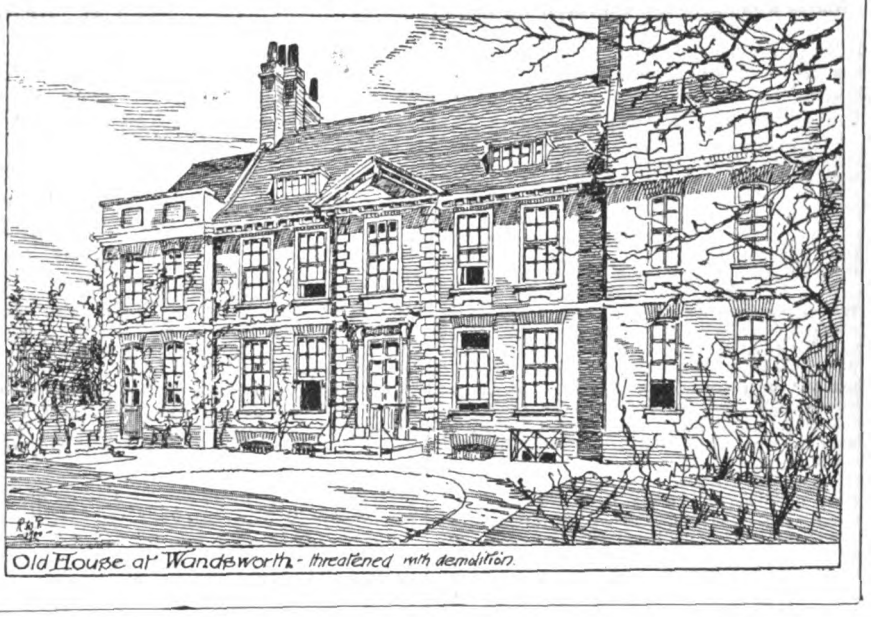
The idea of making pottery the expression of an individual does not seem to be the aim of Continental potters, while in the United States a very great effort is made to produce original work. There is in the American Court a large display of faience contributed by the "National League of Mineral Painters," the "Rookwood" and the "Grueby" potteries. The latter is remarkable for its lustred glaze making, the works look more like metal than earthenware. In the Rookwook vases a deep, rich red and brown tone prevails, the decoration consisting of flowers, foliage, with animal forms introduced in slip under the glaze. There is no particular character about the designs, but the products of its kilns would be very pleasant possessions.

Of pottery of this nature shown by us, no very great achievement is to be chronicled. It is largely coloured glazed ware (Bretby, for instance) not particularly choice on its art side and presumably cheap, at least the impression is that it ought not to be dear, for it does not look "select" enough to command a high price; but it never openly offends, and that is a consideration.

Denmark exhibits the most original porcelain in the Exhibition. No hard porcelain is made in this country (only pâte tendre), consequently we cannot attempt the class of effects familiar to us in the Copenhagen porcelain.

HOSPITAL, KENNINGTON, LONDON.—The foundation-stone has just been laid of the new Belgrave hospital for children, Kennington. The site of the new building is near St. Mark's Church, Clapham-road. The architect is Mr. Percy Adams. An illustration and description of the new building will shortly be given in the *Builder*.

THEATRE, NUNEATON, WARWICKSHIRE. — The foundation-stone of a new theatre was laid at Nuneaton on the 14th inst. Messrs. Owen & Ward, of Birmingham, are the architects.



Old House at Wandsworth - threatened with demolition.

OLD HOUSE AT WANDSWORTH.

AT the junction of St. John's Hill and North Side, Wandsworth, stand the offices of the Board of Works. Eastward of this is the Huguenot cemetery, and again eastward a good example of the Georgian house, once fairly plentiful in the neighbourhood of London, now year by year disappearing. The principal front faces north and is shown in the sketch. The entire frontage is about 70 ft. in length, the two slightly projecting wings being about 15 ft. each, and the centre block 40 ft. It is built of brick throughout, the wings, the horizontal string course, and the coigns of the porch being of rubbed brick. The cornice over the centre block, with the pediment, is of wood: the wings have moulded brick cornices, with a parapet over, with two sunk panels.

The house, as will be seen in the sketch, is only one story in height above the ground floor, and the strong horizontal lines of the string-course between the windows and the cornice give that air of repose so characteristic of many of the houses of this date. Both the wings and the porch on the south side have a greater projection beyond the main block, and a covered way leads to the street entrance. The north entrance at the end of the garden still retains its gate-post and old iron gate (the latter much mutilated). The interior has a good deal of panelling of a simple character, and good newels and balusters to the staircases. The house is, we believe, to be sold on the 27th of the present month, and as doubtless there is every possibility of its being pulled down to make way for modern buildings, this view and note on a typical example of the residences of suburban London in Georgian times will probably be of interest.

In regard to the history of the house we are able to give the following particulars:—The house was bought by Earl Spencer, Lord of the Manor of Wandsworth, from Sarah, Duchess of Marlborough [she died February 24, 1763]. Two wings were added to the front, which faces south, in 1826. In, or about, 1826—perhaps 1828—the property was sold by the then Lord Spencer to, it seems, the father (or grandfather) of its recent occupant. We learn from the auctioneers that the abstract of title begins *anno* 1744.

ARCHITECTURAL SOCIETIES.

THE ARCHITECTURAL ASSOCIATION OF IRELAND.—The annual excursion of this Association took place on Friday and Saturday last week to Kilkenny. The members journeyed from Kilkenny to Thomastown by train, where some hours were spent at that fine old Cistercian foundation, Jerpoint Abbey. The Abbey is most picturesquely situated in the midst of the beautiful scenery of the River Nore, and the architectural remains are in a wonderful state of preservation. Returning from Jerpoint, the remainder of the time available was devoted to the town of Kilkenny, with numerous buildings of interest. The Castle, the seat of the Marquis of Ormonde, was first on the list. A considerable time was spent in the picture-gallery, one of the finest collections in Ireland, including some fine examples of Anibale Caracci, and several portraits by Lely. The Castle itself is not remarkable for very great architectural beauty, being more or less modern in character, but it is a picturesque monumental pile of castellated character. St. Canice's Cathedral (restored some years ago by Sir Thomas Deane), was next visited. Subsequently the party made their way to the Black Abbey, a Dominican Abbey, which has the rare distinction of having remained in the undisturbed possession of the Order throughout the troubled epochs of Irish History to this day. The modern Roman Catholic Cathedral was viewed and found of considerable interest; considering the date of its erection (just prior to the Gothic revival) the design has remarkable merits, the interior being an agreeable surprise with its fine dignified proportions. The Archæological Museum was visited, and the quaint and simple last century Market Home. The Franciscan Abbey and the Courthouse were all visited in turn, completing a most enjoyable trip. The Association was much indebted to Mr. W. K. Clere, contractor, Kilkenny, who most kindly placed his time and local knowledge at the disposal of the party.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loans. — On the recommendation of the Finance Committee, it was agreed to lend the Whitechapel District Board 30,500*l.* for electric-lighting purposes; Hampstead Vestry 27,663*l.* for paving works; and Camberwell Vestry 1,170*l.* for the purchase of land.

Contracts—Retention Money.—The General Purposes Committee reported as follows, the recommendation being agreed to:—

"We have further considered the following recommendation withdrawn from our report to the Council on the 3rd inst. on the question of retention moneys on contracts,* viz.:—'That the solicitor be instructed to insert in the Council's contracts a clause to the effect that all materials and plant of the contractors, when brought on the ground, shall at once become the Council's property?' We think that the clause hitherto inserted in engineering contracts would meet the objections raised to the clause suggested in our previous report, and we accordingly recommend—'That the solicitor be instructed to insert in the Council's contracts a clause to the effect that the plant, tools, and materials provided by the contractor shall from the time at which they may respectively be brought upon the sites of the said works or the lands of the Council and during the construction, and until the completion of the said works, become and continue the property of the Council, and the contractor shall not remove the same or any part thereof without the consent in writing of the superintending officer.'"

* See our issue for July 7.

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Horton Estate—Central Station for the Supply of Water and Electricity.—On the recommendation of the Asylums Committee the scheme was approved for the provision, at a cost of 39,000*l.*, of a central station for the supply of water and electricity to Horton Asylums :—

"The buildings of the central station will include chimney, boiler-house, engine-house, storage-battery room, machine-tool shop, well-house (with a 40,000-gallon water-storage tank, fixed at a height to control the ground-floor buildings of both asylums, and to give a constant supply), water-softening plant house, office, stores, &c. The proposal is at present limited to centralising the water and electric current supplies for lighting and power for the Horton Asylum and the suggested epileptic colony, but the buildings have been so designed that they can be extended from time to time to whatever capacity may be required. The chimney and main flues will, however, be now constructed to meet anticipated requirements. In addition, such provisions as the following, viz., reservoir for cooling water, the fence, the weighbridge, the gatekeeper's office, main roads, drainage, lighting, &c., which are included in the estimated cost, will not have to be repeated when additions are made to the station. The electric-lighting plant for the two institutions before named is for an installation of 3,800 lamps, equalling 8,187 lamps of 8 candle-power. It will also provide the current for sixteen motors, varying in size from 22 b.h.p. to 1 b.h.p., which will supply the motive-power for water-pumping, driving laundry machinery, bread-making machinery, ventilating fans and workshop tools, &c. The system proposed is the 3-wire system, with a voltage of 400 between the outer conductors of the mains, but in all rooms occupied by patients and staff the voltage is by a duplication of the wiring limited to 200, and this will also prevent a failure of light should one of the conductors break down. The water-supply plant—*i.e.*, pumps and softening machinery—is estimated for on the assumption that the well now being sunk will yield a sufficient quantity of water for the epileptic colony as well as for the Horton Asylum."

The Gas Question.—The Parliamentary Committee reported that their attention had been called to the very considerable increases which had been made in the price of gas supplied to the Metropolis. They recommended that "the Parliamentary Committee be authorised to convene forthwith a Conference of representatives of the Corporation of London and the Vestries and District Boards of the Metropolis with regard to the charges for gas made by the London gas companies, and the action which should be taken in the interests of the gas consumers."

Mr. Organ moved that after the words "gas companies" the following words be added: "And with regard to the quality of the gas supplied by these companies." He contended that this was a most important point to be considered, because the quality of gas supplied to consumers had fallen off. The evidence given before the Select Committee appointed by Parliament to consider the matter showed that it was possible for the gas companies to enrich the gas on certain occasions for certain purposes, and any one reading the evidence must come to the conclusion that the companies did so enrich the gas for certain purposes.

Mr. N. Robinson seconded the amendment.

Earl Carrington complained that while the Gas Light and Coke Company charged him 3s. 3d. per 1,000 ft., they charged the "penny-in-the-slot people" 4s. 2d. per 1,000 ft.

Mr. Cornwall (Chairman of the Parliamentary Committee) agreed to accept the amendment.

Mr. Taylor then moved to add words to the effect that the Conference also inquire with regard to the quantity supplied by the gas companies' meters.

Mr. Dew seconded the amendment, which was agreed to.

The recommendation as amended was then agreed to.

Alexandra Park Bill.—The Parliamentary Committee recommended—"That the action taken by the Parliamentary Committee in giving instructions for the sealing and presentation of a petition against the Alexandra Park Bill be approved."

Mr. Cornwall explained that action was not taken in a spirit of hostility to the Bill, but with a desire that the Council should be heard upon several points of detail.

The recommendation was adopted.

Applications under the Metropolis Management and Building Acts Amendment Act, 1878.—The following applications were agreed to :—Arrangements at the Frascati Restaurant, Oxford-street (Mr. C. H. Worley). Arrangements, submitted by Mr. T. J. Stoddart on behalf of the Van Kannel Revolving Door Company, Limited, in regard to Madame Tussaud's Exhibition. Arrangements in regard to an engine-room which it is proposed to erect at the New Cross Empire (Mr. F. Matcham). Electric-lighting installation at the New Grand Palace of Varieties, Clapham Junction (Mr. E. A. E. Woodrow).

Tenders.—The following tenders have been accepted :—

Telephone, &c., installation, Horton Asylum. Messrs. J. T. Mayfield & Co., Queen Victoria-street, 1,665*l.*

A 12-in. centrifugal pump, and alterations and repairs to the existing pump, Crossness Outfall. Messrs. Drysdale & Co., 317*l.*

Docking and repair of the S.S. *Barrow*. Brown's Dry Dock and Engineering Company, Limited, 980*l.*

Ornamental fencing at the wild garden on the north side of the lake in Clissold Park. Messrs. Hill & Smith, 122*l.* 15s.

Oak boundary fencing, Archbishop's Park. Mr. R. Batchellor, 557*l.*

Iron fencing, Archbishop's Park. Messrs. Hill & Smith, 315*l.* 10s. 6d.

Factory and Workshop Acts, 1878 to 1895.—The Building Act Committee reported as follows :—

"We have had before us a copy of the annual report of the Chief Inspector of Factories and Workshops for the year 1899. The report contains much valuable information with regard to the working of the Acts in London ; and speaking of the responsibility of the Council with regard to the means of escape in case of fire in premises in which more than forty persons are employed, the Chief Inspector remarks that in London only, where the Council is the executive authority, is any systematic record forthcoming of the action taken by the Council upon reports made to it by the Chief Inspector. Testimony is also borne to the hearty co-operation of the Council with the Home Office inspectors, one of whom remarks that complaints forwarded to the Council have almost without exception been promptly dealt with, and that much good work has unquestionably been done."

By-laws—Lights to Vehicles.—The following recommendation of the Local Government and Taxation Committee was agreed to :—

"That the Council do repeal the by-law made by the Council on May 2, 1899, relating to lights on vehicles, and do make and seal a by-law in the following form and that such by-law be forwarded to the Secretary of State—

'The by-law made by the Council on May 2, 1899, relating to lights on vehicles is hereby repealed and the following by-law substituted therefor—

The owner of every vehicle which shall be driven or be upon any highway during the period between one hour after sunset and one hour before sunrise shall cause to be fixed outside such vehicle and on the right or off-side thereof a lamp, which shall be so constructed and placed as to exhibit a white light visible in the direction in which the vehicle is proceeding, and sufficient to afford adequate means of signalling the approach or position of the vehicle, and the person in charge of such vehicle shall, during the said period, keep such lamp properly lighted, provided that the light to be exhibited as aforesaid on any tramcar may be white or any other colour except red.

This by-law shall not apply to any vehicle which is by any statutory enactment, or by any rule, regulation, or order made under any statutory enactment, and for the time being in force, required to carry a lamp outside such vehicle.

Any person who shall offend against this by-law shall be liable for every such offence to a fine not exceeding forty shillings.'"

The Fountain in Leicester-square.—Colonel Probyn asked how it was that the fountain in Leicester-square, given by the late Baron Grant to the Metropolitan Board of Works to be maintained for ever, was falling into decay.

Mr. Goodman said the marble-work was of a very inferior character, and he presumed the underground pipes were of a similar character, because the lowest estimate of putting the fountain into repair was 250*l.* Further, it was found the cost of the water to keep the fountain playing would be 15s. per hour, and under the circumstances they did not at present see their way to make any recommendation.

At five o'clock it was moved that the Council adjourn, and this was agreed to.

ADDITIONS, GREAT SOUTHERN HOTEL, KILLARNEY.—Extensive additions, including the formation of lounge, 70 ft. long by 25 ft. wide, have been carried out at this hotel from designs by Messrs. Carroll & Batchelor, of Dublin. The cost has been about 10,000*l.*

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE annual meeting of the Association of Municipal and County Engineers was opened in the Council Chambers at the Westminster Town Hall on Thursday. Mr. W. Harpur, C.E., of Cardiff, the retiring President, occupied the chair at the opening of the proceedings, supported by Mr. C. H. Lowe, C.E., of Hampstead, President-elect, and a large number of members.

The report of the Council, which recorded continued and satisfactory progress in the membership of the Association during the past year, was presented and adopted.

Mr. Lowe, the new President, having taken the chair, a vote of thanks was accorded to Mr. Harpur for his services during the past year.

The President, in his inaugural address, having thanked the members of the Association for the honour they had conferred upon him by their election of him as President for the year, said the most important change to which Metropolitan engineers were now looking forward was the substitution in November next of the new Local Government Act for that of the Metropolis Local Management Act of 1855. It was difficult to gauge how far the new arrangements might affect the officials in practice—whether the change would be to a great extent in name only or would really extend the powers of the ruling authority, whether it would succeed in waking up the general public to the proper appreciation of their duties so that all might take a fair share of administration and cause them to show greater interest in public works than had been shown in the past. There was room, no doubt, for great improvement in the direction of uniformity of practice in the several districts, so that civic life and spirit might be enhanced and enlarged, and all might work for the one common object of the public good. Now that the titles of vestries and district boards were about to disappear from administrative life in the Metropolis, he might say something as to the extensive work which had been carried out under his personal experience by one of these much-abused bodies during the past thirty years, and in defence of administrators who had given their time and abilities most cheerfully to the service of the public without fee or reward. The 1855 Act had on the whole worked well, and doubtless its administration would have been more efficient had the public taken more interest in its working. It was anticipated that the new corporate bodies about to be created would possess far greater importance and dignity by reason of the class of men who would be induced to come forward as aldermen and councillors, but it might be questioned if they would prove more useful, for at present, with few exceptions, the Local Authorities were composed of hard-working representatives, many with technical knowledge of town work, beside a number of professional men who freely gave the benefit of their information on legal and other subjects. The President then proceeded to refer to the work of the Hampstead Vestry—a district typical of many in the Metropolis. Since 1855 the population of the district had increased from 14,000 to 88,000, the number of houses from 1,900 to 13,250 ; the rateable value from 7,768*l.* to 851,413*l.* ; the length of private roads and footways made up at the expense of the owners had been forty-nine miles, at an outlay of 100,000*l.* ; the main drainage of the district had been carried out at an expense of 70,000*l.*, and various public improvements and widening of streets had cost 130,000*l.*

The President next proceeded to refer in detail to the various and varied duties of the municipal engineer, with reference to the maintenance and repair of highways, scavenging and removal of street refuse, dust-destructors, open spaces and tree planting, the Free Libraries Act, and other matters. The duties of the engineer were of so multifarious a nature that he must train his mind to grasp not only the greatest but the smallest matter coming under his notice. While his chief attention might be directed to some important engineering scheme, he must by no means be deaf to the cries of more water, improved dust removal, sewer emanations, blowing about of waste paper, removal of snow in its season, and the thousand and one grievances which the long-suffering ratepayer is liable to endure. The mention of many of these matters might appear at first trivial and unimportant, but he considered an association

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such as that might be well engaged, and would perform a very satisfactory work, if some of the matters on which he had touched were more fully considered so that upon a plain issue they might be prepared with a concensus of opinion as to what was the right thing to be done in order that the Association might speak with no uncertain voice as to the best method of carrying out the various important branches of local government upon which the public might reasonably look to it for guidance.

The position of the Association must be a source of great satisfaction to its members. During the past few years its numbers had been considerably augmented and its importance acknowledged by the public, kindred professions, and members of the various departments of the public service with whom it had been brought in contact. The total membership at present was 954. The question of increasing the usefulness and benefits of the Association by extending the limits of the privilege of admission had been on various occasions under the consideration of the Council. The matter was one demanding the most careful thought in connexion with the foundation of the Association as laid down in its articles and by-laws. During the past year a most desirable step had been taken in the establishment of an orphan fund. All honour was due to the promoters and subscribers who had enabled the Council to establish the fund on a sound financial basis. They were still hoping for the success of a Superannuation Bill. The Permissive Bill of 1866, from which so much was expected by Metropolitan members, was apparently difficult of interpretation or application, as shown by results in some recent cases. Whilst upon this subject he must mention the case of Mr. Angell, the much-esteemed founder of the Association, a gentleman whose professional attainments were of the highest order, who was, after long and faithful service, dismissed by his Corporation almost at a moment's notice, and, as the case at present stood, with no redress for this altogether unjust treatment. Their Council, as was their bounden duty, endeavoured to take action to protect his interest, and the solicitors were consulted, but could recommend no satisfactory course of action. This case indicated how essential it was that they should seek some safeguard against such treatment. In conclusion, the President said it was well at times to look fairly and squarely at their ordinary every day work with a view to advancement and improvement, for the primary aim of the Association was the maintenance of the status of the members and the diffusion of knowledge for the common good.

[Our report of the proceedings of the Association will be concluded next week.]

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE following gentlemen have passed the Midsummer Examinations of the Royal Institute of British Architects :—

Primary.—David Alex. Adam, Newcastle-on-Tyne; Percy Tidswell Adams, Bournemouth; Ernest Gladstone Allen; Hubert Dennis Aubrey; Gervase Baker; Christopher Bannister, Crowborough; Robert Gerald Barrow, Bideford; Tom Forest Beazley, South Shields; Leslie B. G. Benson, Yeovil; Arthur Gilbert Berry, Norwich; Richard H. P. Lewis Southsea; Ellis Rawson Birks; Henry Blackadder Broughty Ferry, N.B.; Fitzroy Frederick Bodero Penkridge, Staffs.; William Edward Brooks; Baldwin Brown, Bradford; George Ronald Bryce, Glasgow; Albert Edward Bullock; Stephen Burgess Geoffrey Burton; Benjamin Harlow Butters, Accrington; Wm. Wellesley Jas. Calthrop, Chelmsford; Archibald Neil Campbell; Cyril Barnabas Cheshire; George Reginald O. Chorlton, Manchester; Henry Francis Clarke, North Shields; Charles Emmerson Clouting, Cambridge; Wm. Henry Collin; Robert Tyers Cooke, Leicester; Joseph Bertelet Cubey, South Shields; Ernest Thos. Cunliffe Blackburn; Thos. Lawrence Dale; Noel John Dawson Ipswich; Sidney Reyner Day, Skipton; Charles Willing Denton; Alfred William Douglas, Mallock bank; Harold J. T. Duncan; Harold Hicks Earnshaw, Manchester; John Joseph Eltringham, Durham; Harold Quentery Farmer, Stalybridge; Henry F. P. Ford; Douglas Alfred Forster; Edw. Lawrence Gaunt, Ilkley; Frank Stanton Gildersleeve, Hastings; Chas. Jno. Goodwin; Reginald John Gookson; Robt. Francis Graham, B.A. Cantab.; Leonard Bishopp Grant; Jordan Green, Birmingham; William Greenwood, Blackburn; Ronald Hamilton Greig; Sydney Robt. Griffen, Plymouth; Arthur Bernard Harvey, Canterbury; Arthur Hugh Hasnip, Hastings; Walter Wm. Hitchins, Plymouth; Douglas John Hobgen, Chichester; Arthur Rowland Holman; Percy Aspden Horrocks, Bolton, Lancs.; Walter Arnold Ingledew, Tynemouth; Thomas Fredk. Ingram, Wakefield; Charles Henry Jackson; Hugh Parry Jones, Conway, N. Wales; Matthew M. C. Jones, Glasgow; John Norman Keasley; John Harold Kennard; Harold Kershaw, Worthing; Wm. Alex. Kidd, Greenock; James Henry Lang, Dukinfield; Wm. Henry Lomas, Burnley; Charles Ernest Lovell; Percy Wells Lovell; Percy Luker; John Bernard Lind, Chorley, Lancs.; William Mackintosh, Inverness; Herbert Pemberton MacNalty, Winchester; John Hatton Markham; Hugh J. C. Marshall; Charles Redford Merrison; Vibert Middleton, Newcastle-on-Tyne; Chas. Wm. Milburn, Newcastle-on-Tyne; Stanley Chas. Miles, Bournemouth; Ewart Gladstone Millar; Christopher John Monson, Newark; Andrew Muir, Edinburgh; Ernest Ranson Mundle, Newcastle-on-Tyne; Harold Franklyn Murrell; Edw. Robbins Nixey, Hartlepool; Robert Douglas Ogden, Manchester; Basil Oliver, Sudbury, Suffolk; Geo. Wilfrid Page, Bolton; David Parkhill, Belfast; Claude Paterson, Bowdon, Cheshire; Basil Pendleton, Manchester; Leonard Pierpoint, Warrington; Montague Corry Pile, Newbury; Claud Vincent Ponder, Eastbourne; Albert Reginald Powys, Somerset; Harold Oswald Prestwick, Lancashire; Henry Melancthon Pritchard, Cardiff; Mowbray Proctor, Hartlepool; Edgar Quiggin, Liverpool; Thos. Herdman Rae, Sunderland; Frederick Raine, Newcastle; L. A. G. L. Rawles; G. R. H. Reaney; Thos. Edgar Richards, Cardiff; Thomas Morgan Richards, Penarth; Fredk. Gibbon Richer; Wm. Ewart Roberts; Wilfrid Robson, Saltburn; Wm. Herbert Rogers; Percy Havery Ross; Samuel Runcie, Glasgow; Tom Sadler Rushworth; Herbert Ryle, Newcastle; Hayward Lewis Samson; Henry Partridge Sanders, Cardiff; Victor Geo. Santo, Bromsgrove; Lawrence Scantlebury, Launceston; Jesse Francis Schneider; T. T. G. Donaldson Selby; Christopher Long Sharp, Blackpool; James Hughan Shearer, Exeter; Isaac Taylor, Sifton; Harold Slater, Blackburn; H. R. G. S. Smallman; Neil Campbell Smith; E. T. L. Smith; Robert Ernest Stewardson; Geo. Marrison Stone, Tuxford; H. S. Walcott Stone, Taunton; Chas. Stonehouse, Blackburn; Percy Ripley Strong; John Towneley Sugden, Manchester; Harry Cecil Swindells, Manchester; John Wm. Thorpe, Lytham; Maurice Tobias; Alf. Nicholson Tucker, Plymouth; Percy Turner, Bradford; James Irving Tweedie, Annan; James Henry Vaughan, Newport, Mon.; Louis Chas. Veale; Francis Guilford Waddell-Dudley, St. Albans; Richard Arthur Waite, Bradford; H. H. J. Walder, Southampton; Marshall Eyre Walker; Samuel Wallis, Kettering; Wm. Ernest Watson, Greenock; Harry West, Newbury; John Charles Whettam, Weymouth; Thos. Wm. Whipp, Scarborough; Herbert Hodges Whittington; Wm. Whymper, Framlingham; Arthur Gilbert Wood, Stoke-on-Trent; Henry Edward Woodsend, Nottingham; Alex. Lionel Woodward; Henry J. Wyeth; Riginald Wm. Yates, Huddersfield; Henry Young, Bedford.

Intermediate (in order of merit).—Andrew Rollo, Clem Stretton, Leicester; Chas. Thos. Palmer; Leonard Wm. Ensor, Huddersfield; Sidney Hall Goodwin; Reginald Percy Chamberlain, Leicester; Norman Austin Leech; John Swarbrick, Manchester; John Brown, Northampton; Francis Robt. Boyd Haward, Great Yarmouth; Leslie Patrick Abercrombie, Manchester; Edwin Osman Payne; Percival Wm. Hawkins; James Miller, Sheffield; Frank Edw. Stratton, Salisbury; John Norman Randall Vine; Arthur Tedman, Bristol; Wilfrid Stonehouse Payne; Wm. Steel, Sunderland; Willie Hemingway, Bolton; Henry Makin Tait, Glasgow; Charles Frederick Ward, West Bromwich; Arthur Haynes Johnson, Winchester; Archibald Lawrence Holder; Geoffrey Goodwin Moorhouse, Liverpool; Guy Church; Sir Francis Chas. Rupert Ford, Bart., Ilkley, York; Geo. Lister Thornton Sharpe; Geo. Herbert Jackson, Boscombe; James Morton, Lethbridge; Basil Procter, Newcastle-on-Tyne; Fergusson Barclay, Weston-super-Mare; Henry Don Crewdson; Wm. Herbert Hobday; John Parlett; Geo. Maurice & Co., St. Leonards-on-Sea; Godfrey D. B. Shepherd; Wm. Peter Steel, Sidcup; Victor Wilkins; Arthur A. Williamson, Dundee; Rob. Gordon Wilson, jun., Glasgow; Archibald Herbert Winterburn.

Final and Special.—Samuel Chesney, Stourbridge; Geo. Edward Clay; Chas. Heaton FitzW. Comyn; Harold Cooper, Blackburn; Chas. Archibald Daubney; Wm. Ernest Emerson; Jas. Ernest Franck; Arthur Reginald Groome, Manchester; Herbert Haines; Emanuel Vincent Harris; Frederick Milton Harvey, Gorleston; John Stanley Heath; Percy Erskine Nobbs, M.A.; Sidney Vincent North; Cyril Wontner Smith; Wm. Herbert Swann; Alexander Symon; Andrew Mitchell Torrance, jun.; Robert Percival Sterling Twizell, Newcastle-on-Tyne; Charles Edward Varndell; Clyde Young.

KEPPLESTONE ART COLLECTION, ABERDEEN.—This collection is to be at once removed to the Art Gallery and placed in the east wing until the West Gallery is altered for its reception, in accordance with the report made several years ago by Mr. Wallace, architect. A special committee is to report to the Town Council as to the formation of a public park at Kepplestone.

Correspondence.

To the Editor of THE BUILDER.

STOBHILL HOSPITAL, GLASGOW.

SIR,—In your last issue, under the head of "General Building News," there appears a paragraph describing shortly the plans of the new hospital at Stobhill, Glasgow.

As an erroneous impression may be given from this notice, we think it desirable to point out that the plans of this hospital were the subject of an open competition which has excited great interest in Glasgow. We would refer to a short intimation in your issue of June 16 last (page 591) in which the list of the premiated designs is given, and from which it will be seen that we were awarded the first premium. We append below a copy of the official report of the assessors, Mr. J. J. Burnet, A.R.S.A., and Dr. Donald Mackintosh, Medical Superintendent of the Western Infirmary, both Glasgow gentlemen. In this the assessors strongly recommend that our design—referred to as No. 7—should be adopted, and that the authors should be employed to carry out the work. The Parish Council, however, by 16 votes to 12 (*vide Glasgow Evening News*, June 30) decided to ignore their assessors' recommendation and employ the authors of the second design, who are local architects.

It will be observed on reference to the report that there is a considerable difference in the estimates as given by the official measurers appointed by the Council. This difference, however, is considerably less than would appear from a comparison of the figures sent in with the respective authors' reports. These latter were published in the issue of the *Glasgow Evening News* before mentioned, and when read in conjunction with the assessors' report, tend to show that while the measurers added over 57,000*l.* to the estimate for the second premiated design, they deducted nearly 64,000*l.* from that submitted with ours. As this difference in the estimates is said to have greatly influenced the Council in arriving at their decision, we think it but fair to state that while the accommodation generally as regards patients, nurses, and officials was approximately the same in both designs, we, in addition, provided accommodation for a full staff of servants, male and female. We also provided a separate administration block for the inmates who do not come under the heading of hospital patients, as we considered that they required a different mode of administration and a different class of attendants as distinguished from hospital nurses. There was also a small but fully-equipped suite of baths, comprising Turkish, Russian, and medicated baths, and complete facilities for reaching under cover all parts of the hospital and its annexes, such as nurses' home, servants' dormitories, and laundries. The baths, and possibly the second administration block, with portions of the covered ways, might have been omitted, and it would have been possible to economise elsewhere without in any way affecting the efficiency of the scheme in working.

Appended is a copy of the letter from the Clerk to the Council containing the first announcement we received of the result of the competition. From this it will be seen that no opportunity was given us of explaining our design, or modifying it in any way to suit the views of the Council. It will also be observed that, beyond the facts of direct concern to ourselves, no information is given in the Clerk's letter of the placing of the other premiums. For the first intimation of the names of the other architects placed we have to acknowledge our indebtedness to the courtesy of a gentleman connected with your paper.

In a letter to the Council, dated June 14, a copy of which is sent herewith, we requested an explanation of the reasons for which we were set aside. Up to the present no official reply to this has come, but our drawings have been returned to us as we requested. WEIR SCHULTZ & HOWARD.

SUGGESTED SITE FOR NEW WAR OFFICE.

SIR,—There was a slight printer's error in the particulars which accompanied the block plan *re* above in your last week's issue.

The site I suggested for the re-erection of the United Service Museum should have been old *Harrington House* (not Carrington). The former was the town residence of the fourth Earl of Harrington, at whose decease in 1851, or some time after, the mansion became, I believe, Government property. AUGUSTUS ROVEDINO.

*** We altered Mr. Rovedino's "Harrington House" to "Carrington House" of set purpose, as we remember no Harrington House, and thought it was an oversight on his part, the name of Carrington House being familiar. We think there is still an error as to the name. No. 7, Whitehall-gardens, which in 1854 was fitted up for the Minister of War, had been the town house of the lately deceased Earl of Harrington, but we doubt if it was called by his name. We have authentic information, at all events, that in 1855 No. 7 bore the name of "Pembroke House." Carrington House was No. 8.—ED.

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APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

AT the meeting of the London County Council on Tuesday, the following applications under the London Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated :—

Lines of Frontage.

Lewisham.—A temporary wood and iron chapel on the south side of Brownhill-road, Catford (Messrs. Humphreys, Limited, for Mr. F. Higgs).—Consent.

Projection.

Whitechapel.†—A stone balcony at the second floor level in front of No. 85, Whitechapel High-street (Messrs. Bird & Walters for the New London Brewery Company, Limited).—Consent.

Width of Way.

Limehouse and Whitechapel.—A two-story office building on the north side of Upper East Smithfield, Limehouse, and the erection of a boundary wall on the west side of Glasshouse-street and south side of New Martin-street, Whitechapel (Mr. H. W. Williams for the London and India Docks Joint Committee).—Refused.

Line of Frontage and Width of Way.

Islington, South.—A block of dwellings on the east side of Thornhill-road, Barnsbury, on the site of No. 10, Barnsbury-park (Messrs. Davis & Emanuel for the East-end Dwellings Company, Limited, and Mr. E. Harrison, for Mr. D. Weinhausen).—Refused.

Width of Way and Projections.

Holborn.†—Two blocks of buildings on the east side of Shaftesbury-avenue, abutting also upon Vine-street, with projecting oriel windows and a portion of the buildings at less than the prescribed distance from the centre of Vine-street (Mr. R. J. Worley, for the Shaftesbury Avenue Freehold Land Syndicate).—Refused.

Height of Buildings.

Hammersmith. — The re-erection of the Swan public-house, No. 40, Broadway, Hammersmith, with a portion of the new building to abut upon Beadon-road, and to exceed in height the distance of the wall of such building from the opposite side of such road (Mr. C. G. Miller for Mr. J. Strange).—Consent.

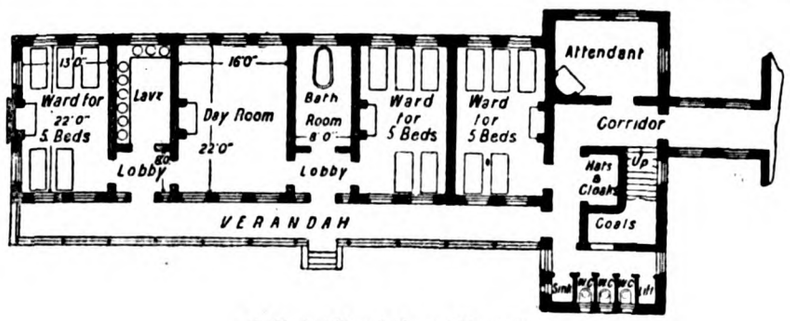
Buildings for the Supply of Electricity.

Hoxton.—A generating station and works on the west side of Bath-place, Haggerston (the Vestry of Shoreditch).—Consent.

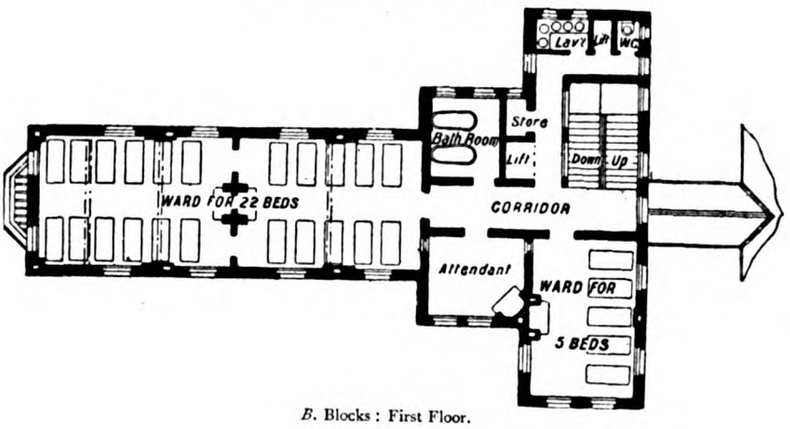
The recommendations marked † are contrary to the views of the Local Authorities.

INFIRMARY BUILDINGS, LADYWELL, KENT.

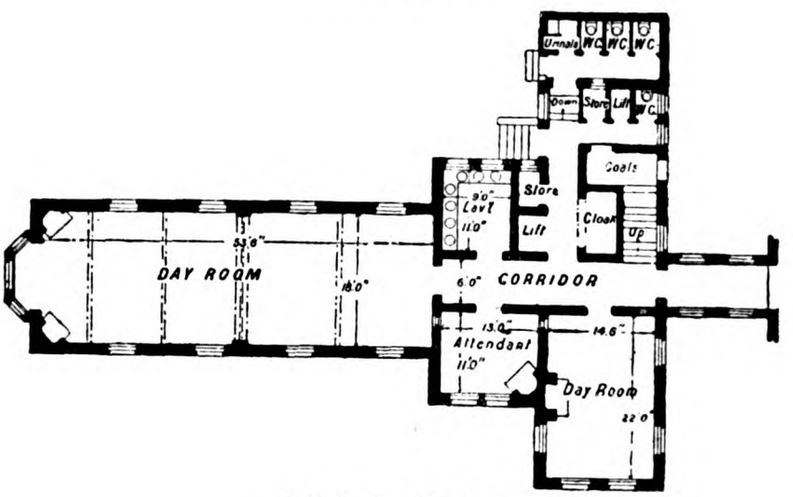
ON the 12th inst. the new buildings at Ladywell, for the accommodation of the aged and infirm poor of the St. Olave's Union, Southwark, were opened by the Prince and Princess of Wales. The buildings are approached from the Ladywell-road. At the entrance is a porter's lodge and office, and on the left are the stables and mortuary, the receiving wards being on the right. The administrative buildings occupy a central position, and are reached by a roadway which encircles the main buildings. On each side of the administrative buildings are the blocks for male and female inmates. The official buildings consist of the committee-room, clerk's office, medical officers'-room, dispensary, matron's office, workroom, and stores on the one side, and upon the other the superintendent's house, his offices, and stores. In the centre is the dining-hall, at the rear of which are the kitchen, scullery, larders, and messrooms for the staff. There are four infirm blocks (A) providing the following accommodation upon three floors :—Large ward for twenty-two, small ward for six, dayroom, attendants'-room, bathrooms, lavatories, stores, offices, and a verandah. At the junctions of these blocks with the main corridor are lifts for service and other purposes. The B blocks are six in number, and are intended for the healthy infirm. They contain dormitories for twelve and ten on the first and second floors, with attendants' room, bath-rooms, lavatories, and offices. Dayrooms for fifty-four are situated on the ground-floor. The blocks are also provided with lifts. There are two C blocks, and upon each floor are three small dormitories for five beds and a dayroom. The rest of the accommodation in these blocks consists of attendants'-room, bathroom, lavatories, offices, and verandahs. The married couples' block (D) consists of two floors, and has accommodation for six couples on each. The rooms are fitted as combined sitting and bedrooms, with a general dayroom on each floor, and bathrooms, lavatories, &c. The isolation block (E) accommodates five of each sex, with nurses'-room between. All the blocks are provided with fire escape stairs. The receiving block (K) provides accommodation for fourteen of each sex with attendants'-rooms, bathrooms, waiting-rooms, and offices. The first floor of this building is used as a store for inmates' clothes, and also for attendants' living-rooms. There are two chapels, F, that for the Established Church accommodating 200, and that for Catholics 150. The mortuary is near the entrance, and comprises a post-mortem room, laboratory, &c. The sleeping accommodation for the male and female staff is provided on the first floor of the administrative buildings, the sitting-rooms and mess-rooms being on the ground floor, close to the kitchen. The spaces between the blocks are laid out with grass and tar-paved walks. The laundry, H, is at the back of the administrative building. On the left of the receiving-room is the foul washhouse, and on the right the general washhouse, fitted with washing-machines, hydro-extractors, &c. The drying-closets are heated by Messrs. Seagrave & Bevington's apparatus. The ironing-room contains a steam ironing-machine, various mangles, &c. The lady-superintendent's office overlooks the whole of the laundry. The machinery is driven by electric



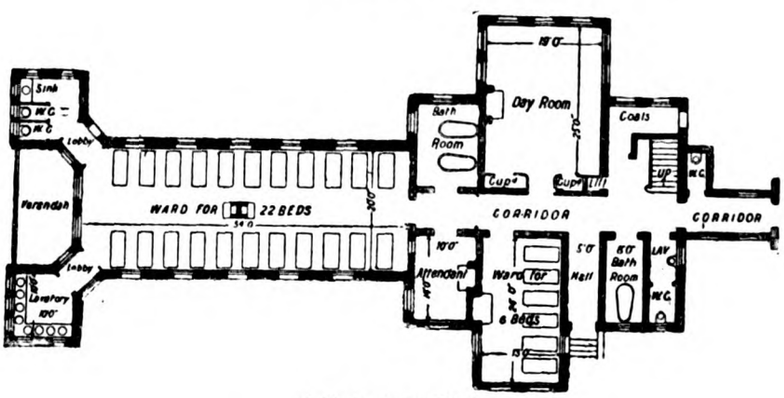
C. Blocks : Dormitories and Dayroom.



B. Blocks : First Floor.



B. Blocks: Ground Floor.



A. Blocks : Infirm Ward.

New Infirmary, Ladywell : Plans of Various Wards.

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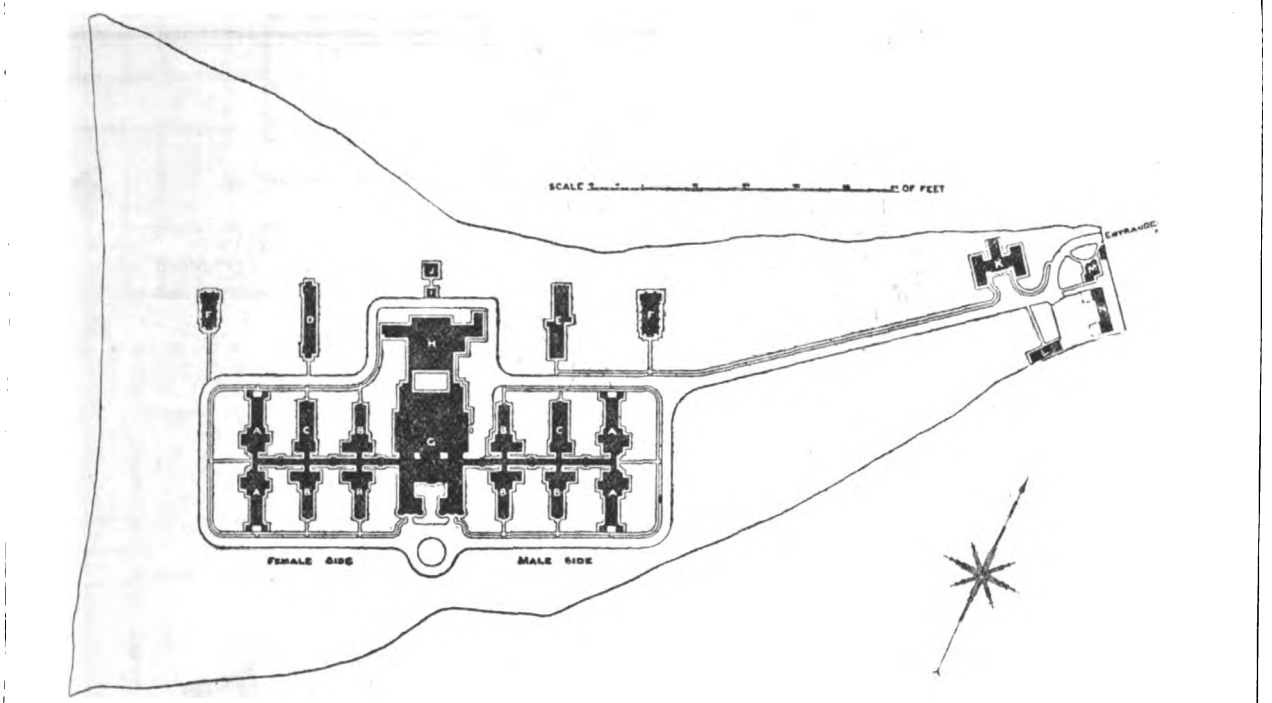

New Infirmary, Ladywell: General Plan.

motors supplied from the engine and dynamo-room, which, with the boiler-house, bakery, &c., is situated in the same block as the laundry. In the boiler-house are three Lancashire boilers, which provide the steam for the warming apparatus, cooking, laundry, electric lighting, and other purposes. The buildings are all lighted by electricity. There are three dynamos, each driven by a 50-h.-p. vertical high-speed engine. The drainage system falls into the new London County Council sewer. The water supply will be taken from the well, 210 ft. deep, between the water-tower and the laundry. Water mains are also connected with the public mains of the Kent Waterworks Company, a separate supply being provided for the fire mains. The whole of the rain-water is collected for use in the boilers and laundry. The heating apparatus is on the low-pressure system, all the pipes for heating and water-supply being fixed in a subway under the main corridor, which extends the length of the buildings, 774 ft.

The architects were Messrs. Newman & Newman, of Tooley-street, the architects to the Board. The following were the contractors:—Building work and forming roads and airing grounds, Mr. Charles Wall, Chelsea; engineering works, including boilers, hot water, heating laundry and kitchen, Messrs. Clements, Jeakes, & Co.; well and pumps, Messrs. Baker & Sons; electric lighting, Messrs. Mackie & Co.; engines, Messrs. Robey & Co.; lifts, Messrs. Waygood & Co.; telephones, National Telephone Company; wood block floors, Messrs. Goddard & Sons, Farnham; fire escape staircases, the St. Pancras Ironwork Company; glazed bricks, baths, and sanitary fittings, Farnley Ironwork Company; hot-air stoves, Mr. John Grundy and Messrs. Clements, Jeakes, & Co.; and the stoves and ranges, the Albion Iron Company. The clerk of works was Mr. F. S. Durston.

Illustrations.

COMPETITION DESIGN FOR OLD BAILEY SESSIONS HOUSE.

WE publish this week the exterior perspective view, the interior view of the Hall, and the two principal plans, of the fine design submitted by Mr. H. T. Hare in the above-named competition.

We have already given our own comments on all the designs. It is only necessary to add here that Mr. Hare points out (what is in fact pretty obvious from a study of his design) that his idea in designing the exterior was that it should be as far as possible reminiscent of the old building; that the grouping should be so arranged as to comprise the entire frontage to the Old Bailey; and that, in such close proximity to St. Paul's, he considered that a prominent feature such as a tower or dome was unadvisable.

LIVERPOOL DOCK OFFICES: DETAIL ELEVATION.

WE gave last week the perspective view and plans of the first premiated design in the competition for new offices at Liverpool for the Mersey Docks and Harbour Board, with the description of the design by the architects, Messrs. Briggs, Wolstenholme, Hobbs, and Thornely.

We now give, to complete the illustration of this important design, the detail elevation.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

3. INTERNAL EXPLOSION ENGINES—THE "OTTO CYCLE"—THE WATER-JACKET—ELECTRIC-LIGHTING ENGINES—ACTUAL AND THEORETICAL EFFICIENCIES.

IN small installations there are many advantages in adopting a gas or oil engine as the prime mover instead of a steam-engine and boiler. They take up very little floor space and require no chimney. There is no boiler to insure and keep in repair, no ashes or clinker to remove, and they can be started in a few minutes. For these reasons, and owing to the great improvements which have recently been made in their design, they have become very popular. The principle of both engines is the same, although there is endless variety in the methods adopted of utilising it. The "Otto cycle" is still the action used in the main types of either engine, and a brief description of it is necessary.

In the "Otto cycle" there are four consecutive operations gone through in the cylinder of the internal explosion-engine. In the first operation a mixture of gas and air is drawn into the cylinder by the outward stroke of the piston, and during the second it is compressed. At the beginning of the third operation the piston is on the point of moving outwards again, and this is when the charge is fired. In the fourth operation the piston returns and drives the discharged gases out of the cylinder. The cycle of operations then begins again. The action can be briefly described as follows:—In the first forward stroke—admission (1); in the return—compression (2); in the second forward stroke—explosion and expansion (3); and in the return—exhaust (4). In order to accomplish this cycle it is necessary to have four valves. One of these valves admits air into the cylinder, another admits gas, a third exposes the mixture of gas and air to the ignition-tube, and the last allows the products of combustion to escape. The efficiency and the power of the engine depend, amongst other things, on these valves being opened at the proper time. To accomplish this some mechanical device is necessary that will open these valves once only every two revolutions. This is done by means of a countershaft driven by bevel wheels direct from the crankshaft. The ratio of the teeth on the wheels is 2 to 1, so that the countershaft makes one revolution whilst the crank makes two. Cams on this countershaft open and shut the valves at the required times. As there is only one effective stroke every two revolutions, it is obvious that the flywheel must be heavier in proportion than for a steam-engine, in order to keep the speed approximately constant. In modern gas-engines there are generally two flywheels, and for electric-lighting work these need to be massive.

The governor acts either by throttling the supply of gas when the speed becomes excessive or it is a hit-and-miss governor—that is, it cuts off the gas entirely from one explosion when the speed rises above that for which the governor is set.

Owing to the intense heat developed in the cylinder of a gas-engine during the explosion, it is necessary to surround the cylinder with a water-jacket. The initial temperature of the gases in the cylinder after the explosion is between 2,000 and 3,000 deg. Fahr. It is, therefore, not very different from the melting point of cast iron. It is found by experiment that the best working temperature for the water in the jacket is about 150 deg. Fahr.

The method usually adopted to provide this jacket with water is to connect it to a vertical cylindrical water-tank, about 6 ft. high. A pipe connects the top of the water-jacket to the top of the tank, and another pipe connects the bottom of the water-jacket to the bottom of the tank. By this means a circulation of water is kept up round the cylinder of the engine, the hot water flowing upwards to the top of the tank and the cold water at the bottom of the tank flowing into the water-jacket. The tank ought not to be less than 6 ft. high, as the higher the top of the tank is above the cylinder the better is the circulation. For a 20 h.-p. engine about 700 gallons of water should be provided. It must be remembered that the heat absorbed by the water-jacket is at least 50 per cent. greater than that converted into useful work, and this, of course, considerably lowers the efficiency of a gas-engine.

The proper amount of air to be mixed with the gas in order to get the greatest economy is not yet definitely settled. Experiments conducted under the auspices of the Institution of Mechanical Engineers, the results of which were published in 1897, prove that the ratio of the air to gas depends on the amount of compression. The ratio of 10 volumes of air to 1 of gas gave some of the most economical results. When the ratio was reduced to 6 of air to 1 of gas then greater power was obtained, but only at the expense of a higher consumption of gas per indicated horse-power. Unfortunately, the experiments were not sufficiently exhaustive; they show clearly, however, that the maximum efficiency of a gas-engine is not at its maximum load. For

(Continued on page 60.)

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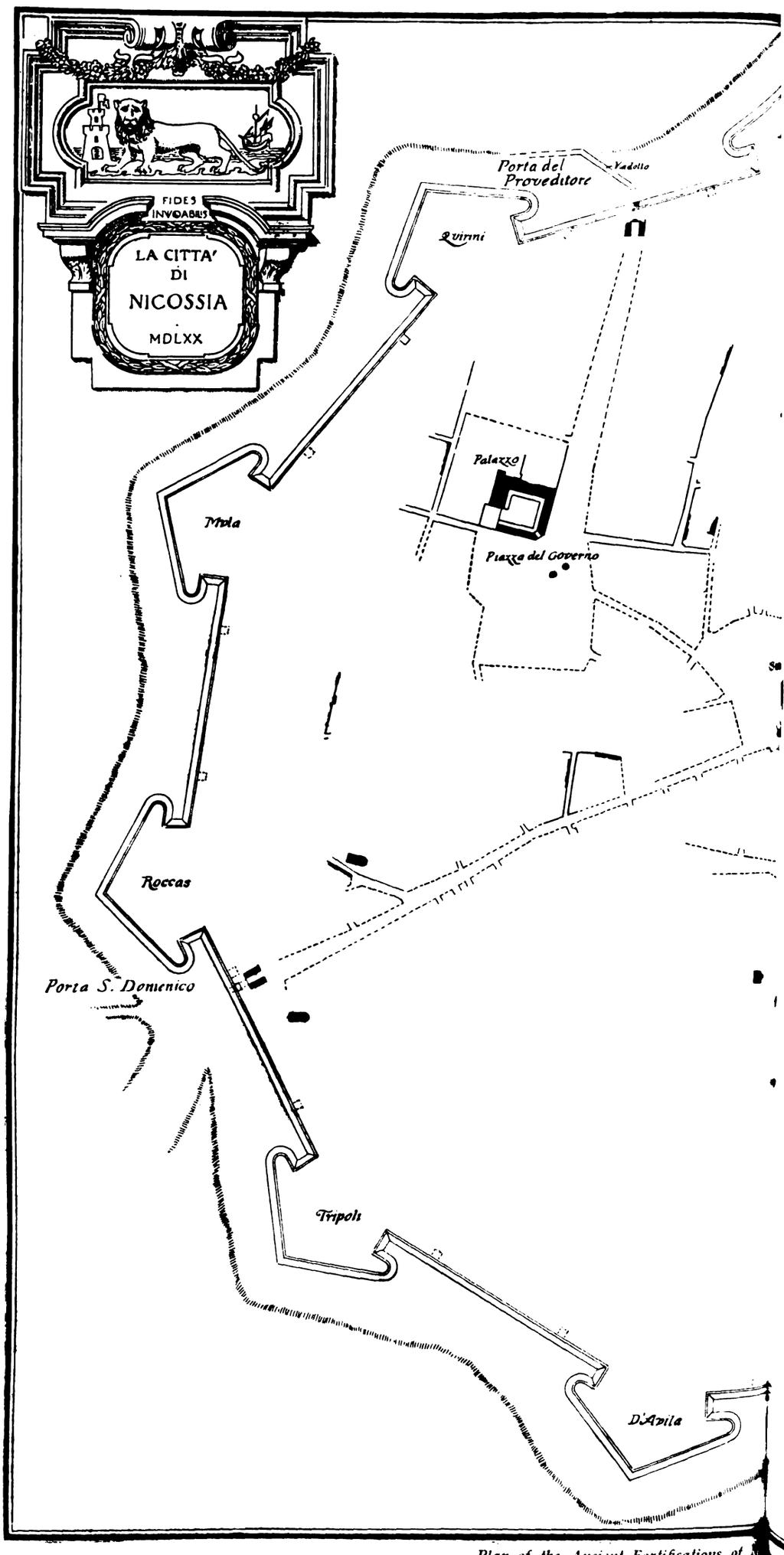

Plan of the Ancient Fortifications of

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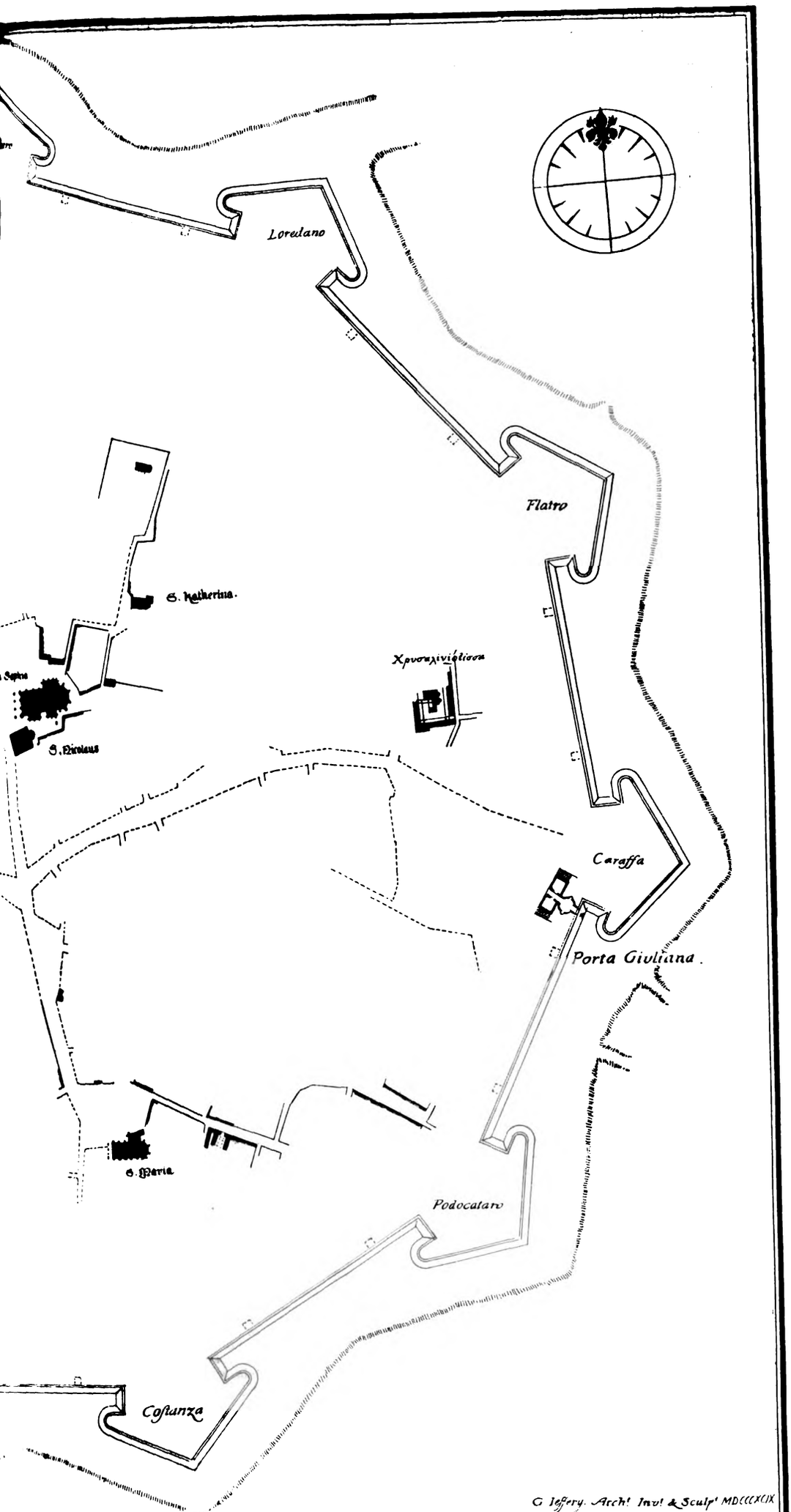

, Cyprus. *(See first article in the present issue.)*

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this reason, then, it is advisable when ordering an engine to specify for one whose power is greater than that actually necessary for the work.

A modern gas-engine of about 20 h.-p. consumes about 20 cubic feet of gas per indicated horse-power per hour. If gas costs 3s. per 1,000 cubic feet, this works out to about ¾d. per horse-power per hour, or, in electrical language, 1d. per Board of Trade unit.

In an oil-engine the explosive mixture consists of oil, vapour, and air. There are two methods used for converting the petroleum into vapour. In the first method the oil is admitted into a vaporiser, which is a strong vessel maintained at a very high temperature. It is there completely converted into vapour before entering the cylinder. In the second method the oil is injected in the form of spray by means of a jet of compressed air into a chamber which is heated by a jacket through which the exhaust gases pass. The temperature is sufficient to convert the spray into vapour. From the hot chamber the vapour mixed with air is drawn into the working cylinder. Once in the cylinder the cycle of operations is the same as for a gas-engine. In some elaborate tests of oil-engines made at Cambridge a few years ago, it was found that an indicated horse-power for an hour could be got by the consumption of a pound of oil. The cost of a brake horse-power hour, that is, the work actually utilised in driving machinery, worked out to about a ½d.

When a gas supply is available, and the price of the gas is not too dear, then a gas-engine is preferable to an oil-engine. The burner to heat the ignition-tube must be lit for about ten minutes before the engine is started. If the gas-engine be 12 h.-p. or under a labourer will be able to give the flywheel the one or two turns necessary to start it. For higher powers a self-starter is necessary. This may be an electric motor, or compressed air may be stored in a steel cylinder and utilised to start the engine. In some gas-engines the explosive mixture is fired by a spark got from an electric igniter operated by dry cells. Occasionally also a gasoline vapour generator is installed with the gas-engine to provide against possible interruptions to the gas supply.

The great drawback to internal explosion-engines for electric lighting is their variable torque, which makes it almost impossible to use them directly for electric lighting, although of course they can always be used to charge accumulators. The fluctuation in speed can be diminished by heavy flywheels, but this does not get over the varying speed due to different loads. A good modern gas-engine ought not to fluctuate more than 5 per cent. in its speeds at all loads. Guarantees are given in catalogues of gas-engine makers of the variation of the speed being not more than 1 or 1½ per cent., but we have never seen published tests on such an engine.

Gas-engines are sometimes used in central stations. In this case they have generally two tandem single-acting cylinders, one long piston-rod running through the ends of both, and the expansion-stroke in one following the compression-stroke in the other. Two pairs of such tandem engines coupled two together with cranks at 90 deg., will give four impulses per revolution, and, theoretically at least, a very steady torque, and plant of this description is being laid down in several stations. At the present time the Westinghouse Company are building gas-engines of very large size for central station work. An engine of 1,500 h.-p. even has been built. They claim that in the Westinghouse engine they can get 1 i.-h.-p. hour with a consumption of only 8 cubic feet of natural gas. They are also showing at Chelsea gas-engines driving dynamos directly and lighting lamps, which burn with no perceptible flicker. These gas-engines are expensive, but they seem a notable advance on anything done hitherto.

Theoretically, the efficiency of an internal explosion-engine is much higher than that of a steam-engine. Carnot proved that if T_2 be the absolute temperature of the working substance and T_1 the temperature of the condenser in an engine, then the maximum amount of the heat supplied that it is possible for the engine to turn into work is $\frac{T_2 - T_1}{T_2}$. In tests made by Professor Kennedy on a gas-engine it was found that T_2 was 2,600 deg. and T_1 570 deg., both temperatures being measured on the air thermometer (2,140 deg. Fahr. and 110 deg. Fahr. respectively). Hence the greatest possible efficiency of this engine is

$$\frac{2{,}600 - 570}{2{,}600} = 78 \text{ per cent.}$$

The actual efficiency—that is the ratio of the work done to the calorific value of the fuel consumed—was found to be 26 per cent. Hence a gas-engine utilises about 33 per cent. of the maximum possible work to be obtained by a theoretically perfect engine working between the temperatures considered.

In a steam-engine T_2 is the temperature of the steam in the boiler and T_1 is the temperature of the condenser. For example, in some tests made on a quadruple-expansion pumping-engine at Pittsburg it was found that the actual efficiency was 23 per cent., which is the highest number yet obtained for a steam-engine. The temperature of the steam was 311 deg. Fahr., and of the condenser 105; the theoretical efficiency is, therefore,

$$\frac{772 - 566}{772} = 26{\cdot}7 \text{ per cent.}$$

Hence this steam-engine utilised over 80 per cent. of the maximum possible work obtainable.

Instead of taking Professor Kennedy's figures, if we had taken Mr. Westinghouse's of 8 cubic feet of gas per indicated horse-power, then this would show that the gas-engine was utilising over 50 per cent. of the maximum possible work obtainable. It will be seen that there is more room for improvement in the heat efficiency of gas-engines than in steam engines.

The following may be taken as average figures, showing what becomes of the heat generated in a gas-engine:—20 per cent. of the heat is converted into indicated work, 37 per cent. is absorbed by the jacket, and the remaining 43 per cent. is lost in the escaping products of combustion.

OBITUARY.

MR. T. M. LOCKWOOD.—We regret to have to record the death, on the 15th inst., of Mr. Thomas Meakin Lockwood, of Chester, an able architect, whose name is known to many of our readers. Mr. Lockwood carried out a great many works in Chester and in various parts of Wales. Among them may be mentioned the Law Courts at Chester Castle; various buildings in Eastgate-row and Budge-street-row, Chester; the restoration of Chester Town Hall, and the Northgate Congregational Church in the same city; the Town Hall, Newport; Municipal Buildings, Oswestry, &c. His design for the Grosvenor Museum and Schools of Art at Chester was illustrated in the *Builder* of August 21, 1886; and his design for a new front to the Chester Free Public Library, exhibited at the Royal Academy in 1888, was illustrated in the *Builder* of the same year. In our issue of August 29, 1885, we published the illustrations of the new Town Hall for Newport (Mon.), designed by Mr. Lockwood in conjunction with Mr. Lansdowne. In the spring of last year Mr. Lockwood was commissioned to conduct and supervise the restoration of Bishop Lloyd's Palace, Chester, erected in the year 1603, and described in the *Builder* of April 29, 1899. As an architect, Mr. Lockwood might be classed among the old school of Gothic revivalists; at all events, his predilections and tendencies were all in favour of Gothic. Mr. Lockwood combined some tastes and capabilities which do not very often go together. On the one hand he was an eminently practical architect in his knowledge of details of work, and proved on one occasion that he might, had he chosen to do so, have successfully practised as a quantity surveyor; on the other hand he was possessed of exceptional literary knowledge, and of considerable talent as a writer. He showed this in an amusing manner on one occasion, when he threw the story of a contested competition, in which some rather odd things had occurred, into the form of a quasi-Biblical narrative, with hits at everybody right and left. It was printed for private circulation, and was as clever and humorous in its way as the "Chaldee Manuscript" which made the reputation of *Blackwood's Magazine* in its early days. Mr. Lockwood, who was seventy at the time of his death, was a Fellow of the Royal Institute of British Architects, having been elected in 1887. We learn from the local papers that he was a Freemason, and took an active interest in the affairs of the Cestrian Lodge.

MR. J. M. MEADE.—Mr. Joseph Michael Meade died suddenly on Saturday last at his residence at Merrion, Dublin. Having built up a large business as a builder and contractor, he became a member of the Corporation in 1886, and continued till his death to sit as alderman for Trinity Ward. He had been chairman of most of the Corporation committees. He represented the Corporation on the Commission which was lately appointed to inquire into the causes of the high death-rate in Dublin. Mr. Meade was elected Lord Mayor of the city in 1891 and again in the following year. In 1892, the year of the tercentenary of Trinity College, he received from the University the honorary degree of LL.D. He was sworn a member of the Privy Council in Ireland in 1893.

MR. R. WHEELER.—We regret to have to record the death on Saturday, the 7th inst., of Mr. Richard Wheeler, of York, clerk of works, in the sixty-eighth year of his age. Mr. Wheeler, who was born at Buckland, Berks, in 1832, had acted as clerk of works on some important buildings—among them Keble College; restoration of Berkhamstead Church; All Saints' Church, Babbacombe; extensive additions to Rugby Schools; restoration of Trumpington Church, Cambridge; new Roman Catholic church and presbytery, Brighton; Examination Hall of the Royal College of Physicians and Surgeons on the Thames Embankment, &c. &c. At the time of his death he was superintending the work at Yorkshire Banking Company's bank at York, and had attended on the building only a few days before his death, though then struggling with the illness which proved fatal to him. His funeral, which took place at Fulford, York, on the 11th inst., was attended, among others, by the managers of the Yorkshire Banking Company, by the architect for the building, Mr. Kitson; and by the contractors, Messrs. Rawlings & Balaby.

GENERAL BUILDING NEWS.

WESLEYAN CHAPEL, BURGESS HILL, SUSSEX.—A new Wesleyan chapel is in course of erection at Burgess Hill at the junction of the London-road and the Royal George-roads. The building, in red brick and Bath-stone dressings, has been designed by Mr. Weir, architect, London, and is being built by Messrs. Norman & Burt, of Burgess Hill, and will seat about 250.

NEW CHURCH, BLAIRGOWRIE.—The First Free Congregation, Blairgowrie, are to erect, at a cost of about 6,000*l*., a new church, according to plans by Messrs. D. & J. R. McMillan, architects, Aberdeen.

IMPROVEMENTS, PARISH CHURCH, CREWKERNE, SOMERSETSHIRE.—Various improvements which have been carried out at this church were dedicated on the 1st inst. Choir-stalls of English oak have been erected in the chancel in place of the old-fashioned pews, which were removed a year or two ago. Four steps of polished Devonshire marble have been substituted for the old stone steps in the chancel and sacrarium, polished Devonshire marble squares have been laid all over the sacrarium, and the chancel has been paved with glazed black, terra-cotta, and other coloured tiles. The work remaining to be done consists of colouring the walls of the sacrarium and the chancel, and the insertion of a plinth for the Holy Table. The completed work was executed by Messrs. Harry Hems & Sons, from plans by Mr. Howard Gaye, of London. The cost will be about 500*l*.

CHURCH, GOOLE.—The Hon. Mrs. Maclagan, wife of the Archbishop of York, laid the foundation-stone on the 12th inst. of a new church for St. Paul's district, Goole. The new building, which at first will consist of nave and aisles only, will give accommodation for 700 adults, and will be built of brick and terra-cotta, with stone piers in the aisles. The cost of the building will be 3,300*l*. The church, which is to be dedicated to St. Paul, consists of nave and aisles, chancel with aisles, the south one being used as an organ-chamber; the vestries are also placed on the south side, and are so arranged that they can be used as a morning chapel if required, and have an apse end. Ample arrangements have been made for entrances and exits, there being doors with porches at each corner of the nave aisles. The nave is separated from the aisles by stone arcades of five arches, the piers being octagon with moulded caps. The chancel arch is of stone, and carried on clustered shafts and moulded corbels. The roofs throughout are open timbered and of pitch-pine unvarnished. The materials intended to be used are red brick, with terra-cotta dressings, the internal arcade being of stone. The architects for the work are Messrs. Brodrick, Lowther, & Walker, of Hull and Bridlington Quay, the general contractors being Messrs. Jackson & Dimberline, of Goole, and the terra-cotta is from Mr. Edwards, of Ruabon.

RESTORATION OF WREXHAM PARISH CHURCH.—At a recent meeting of the executive committee charged with the duty of carrying out the scheme for the reparation of the Wrexham parish church, a detailed report by the architect, Mr. Prothero, on the state of the tower was read. In this it was stated that the whole of the upper part of the tower was in a very bad condition. The architect estimated that at least 3,000*l*. would have to be spent on the tower to put it in a sound condition. The estimate for the restoration of the tower was divided up into sections, and it was agreed that, before orders were given for the execution of the work, the architects should be requested to divide up the work necessary for the repair of the nave of the church, and to give separate estimates for that also. It was decided that the work on the highest part of the tower—the turrets, pinnacles, and parapet—should be at once proceeded with.

METHODIST FREE CHURCH, ASHINGTON, NORTHUMBERLAND.—A United Methodist Free church and Sunday school in the centre of New Hirst, Ashing-

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ton, was opened on the 7th inst. The architect was Mr. Osborne Blythe, of Ashington.

CONGREGATIONAL CHURCH, SWINTON, YORKSHIRE.—Memorial-stones were laid on the 12th inst. of a new Congregational church at Swinton. Messrs. Hemsoll & Paterson, of Sheffield, are the architects.

WESLEYAN CHAPEL, KINGSBURY - EPISCOPI, SOMERSETSHIRE.—The new Wesleyan chapel at Kingsbury-Episcopi was opened on the 5th inst. The new building stands in front of the old chapel (which will now be used for a Sunday school), and is built of Ham Hill stone, with a slate roof. It is 56 ft. long and 46 ft. wide, and will seat 370 persons. Mr. Alexander Lauder, of Barnstaple, was the architect; and Messrs. Yandle & Son, of Martock, were the builders.

CHURCH, BELFAST.—The new parish church of St. Peter, on the Antrim-road, Belfast, was opened on the 29th ult. The building is of Scrabo sandstone, with Giffnock dressings, and a roof of green Westmoreland slates. The church is not yet completed, the finished portion consisting of one bay of the nave, the transepts, and the chancel, the total length being about 70 ft. The chancel is 27 ft. deep by 22 ft. long, and the nave is 28 ft. wide by 50 ft. 6 in. high. Over the communion table is a moulded panel in terra-cotta by Mr. George Tinworth. The architect is Mr. Samuel P. Close, and Messrs. Laverty & Sons are the contractors.

ALTERATIONS, COLEY CHURCH, NEAR HALIFAX.—It is proposed to carry out various alterations at this church at a cost of 1,750*l*. Mr. Hodgson Fowler, of Durham, is the architect.

FREE CHRISTIAN CHURCH, LEICESTER.—The memorial stone of the new Free Christian church on the Narborough-road, Leicester, was laid on the 4th inst. The building will be of brick and terra-cotta. Mr. Charles Kempson is the honorary architect.

CHURCH, ARDROSS, ROSS-SHIRE.—A new church has been erected in the vicinity of Ardross Castle for Mr. Dyson Perrins. The building will seat 400 persons, and was designed by Messrs. Ross and Macbeth. The cost was about 2,000*l*.

BOARD SCHOOL, GLOUCESTER.—The memorial-stone of the Hatherley-road Board school, Gloucester, was laid on the 3rd inst. The school will accommodate 600 boys and girls and 350 infants. The cost will be about 15,000*l*. Mr. Alfred J. Dunn is the architect, and Messrs. John Gurney & Sons are the builders.

BOARD SCHOOL, BITTERNE PARK, SOUTHAMPTON.—The foundation-stone of the new school at Bitterne Park was laid on the 4th inst. The buildings will be so arranged that they can be extended at some future time. They will consist of a two-story building for the boys and girls, and a detached building for the infants. The architect is Mr. J. H. Blizard, and Messrs. Golding & Ansell are the contractors. The contract price was 12,499*l*.

CATHOLIC SCHOOL, HINDLEY GREEN, LANCASHIRE.—The foundation stone of a new Catholic school in Swan-lane, Hindley Green, was laid recently. Messrs. Sinnott & Powell, of Liverpool, are the architects, and Messrs. Howard, of Wigan, are the contractors. The school will accommodate 180 children, and will cost about 1,600*l*.

THE NEW WEST RIDING ASYLUM.—Colonel W. Langton Coke held a Local Government Board inquiry in the Council Offices, Wakefield, on the 3rd inst., into an application by the West Riding County Council for permission to borrow 106,283*l*. for the provision of a lunatic asylum on the Storthes Hall estate. Mr. Vickers Edwards, surveyor, stated that it was intended to construct the asylum in three stages, this loan being for the first stage, which would consist of acute hospital, with cottage homes.

THEATRE, PERTH.—A new theatre is being erected in Perth from designs by Mr. Alexander, of Dundee.

COLD STORES, HUDDERSFIELD.—Cold storage premises in connexion with the Corporation abattoirs at Huddersfield were opened on the 5th inst. The buildings have been erected from the designs of the Borough Engineer, Mr. K. F. Campbell. The refrigerating machinery was supplied by the Linde British Refrigeration Company, Limited. The cost has been about 4,300*l*.

GASWORKS, GLASGOW.—The first sod of the new Provan gasworks was cut on the 4th inst. The engineer is Mr. William Foulis.

CONDITIONING HOUSE, BRADFORD.—The most direct link between the staple trade and the Municipality of Bradford is the Conditioning House, where Bradford's products are officially tested, and it is satisfactory to find that that link, since it was first forged in 1891, has steadily increased in strength. Originally work was started in a building behind the Town Hall, but some years ago large additional premises were taken in Nelson-street. Now the work has completely outgrown the accommodation, and the City Council has decided to build extensive premises on a site in Canal-road and Cape-street. The total cost of the new building will be about 31,000*l*., exclusive of the site. The new building, which has been designed by Mr. Frederick Wild, architect, Bradford, will have frontages to Cape-street and Canal-road, the main entrance being in the former thoroughfare. It will consist of two blocks, connected at the front by the range of offices, and at the back by steel gangways. Between the two blocks a roadway, covered with a glass roof, is provided for. The roadway will be 30 ft. wide, and will be connected with another roadway of the same width leading to the entrance in Canal-road. The frontage to Cape-street measures 177 ft. 10 in., and to Canal-road 212 ft. 3 in. The building will be constructed of stone, with ashlar dressings, and the ground floor up to the first floor windows will be faced with rusticated sandstone. There will be a basement, a ground floor and three upper stories. In depth the building will measure an average of 208 ft., whilst one block will be 88 ft. wide and the other 60 ft. wide. The whole of the Cape-street frontage on the ground and first floors is set aside for offices, which will be reached by entrance doors leading to corridors on either side of the main entrance archway. Ten rooms in all—five on each floor—are provided for office purposes, and there are complete sets of lavatories, &c., for the office staff and also for the workpeople on each floor. The rest of the building consists of warehouse and testing-room accommodation. These are reached by means of stone staircases which are placed on either side of the office entrance. Opening on to the central roadway are eight sets of crane doors, and each block is provided with a hoist from the basement to the top floor. The whole of the doors between the office portion of the building and the warehouse are of iron. On the topmost floor, fronting to Cape-street, is the conditioning-room, the floor of which is fireproof. Light is not particulary needed in the warehouses, but on each floor there are one hundred windows. The new building will have a total floor area of 15,844 square yards, the area of the basement and ground floors being 3,118 square yards each, and of the upper floors 3,216 square yards each. About 11,000 square yards of the floor area will be available for storing and testing tops, wools, nails, waste, yarns, cases, and packages, the balance being occupied by conditioning and testing rooms and offices of various descriptions. At present the Conditioning House has 45 ovens in use; in the new building provision has been made for the installation of 100. A properly-constructed laboratory for the testing of mixed fabrics will be fitted, and there will also be a much improved equipment for scouring and washing in order to obtain the "results" of greasy wools after absolute washing and drying. In the new building many branches of business which now have to be shirked owing to a lack of means for adequately dealing with them will be developed according to the needs of the trade. The contractors for carrying out the works are:—Masons, Henry Birkby & Son, Wyke; carpenter and joiner, Mr. W. G. Bogg; plumber and glazier, Mr. F. W. Higginbotham; plasterers, T. Cordingley & Sons; slaters, T. Nelson & Sons; painter, Mr. W. Townson; and iron-founders, Roberts & Co., Ltd.—*Bradford Observer.*

THE ERECTION OF ARTISANS AND LABOURERS' DWELLINGS, DUBLIN.—The Artisans' Dwellings Committee of the Corporation have at length announced that they are prepared to receive tenders for the erection of a considerable number of residences of this class in the Bride's-alley area. The plans, specifications, and conditions have been for some time prepared by the City Architect, Mr. Charles J. MacCarthy, C.E. The erection of these artisans and labourers' dwellings on what is known as the first section to be dealt with will be at once taken up. This section will include seventy-two residences, made up of two-room and three-room dwellings. Meanwhile, pending the acceptance of tenders for the work, the Corporation are proceeding with the formation of the foundations for the remaining two sections. It is calculated that the first section will be completed within twelve months from this time, affording accommodation to some 360 persons, counting five to a family. Over the entire area it is intended to erect 198 buildings, which will decently house close on 1,000 persons, who have been for years huddled together in wretched tenement rooms without any sanitary provision in this neglected quarter.—*Irish Times.*

POST OFFICE, LANARK.—The newly-erected post-office at the Cross, Lanark, was opened on the 2nd inst. The company present at the opening were shown over the building by Mr. Charles White, Assistant Surveyor, Edinburgh General Post Office. The contractors were as follows:—Mason work, Messrs. Dunlop & Ryley; joinery, Mr. D. Purdie; slating and plastering, Mr. John Glaister; and plumbing, Mr. Jas. Wood.

PAVILION, BRAMALL LANE CRICKET GROUND, SHEFFIELD.—The pavilion at this ground is to be rebuilt from plans by Mr. A. E. Turnell, architect, of Sheffield.

RACECOURSE, RIPON.—A corner stone of the grand stand on the new racecourse at Ripon was laid on the 30th ult. Messrs. Mangnall & Littlewood, of Manchester, are the architects.

BUSINESS PREMISES, ABERDEEN.—New premises for Messrs. John M. Henderson & Co., hoisting and transporting machinery makers, are being erected at the west end of King-street-place, Aberdeen. The architects are Messrs. Brown & Watt; the contractors being—masonry, Messrs. Fordyce & Co.; carpentry, Messrs. Watt & Clark; and slating, Mr. Alexander Murray.

HOTEL, SHERINGHAM, NORFOLK.—Burlington Mansion, a new hotel situated on the Esplanade at Sheringham, was opened recently. The building is four stories high, and will accommodate seventy persons. Mr. A. C. Havers, of Norwich, was the architect, and Mr. G. Riches, of Cromer, the builder. The parquetry oak flooring of the dining-hall and smoking-room was laid by Messrs. Ebner, of London. The stained glass was carried out by Messrs. Weyer, of Norwich. The luggage lift was supplied by Messrs. Archibald Smith & Stevens, of London. The gas-fittings and electric-bells were supplied by Mr. R. A. Pank, Great Yarmouth; the baths, hot-water pipes, and gas-cookers by Messrs. C. Payne & Co., Norwich; and the plumbing was executed by Messrs. Watson & Kirby, of Norwich. Messrs. J. Tylor & Sons, of London, supplied various fittings.

OPENING OF WILLESDEN NEW COURT-HOUSE.—This building, which takes the place of the old Harlesden Court-house, was opened on the 5th inst. The elevation of the building, which harmonises with the adjoining building, the Harlesden Constitutional Club, is of red bricks and stone dressing, a porch leading to the two courts, which are right and left. There are special rooms included in the plan for the magistrates, chief clerk, warrant officer, solicitors, and witnesses; whilst a special feature included in the arrangements of the new court-house are quarters for the County Council's Inspector under the Adulteration of Food and Weights and Measures Acts. The architect of the building is Mr. Wakelam, Surveyor and Engineer to the Middlesex County Council; and the contractors Messrs. Cowley & Drake, of Willesden; the Council's clerk of works being Mr. Burt.

ENTRANCE PORCH, MERCHANT SEAMEN'S ORPHAN ASYLUM, SNARESBROOK, ESSEX.—On the 13th inst. the foundation stone and pillars of the entrance-porch to this asylum were replaced by two new Portland stone bases and two columns of Aberdeen granite. The Portland stone bases were presented by the architect to the Institute, Mr. A. Mitchell, the work being contributed by Messrs. Colls, of London. One of the stones which were removed was the foundation stone laid by the Prince Consort in 1861, the mallet used at the recent ceremony being that used at the original stone laying.

SANITARY AND ENGINEERING NEWS.

NEW RESERVOIR FOR THE TEES VALLEY.—At a meeting of the Tees Valley Water Board, held at Middlesbrough on the 6th inst., an offer by Mr. John Scott, of Cotherstone, contractor, to do the excavating, &c., for the new Grassholme Reservoir, for the sum of 384,499*l*. 14s. 1d., was accepted. An amendment to offer the work for tender to a number of selected contractors was lost.

SANITARY IMPROVEMENTS, LURGAN, CO. ARMAGH.—Mr. P. C. Cowan, Chief Engineering Inspector to the Local Government Board, held an inquiry at Lurgan recently into an application by the Urban District Council for sanction to the following loans:—400*l*. for purchase of a steam roller, 80*l*. for purchase of a road scarifier, 350*l*. for sewerage works, 1,000*l*. for the erection of an abattoir, and 725*l*. for paving works. Evidence in support of the application was given by Mr. H. Shillington, the Town Surveyor.

SEWERAGE WORKS, &C., CHICHESTER.—Major-General H. D. Crozier, R.E., an inspector to the Local Government Board, held an inquiry at the Council Chamber, Chichester, on the 11th inst., into an application by the City Council for sanction to borrow 1,000*l*. for works of sewerage and improvements works in certain roads. The City Surveyor, Mr. J. J. Saunders, gave particulars of the scheme.

DRAINAGE SCHEME, &C, MIDDLESBROUGH.—On the 11th inst. Colonel A. G. Durnford, R.E., Local Government Board Inspector, held an inquiry at the Municipal Buildings, Middlesbrough, into an application by the Corporation for powers to borrow 17,800*l*. for laying a new sewer along Snowdon-road, and 5,310*l*. for paving a portion of Cannon-street. Mr. Frank Baker, the Borough Engineer, explained the scheme.

SEWERAGE SCHEME, HAWARDEN.—Mr. H. H. Law, M.Inst.C.E., Local Government Board Inspector, held an inquiry on the 10th inst. at Hawarden into the application by the Rural District Council of Hawarden to constitute a special drainage district comprising part of the parish of Hawarden and part of the township of Saltney, and to borrow 15,000*l*. for purposes of sewage disposal. Mr. H. Enfield Taylor, C.E., described the scheme.

SEWERAGE SCHEME, PONTCANNA, GLAMORGANSHIRE.—The pumping-house at Maindy, in connexion with the sewerage scheme for Pontcanna, was opened on the 5th inst. The system will drain Llandaff, Fairwater Grove, and Pontcanna, the Pontcanna part of the scheme having been completed. The contractor is Mr. E. H. Page, of Cardiff. Mr. Frazer is the engineer.

WATER-SUPPLY, BARRY, GLAMORGANSHIRE.—The work of sinking an additional well at Biglis, in connexion with Barry's water-supply is nearing completion. The well is 40 ft. to the bottom of the sump, and is 11 ft. in diameter. A new engine and pumping-house has been erected, and the cost has been about 6,000*l*. The work is being carried out from plans by, and under the superintendence of

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Mr. E. W. Waite, the water engineer to the Barry District Council. Messrs. J. H. Vickers & Co., of Nottingham, are the contractors.

STAINED GLASS AND DECORATION.

STAINED-GLASS MEMORIAL WINDOW, ST ANDREW'S CHURCH, HINGHAM, NORFOLK. — A stained-glass memorial window has been placed at the east end of the north aisle of St. Andrew's Church. The subject is the Feeding of the Five Thousand, and underneath is placed a brass bearing an inscription. The work was carried out by Messrs. Heaton, Butler, & Bayne, of London.

MEMORIAL WINDOW, PARISH CHURCH, ECCLESMACHAN, LINLITHGOWSHIRE. — A stained-glass window in memory of the late Rev. George Douglas Shepherd has been placed in Ecclesmachan parish church. It was executed by Messrs. Ballantine, of Edinburgh.

FOREIGN.

FRANCE.—The "Union Syndicale des Architectes" has addressed a petition to the Ministers of Commerce and of "Instruction Publique" in favour of assuring to architects the artistic property in their designs.——The Gustave Moreau Museum, in the house of the late artist, 14, Rue Larochefoucault, Paris, is now open to the public.——M. Injalbert, the sculptor, has just completed his model of the monument to be erected on the Place de la Sorbonne, to the memory of Auguste Comte. It consists of a bust of Comte on a pedestal of Louis XV. style, beside which a seated figure of a man represents the Genius of Study, and a standing figure of a woman, with an infant in her arms, symbolises Humanity. The monument is to be carried out in bronze and marble.——The Department of "Travaux Publiques" is considering a petition in favour of the construction of a navigable canal between Epinay and Neuilly-Plaisance, with the object of avoiding the inundations in the communes bordering on the Seine.——The ninth annual Congress of the Société Nationale des Architectes de France will hold its public exhibition at the Hôtel des Chambres Syndicales, on the Sundays of September 2 and 9.——The jury in the competition opened by the Municipality of Honfleur for the rebuilding of the hospital of that town, has placed first the plans of M. Ruel, of Rouen; M. Lequeux, of Rouen, obtains the second place, and M. Brien, of Honfleur, the third.——M. Albert Besnard has just completed a fine set of mural paintings for the chapel of the Franciscans, at the Hospital at Berck-sur-Mer.——The French Parliament is considering a scheme relating to the formation of a canal to unite Marseilles by water communication with Lyons. The cost of this canal, which would be 378 kilomètres in length, is estimated at 91,400,000 francs, and, in view of the necessity of tunnelling under the Rove, the work would probably occupy from eight to ten years.

MISCELLANEOUS.

PROPOSED UNDERGROUND TELEPHONE SYSTEM, ABERDEEN. — The National Telephone Company have applied to Aberdeen Town Council for wayleave for the purpose of laying down underground wires at a cost of about 40,000*l.* It was represented that similar facilities had been granted in Edinburgh last year. Consideration of the Aberdeen application has been postponed.

CATTLE MARKET, CHESTERFIELD.—The new cattle market which the Chesterfield Corporation has laid out was opened on the 5th inst. The market is situated between the bottom of the Market-place and the East to West Railway, and covers an area of two acres. The entrance is in Queen's Park-road. There are the usual pens, and accommodation for weighing, sales, &c. The work was carried out by the Corporation's workmen under the supervision of Mr. Nicholas. The cost was 4,000*l.*

OPEN SPACES.—It is stated that the congregation of Lyndhurst-road Church, Hampstead, provided funds for the laying out of the disused burial-ground —opened a few days ago—appertaining to the old Congregational chapel in Collier's-rents, White-street, Southwark.—Mr. T. E. Knightley is appointed honorary surveyor to the committee, of which Mr. C. E. Tritton, M.P., is chairman, for securing the addition of about 43 acres to Brockwell Park, Herne-hill and Brixton, at a total cost, including legal and other expenses, of 65,000*l.* The sum asked for the land by the Blackburn Estate trustees, as vendors, is 63,750*l.*, towards which amount subscriptions are made by the Lambeth Vestry, 20,000*l.*; Camberwell Vestry, 6,000*l.*; Newington Vestry, 1,500*l.*; London County Council, 30,000*l.*; the Ecclesiastical Commissioners, 1,000*l.*; the City Parochial Charities Trustees, 1,000*l.*; and an anonymous donor, 1,000*l.* The Committee anticipate that the Vestries of Camberwell and St. George, Southwark, will adopt the recent recommendations of their respective General Purposes Committees to make additional grants of 2,000*l.* and 1,000*l.*, so that a balance of 1,500*l.* only would be needed. When the property is finally acquired its freehold will be vested in the London County Council.—The graveyard of Christ Church, Blackfriars-road, was opened to the public on June 16, having been laid out by the Metropolitan Public Gardens Association, who have also begun to lay out the churchyard of St. Mary, Plaistow, and have undertaken to help in dealing similarly with the churchyard of St. Giles', Camberwell, and the burial-ground of St. Bartholomew's Hospital, on the south side of Seward-street, Goswell-road (latterly used as a stable-yard), in conjunction with St. Luke's Vestry and the London County Council; Marian-square, Hackney-road, the Bethnal Green Vestry having offered to maintain the ground; Albert-square, Commercial-road; Bedford-square and Sydney-square, Stepney; and sites at Sumner-road, Camberwell, and Shadwell, when their transfer to the several Local Authorities shall have been completed.—The new recreation-ground, nearly one acre and a half, at Grace and St. Leonard's streets, Bromley-by-Bow, was acquired for 6,000*l.* by the London County Council, and has been laid out as a garden with shelters and a band-stand, and two separate gymnasiums for boys and girls. The ground was cleared by the demolition of Tudor House, of which the handsome staircase, the main doorway, the gate and railings, and other fittings have been removed to Victoria Park. Tudor House, erected in William III.'s reign, had been included in the Council's Register of Historical Buildings—see also the *Builder* of May 13-20, 1899. On the right-hand side of the chief entrance into the garden are set up some of the stones of Northumberland House, Charing Cross—pulled down 1877-8 by the late Metropolitan Board of Works — and against one of the boundary walls is built up some of the vaulting from the arch of the water-gate of that house. The garden was laid out at a total cost of 2,780*l.* from the designs of Lieutenant-Colonel Sexby, chief officer of the Parks Department, L.C.C.

CORPORATION CONTRACTS AT CARDIFF.—At a joint meeting of the Public Works and Town Hall Committee, Cardiff, on the 11th inst., the proposal to insert a lock-out clause in Corporation contracts was discussed. At a meeting of the Corporation on the previous Monday a deputation from the united building trades attended, and a succession of speakers protested from the men's standpoint against the introduction of a lock-out clause. An explanatory letter was now read from Mr. D. W. Davies (Secretary of the Master Builders' Association), in which he urged that, from the reports in the Press and the expression of opinion by individuals, there was a considerable amount of misapprehension prevailing as to the desire of his Association in the matter. He wished to say that the words used by him in his letter of May last expressed the sincere intention of his Association without any ulterior motive whatever, and the words used in that letter confining the scope of the lock-out clause to the borough of Cardiff did not admit of the external interference of any body other than those who had mutually agreed upon the rules now governing his Association and all other trades in the borough of Cardiff.—In subsequent discussion Mr. Crossman opposed *in toto* the insertion of a lock-out clause. He would not agree to a clause, however it might be worded, under which the men would have no opportunity of protecting themselves.—Mr. Veall believed the London County Council had such a clause in their contracts, and that the trades-unionists did not object.—Alderman David Jones was in favour of a protective clause, under which men could not be locked out in respect of any dispute outside the borough. There never had been a lock-out of all sections for the sake of one.—Mr. Mildon contended that the lock-out clause should not apply to any trade other than those causing the dispute.—The Deputy Mayor said it seemed that a lock-out was a protection for the masters, and that a strike was what the men considered to be their protection.—Mr. Crossman replied that that was not so. The strike clause protected the employer from the time of the strike.—Alderman Ramsdale (Chairman) was in favour of a qualifying clause under which one section should not suffer through the action of another.—Mr. R. Hughes seconded Mr. Crossman's proposal against a lock-out, on the ground that, as masters and men already had printed rules and regulations, it was unfair at this juncture to interfere.—The Town Clerk explained that in all precedents he had looked up, the word "lock-out" appeared.—The Deputy Mayor favoured the appointment of a sub-committee, and Mr. Veall suggested that the committee ascertain what was done in other towns. Eventually the proceedings were adjourned pending information from other sources.

ELECTRIC LIGHTING, &C., MANCHESTER.—On the 12th inst., at the Manchester Town Hall, Mr. H. H. Law, Local Government Board Inspector, held an inquiry relative to an application by the Corporation for sanction to borrow 189,890*l.* for purposes of electric lighting, and 3,520*l.* for the purchase of land for purposes of pleasure-grounds. Mr. Hudson, Deputy Town Clerk, explained that the sum which it was sought to borrow for electric-lighting purposes formed part of an amount of 500,000*l.*, which it was decided by the Council in March, 1899, to apply for. The buildings and plant in respect of which the present expenditure was proposed would be erected upon a plot of land bounded by Bloom-street, Windsor-street, the Rochdale Canal, and a branch arm of that canal. It was stated that it was proposed to construct a new generating-station on the land, the present station in Dickinson-street having been found inadequate. Evidence was given also by Mr. C. H. Wordingham, Electrical Engineer to the Corporation, and Mr. J. H. Andrews, architect and surveyor. In connexion with the second part of the inquiry, Mr. Hudson explained that it was for the purchase of land in Chorlton-upon-Medlock, to be used as a recreation-ground.

THE HANGING BRIDGE, MANCHESTER.—A deputation of Manchester citizens interested in the preservation of the Hanging Bridge, which has in part been laid bare by the removal of property near the Cathedral, waited upon the Improvement Committee of the Manchester Corporation on the 11th inst. Those who attended included the Dean of Manchester (Dr. Maclure), Mr. Herbert Philips, Mr. E. J. Broadfield, Dr. Broadbent, Mr. F. H. Oldham (President of the Manchester Society of Architects), Mr. Medland Taylor, Mr. J. J. Phelps, and Mr. T. Swindells. The Dean, in introducing the deputation, said that the Hanging Bridge, which possessed so great an antiquarian interest, should be preserved and exposed to the public view. Mr. Broadfield, Dr. Broadbent, Mr. Herbert Philips, and Mr. Swindells also addressed the Committee, and it was urged, in addition to the request that the bridge might be preserved to the public, that Minshull House, which stands upon a portion of the bridge, should be removed, so that the whole of the ancient structure might be made visible. In reply to the deputation, the Chairman assured them that there would be no precipitate action in the matter. Every opportunity would be given to those interested and to the public generally to ascertain whether some means could be adopted of retaining the bridge and keeping it for public inspection. It was possible, he suggested, that Manchester as a community might be disposed to find the money necessary to secure the object which the deputation had in view. Later in the day the Improvement Committee inspected the bridge and the site.

WINTER GARDEN, CHELTENHAM.—The Corporation of Cheltenham are about to reglaze the whole of their winter-garden roof. Messrs Helliwell's system of glazing, with steel bars and copper caps, will be employed.

SHADWELL FISH MARKET.—At their meeting on Thursday, last week, the Court of Common Council resolved to carry out the purchase from the London Riverside Fish Market Company of the fish market at Shadwell. The area covered by the sale extends over 331,700 ft. superficial, and the purchase money is reduced from 210,000*l.* to 175,000*l.*, to be payable in Corporation 2½ per cent. stock at par.

IMPROVEMENTS AT MARGATE.—The Select Committee of the House of Commons, presided over by Colonel Gunter, considered last week the Omnibus Bill promoted by the Margate Corporation which has been passed by the House of Lords, where, however, the measure was curtailed by the omission of proposals relating to the local water supply and the acquisition of the pier and harbour undertaking with the construction of new works. The Bill, as it now stands, is virtually unopposed; it provides for a cliff promenade and drive at Westbrook, which, with the new road on the Bridewell Hospital estate, will extend half the way to Westgate, a similar road, 85 ft. wide, extending along about one mile and a half of the sea-front between the parade, at Duke-street, and the Clifton Baths, for reclaiming certain lands from the sea, and constructing various retaining walls on the foreshore.

PUBLIC IMPROVEMENTS, BRIGHTON. — Colonel C. H. Luard, an inspector to the Local Government Board, held an inquiry in the Town Hall, Brighton, on the 10th inst., into applications by the Town Council for sanction to borrow 24,625*l.* for the purchase of land for public walks, pleasure grounds, and of allotments, and 15,523*l.* for street improvements. It was stated that the land proposed to be purchased was situated on the east side of Ditchling-road, in the parish of Patcham, and consisted of 180 acres. The street improvements loan was for wood paving in St. James-street, and the purchase of property for the widening of London-road. The inquiry was attended by Mr. F. J. C. May, the Borough Surveyor.

NORTH STAFFORDSHIRE AND DISTRICT MASTER BUILDERS.—The annual outing promoted by the North Staffordshire and District Branch of the National Builders' Association took place recently to the Lakes. The party left Stoke on the 5th inst. at 7.25, and when the Lake Side Station at Windermere was reached at noon, the journey having been via Carnforth and the Grange-over-Sands route, a company of 225 ladies and gentlemen took lunch at the Lake Side Hotel. After lunch a special saloon steamer was ready to convey the party the whole length of the lake to Ambleside, a distance of some twelve miles. Arrived at Ambleside, carriages were in waiting to convey the party a circular drive of twelve miles. The way taken was by Clappersgate to Skelwith, by Loughrigg Tarn, High Close, Red Bank, Grasmere, Rydal, back to Ambleside. On the drive being completed, the members sat down to dinner at the Queen's Hotel, Ambleside. Before the company separated, Mr. Councillor W. Cartledge, of Burslem, moved a vote of thanks to Mr. Bowden for his arrangements. Mr. George Wade, of Burslem, seconded the motion,

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and it was heartily carried. Mr. Bowden expressed his great delight at the success of the outing and for the manner in which the motion had been made and received. The North Stafford train was awaiting the party at Lake Side. The return journey was started at seven o'clock, and Stoke was reached at half-past eleven.

THE INSTITUTE OF SANITARY ENGINEERS (INCORPORATED).—At a meeting of the Election Committee held on the 11th inst. the following gentlemen were elected:—Members — C. B. Burnett, Sandhurst; A. Timberlake, Kings Langley. Associate—W. J. D. Rudman, Bristol.

EMPLOYMENT IN THE BUILDING TRADES DURING JUNE.—The *Labour Gazette* states that employment in the building trades remained good during June. The percentage of unemployed union members among carpenters and plumbers at the end of the month was 2·0 compared with 1·9 in May, and 1·5 per cent. in June, 1899. During the month ten disputes commenced; four have been settled, but no settlements are reported of the remaining six. Six of the disputes were in England, and four in Scotland. The disputes which have been settled were all in England.

BUILDING TRADES' GIFT TO THE NATION.—In connexion with Princess Christian's Homes of Rest for Discharged Soldiers and Sailors now in course of erection at Bisley, the Queen has been pleased to endow two beds, the Duke and Duchess of York endow one bed for a soldier or sailor, the Princess Christian of Schleswig-Holstein one bed for the King's Royal Rifles, and Princess Victoria of Schleswig-Holstein and Princess Aribert of Anhalt a bed for a "Greenjacket."

CAPITAL AND LABOUR.

BRICKLAYERS' STRIKE AT IPSWICH.—A dispute in the building trade at Ipswich has culminated in a strike. The operative bricklayers some time ago asked that wages should be increased from 7d. to 8d. per hour. After some correspondence with the Ipswich Building Trades' Association, the masters offered a ½d. rise from July 1 and a further ½d. from March 25 next. This offer was coupled with a stipulation that there should be no alteration of rules, and that the terms should be binding for three years. The men, while agreeing to the proposed wage, stuck out for an alteration in the rules, and eventually stopped work. About 100 bricklayers and a large number of labourers are now out on strike. It is stated that some of the builders are prepared to sign the rules.

DUNDEE JOINERS AND THEIR WAGES. — The operative joiners of Dundee have considered the decision of the employers to reduce the wages by ¼d. per hour at the beginning of August. They have decided to resist any effort at a reduction, by a strike if necessary, but have asked the employers to agree to a conference before their decision is put in force.

TERMINATION OF THE TAUNTON STRIKE.—The strike among the carpenters and bricklayers of Taunton has been settled, after having lasted fifteen weeks. They came out on a demand for a rise of a penny an hour, with a code of working rules, and now they have accepted the masters' terms of a halfpenny an hour rise, to take place at once, and a further rise of a halfpenny an hour in the first week of June next.

LEGAL.

A KENDAL ARCHITECT'S CLAIM FOR WORK DONE.

AT the Lancaster Assizes on the 9th inst., before Mr. Justice Channell, Mr. John Hutton, architect and surveyor, Kendal, sought to recover 147*l.* for professional work done for Leonard Chorley, licence holder, of Sedbergh. Mr. Pickford, Q.C., M.P., and Mr. J. T. Sanderson appeared for the plaintiff; and Mr. Shee, Q.C., and Mr. Cavanagh represented the defendant, who entered a counter-claim for 25*l.*

The defendant disputed the claim on the ground that the work done was unsatisfactory, owing to want of skill and negligence on the part of the plaintiff. The defendant's counter-claim was for loss during the season by the work not having been done properly and the contract completed.

The Judge held that the defendant could not legally recover on that ground, as an architect was not a guarantor but an advisor, and was not expected to guarantee when certain work would be completed.

The jury found a verdict for the plaintiff for 118*l.* 11*s.* 3*d.* They dismissed the counter-claim.

SANITARY WORK AND COST TO OWNER.

AT the Clerkenwell County Court, before his Honour Judge Edge, the case of G. Cox, builder and sanitary engineer, Holloway-road, N., *v.* J. W. Beer, Yerbury-road, Holloway, was heard. Plaintiff's claim was for 9*l.* 8*s.* for work executed.

Mr. Gerrish appeared for the plaintiff, and Mr. Burnard represented the defendant, who had entered a counter-claim for 6*l.* 10*s.* damage to tiles which had not been re-laid and for missing tiles which the plaintiff had broken. The question of the value of the work which had been done by the plaintiff had been referred by the Judge to an expert of the Court, and he had valued the work at 30*l.* 1*s.*, but as the plaintiff's claim was only 32*l.* 18*s.* he would give judgment for the latter amount. He did not expect a report to the last shilling, and if the plaintiff charged a moderate amount he gave him judgment for his full claim.

Mr. Burnard said as the plaintiff was suing under a contract, he relied upon the estimate or contract where the plaintiff agreed to do the work at a cost of about 20*l.* The plaintiff's contention was that certain work was required to be done in pursuance of the sanitary inspector's notice. But the defendant gave no instructions whatever for extra work.

The Judge said that the sanitary inspector had no authority to order them to lay a single stone. He had seen some very hard cases in that Court, where sanitary inspectors had landed owners in an enormous expense without a single reference to them; and he looked upon their action with the gravest suspicion, and where the work had been done without bringing it to the notice of the owners he should disallow all costs. They might take that as a notice from him, and he intended to act upon it. A sanitary inspector had no authority to sign those directions.

In cross-examination by Mr. Burnard, the plaintiff denied that his men deliberately broke up the water-closets in order to make a job.

By the Judge: He had never paid any commission to any sanitary inspector. He had not made him presents in kind, or to his wife or any member of his family.

The Judge: I should be glad to hear that that was universal.

Defendant, on being called, said the plaintiff agreed to do the work at a cost of 20*l.*, witness telling him to do what the sanitary authorities required and nothing more. Witness paid 23*l.* 10*s.* altogether, and that was what he agreed to pay.

The Judge, in giving his decision, said with regard to the sanitary inspector's requirements he would strongly advise builders who had given estimates, but had not entered into binding contracts, when they found the work was likely to cost 50 per cent. more, should communicate with their customers in writing, so that they might approve of the matter. He would scrutinise all those cases very carefully, and the inspectors, if they found that some work had become necessary, which was not pointed out in the notice served, ought to serve a subsequent notice, calling attention to the requirements, and that ought to be served upon the owner. Otherwise owners of property would find themselves involved in a great expense. He gave a verdict for the plaintiff with ordinary costs, and for the defendant on the counter claim for 15*s.* without costs.

A LANCASTER BUILDER'S SUCCESSFUL CLAIM.

THE business of the Lancaster Assizes was concluded on the 11th inst., the only case for trial being one in which a builder named Robert Thompson, of Dalton-square, Lancaster, claimed 122*l.* from Frederick Wolfenden, a wine and spirit merchant of the same town, as damages for breach of agreement.

The plaintiff alleged that in 1896 he sold a portion of the old infirmary to the defendant on condition that he was given the work of executing any alterations which were carried out. The defendant subsequently built an hotel on the site, but did not accept plaintiff's tender, and in his behalf it was now submitted that the alterations he contemplated at the time of the agreement only comprised the fitting-up of the ground floor for his brewery plant.

The jury found a verdict for the plaintiff for the full amount.—*Yorkshire Post.*

WHAT IS A PUBLIC BUILDING?

AT the Lambeth Police-court on Tuesday afternoon Mr. Hopkins decided a case which raised an important point under the London Building Act.

Mr. Priestman Moses, a builder, of Old Kent-road, was summoned by Mr. Ellis Marsland, District Surveyor for Camberwell, for failing to comply with a notice of irregularity served upon him in connexion with some work which he is carrying out at Elmgrove, Rye-lane, Peckham, for the Metropolitan Asylums Board.

Mr. Herbert Smith said he was instructed by the Asylums Board to appear for the defendant. The question raised by the summons was a very important one, and should his Worship decide against him he was instructed to ask him to state a special case.

Mr. Ellis Marsland said he had summoned the defendant for failing to comply with Sections 70 and 68 of the Act. The point was whether this was a public building or not. On April 7 he received a notice from the defendant with regard to certain alterations at No. 16, Elm-grove, Peckham. The notice set out that the defendant was about to make certain alterations to a private dwelling-house, and convert the same into a public building for the Metropolitan Asylums Board, and intended to be used for the reception of defective children. He subsequently received a copy of the drawings. He discovered that it was proposed to make considerable additions to the house, and to adapt it for the accommodation of defective pauper children. It was proposed to retain the existing wooden staircase instead of substituting a fire-resisting one, and he also found that some of the rooms were not of the proper height. He pointed that out to the defendant and served the notice produced upon him. As the defendant objected to do what he required, he asked the defendant to take the matter before the Tribunal of Appeal. That was not done, and he served the defendant with a notice to amend the work so soon as it was sufficiently advanced to enable him to do so.

Mr. Herbert Smith remarked that the London County Council had been communicated with in regard to the matter, and had replied that they took the same view as the Asylums Board.

Mr. Marsland, demurring, said the question was whether this was the conversion of a private into a public building. The defendant admitted that it was, but his employers said it was not. It was a building bought by a public body with public money, and adapted for the use of defective pauper children. He was of opinion that if a fire occurred at night it would be a death-trap. The plans certainly showed on one side a fire staircase, but on the other side the children would possibly have to pass down a burning staircase.

Mr. Herbert Smith took exception to that expression of opinion.

Mr. Hopkins: About the law?

Mr. Herbert Smith remarked that under an order made by the Local Government Board the Asylums Board were required to undertake the care of a particular class of children. A special sub-committee was appointed to inquire into the best way of dealing with such children, and it was determined to buy a number of private dwelling-houses, each providing accommodation for twelve or thirteen children, and to send the children to neighbouring Board schools. This house was bought for that purpose, and eminent architects were called in to adapt it for that use. A fire escape had been provided outside, so that there was absolutely no risk to the children. He maintained that this did not come under the definition of a public building.

Mr. Hopkins reminded the learned counsel of the terms of the notice given by the defendant.

Mr. Herbert Smith argued that the notice given by the builder could not make this a public building

Mr. Hopkins: The only persons I am dealing with are Mr. Marsland on the one hand and the builder on the other.

Mr. Herbert Smith admitted that he had not heard of the notice given by the defendant until now.

Mr. Hopkins: How are you going to get over the fact that this is a building converted from a dwelling-house into a building used by the Asylums Board for its own purposes?

Mr. Herbert Smith said that was not sufficient. He had a case upon that point. It was contended that the ambulance buildings of the Board were public buildings, but the Divisional Court held on a special case that that was not so.

Mr. Hopkins: I am afraid you will have to take your case.

Mr. Herbert Smith: Very well, sir. Proceeding, the learned counsel said there was one further point he wished to make. The Asylums Board sent to the London County Council to ask their opinion, and they said they were of opinion that the case did not come under the Act.

Mr. Marsland: It is not quite correct to say the County Council take that view. It is only the Building Act Committee that take that view.

Mr. Herbert Smith said the Asylums Board felt that they could not incur this large expense. Their architect was a very experienced man in these matters.

Mr. Hopkins: I don't want to raise any question as to which is the most effective way of doing it. I want to stick to the law

Mr. Herbert Smith said he was bound to admit that if this was a public building the District Surveyor was entitled to lay down his requirements. If his Worship would look at the drawings he would see that this was simply a dwelling-house, in which the children would live as they would do in any other private house. It was not a public building in any sense. The position the Board took up here was that in regard to this dwelling-house they were in the same position as a private owner. This was really an experiment in the direction of keeping children in small numbers.

Mr. W. H. Jarrett, a clerk in the service of the Asylums Board, stated that on April 2, 1897, the Local Government Board made an order giving the Asylums Board the control of children of defective intellect or physical infirmity. The Asylums Board considered the best way of dealing with such children would be to buy houses in different parts of London near the centres where the School Board had special schools, where instruction was provided for such children. In pursuance of that conclusion they bought the house 16, Elm-grove, which was being altered so that twelve children could be boarded there. Those children would simply board in the house, and would be sent for their education to the Board schools. There

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would be nothing in the way of hospital treatment at the house, and in no sense, beyond the fact that it was the property of the Asylums Board, would it be a public building. There would be a matron, cook, and housemaid living upon the premises to look after the children, who would live exactly as they would do with their parents at home.

Mr. Charles Henman, architect, said he was instructed by the Asylums Board to carry out the alterations to this house. The accommodation was limited at the outside to fourteen persons. An outside iron staircase was provided in case it should be needed.

Mr. Hopkins made an order requiring the defendant to amend the work in accordance with the District Surveyor's requirements, but agreed to state a special case for the opinion of the Divisional Court. It was understood that both sides would do their best to facilitate the matter with the view of obtaining an early decision of the Superior Court.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

5,663.—KILNS FOR BRICKS, TILES, DRAIN-PIPES, &c.: *O. Bock.*—A continuous kiln, after the annular kind, is fitted with a burning-chamber that has neither divisions nor doors, and is placed below the floor level, being charged and discharged from above, and having a removable cover or roof that forms the floor of the drying and working chamber or oven; the cover has passages which join wider passages leading into the main flue in the middle wall, and is made of ordinary bricks laid upon the charge when the articles are strong enough to carry the weight, but in other cases the roof is formed with hollow moulded bricks or blocks made and disposed so as to leave transverse passages, partitions being "bricked-in" lengthwise; in another form the kiln, which is described as being applicable also for the manufacture of lime and cement, has a wider burning-chamber, the ends excepted, together with additional flues in its outer wall, which pass into the main flue beneath the kiln.

5,702.—WASTE WATER FLUSHING: *W. T. Owens.*—The basin, which has an outlet trapped passage in its side, is fashioned with a flange, in order to obviate splashing; waste water is collected in the basin until the seal in the remoter and lower trap of the outlet becomes blown out, and the flush is thereupon started, that action being accelerated by the overflow which is diverted down the passage of the outlet by means of an overhanging half-rounded ledge immediately above the higher trap of the outlet.

5,715.—CONSTRUCTION OF TUNNELS: *B. F. Carpenter and C. N. Fowler.*—The invention relates to a method of making tunnels beneath streets and open spaces without disturbance of the surface. The surface material is held up from above whilst excavation is in progress and the underground supports are being built up. Outside the line of the work, timbers, girders, &c., are laid upon the ground or upon supports, and to them are attached rods which pass through holes in the soil to other frames, plates, and girders, about which are ranged poling boards with other supports for the roadway and the earth, gas and water mains and other conduits and pipes being similarly hung up during the operations. A bridge laid upon girders deeper than the supporting-girders, and resting upon the ground, provides for the continuous maintenance of traffic along the street, whilst the pavement and concrete-bed of a road are together kept entire and are utilised, either with or without timbers, for holding up the sides of the buildings, road, and so forth. Ingress of water is prevented by filling in the holes through which the hanging-rods are inserted, and the holes, after withdrawal of the rods, are used for filling in cement or asphalt as a waterproof cover above the tunnel.

5,727.—RECESSED BRICKS: *J. Cornish.*—A knife consisting of a steel band bent into the shape of a loop or a ring and sharpened at one of its edges is employed for making a recess or frog in the under surface of a wire-cut brick without the operation of stamping or pressing; the ends of the steel loop are closed together and inserted into a handle.

5,735.—CONTRIVANCE FOR VENTILATING AND FLUSHING DRAINS AND SEWERS: *R. T. Preston and G. C. Ralston (J. Stone & Co.).*—An ejector forces sewer gas mixed with fresh air through water before it is passed to the outlet pipe, it is placed below water-level in a tank, and is worked with air or water under pressure. Two nozzles communicate with the sewer exhaust pipe, and another nozzle beyond with the fresh air inlet. Water from the tank may be caused to flow into a flushing-tank discharged by means of a siphon, and the water pressure may be used for driving a wheel which exhausts the gases and forces them through the tank.

5,755.—A PLASTIC COMPOSITION: *A. Lauermann.*—To an admixture of gypsum (100 lbs.), infusorial earth (8 lbs.), and wooden or paper pulp containing 35 per cent. of cellulose (10 lbs.), are added East India rubber in a half-liquid state (12 lbs.) and water (80 lbs.). The compound is spread in layers alternately with layers of aloe, jute, or some similar fibre (about 10 lbs.), and may be used for cornices, ceiling ornamentation, and many other objects.

5,810.—TILES FOR ROOFS: *J. Thatcher.*—The tiles, intended for the gable-ends of roofs, are fashioned with flanges at their sides which will overlap the end rafters, barge-boards, or walls, and, being cut away at their lower ends, will fit closely together when laid. The flanges also are tapered so as to maintain a straight lower edge; the tiles for eaves are bent down over the gutters so as to prevent rain from entering beneath the roof.

5,822.—A SIZING PREPARATION: *L. Beeck.*—A powder is made by steeping and boiling size in the customary manner and then adding calcined soda or alum. Thus the mixture when cooled leaves a dry mass to be pulverised. Soda and alum are added to the powder, which will serve as a priming, for surfaces that are to be painted, by being prepared with hot water.

5,944.—A DOOR HINGE: *C. Rothkegel.*—The rising hinge, adapted for use with anti-friction balls, has a pin which is formed of two parts in whose adjacent ends are cut spiral grooves. A sleeve keeps the balls in their places in the grooves when the door to which the hinge's upper part is affixed is opened. It rises and then becomes closed again by the force of its own weight.

6,049.—A COUPLING FOR INSULATED PIPES: *S. R. Dresser.*—The coupling is formed of two clamping plates (made of one piece or more) which have apertures slightly larger than the two pipes, and are fitted with bolt-holes and strengthening ribs. Into a recess of the clamping-plate fits an india-rubber ring, which is also extended through that plate's aperture, whilst a V-shaped recess takes the metal coupling sleeve's end, the central bore of that sleeve being enlarged at one end that it may take the insulating-sleeves, which bring the pipe ends into engagement. At the coupling's other end may be used a ring without a sleeve.

6,074.—A CLAMP FOR USE BY WORKERS IN WOOD: *L. Woebs.*—Of the two jaws that grip the wood one is pivotted at its lower end and is to be adjusted with cam levers which are pivotted on to a piece fixed at the end of the body of the clamp and have a retaining pawl that engages with a rack upon the fixed piece's end; a separate piece carries the other jaw, and its base can be forced downwards into engagement with notches by means of a cam lever which is pivotted on to a bolt that slides in a slot in the body of the clamp. Of the three arms of the body—set at right angles to one another—two are toothed to take the tooth of the sliding-piece, whereon is mounted a cam lever, by means of which the tool may be clamped to a table or other rest or support.

6,101.—STAIR, MANHOLE-DOOR, AND OTHER TREADS: *W. H. Winslow.*—The treads are made of strips, in dove-tail shape, of lead or other non-slipping material, and of strips of hard metal, which are fastened to a board (to be afterwards taken away), and are then bonded together with a coating of metal which is electrolytically deposited upon the strips and constitutes their frame or backing.

6,103.—GRATINGS FOR DRAINS AND SEWERS: *J. F. Wallace.*—Upon the under side of the hinged grating is affixed a pivotted spring-catch which, when the grating is depressed, will engage with a side of the frame, and is to be struck out of engagement, when it is desired to raise the grating, with a bent-ended key which is inserted through a hole in the grating.

6,113.—CASES FOR LOCKS AND LATCHES: *C. R. Heckford (J. Spink & Son).*—At the hinder end of the case's back-plate are formed two tenons which are put into holes in the case's back end, then the case's fore end is sprung over so that a hole therein may take another tenon upon the back-plate's forward end; in one modification of the invention the back-plate, which is made plain, is placed under projections upon the case's back end, and then, after having been forced down an inclined projection upon the case's fore end, is sprung below it, the back-plate's edges being rabbeted, and serving for distance-stops as they press upon the rim of the case.

6,169.—A POLISH FOR METALLIC SURFACES: *F. Herbert and J. Brown.*—The polish consists of an admixture of ammonia, twenty-five parts; turpentine, thirty parts; methylated spirit, twenty-five parts; putty powder, five parts; rouge, five parts; flour emery, one part; and red crocus powder, nine parts.

6,211.—WORM GEARING FOR LIFTS, &C.: *E. G. Hoffmann.*—The worm's blade is shaped so that it shall engage with the rollers that are mounted with ball bearings upon studs screwed into the rack and thereby form the teeth of the rack, the parallel sides of the blade's edge also engage with slots cut transversely in the rack in the event of the rollers being broken; for worm-wheels it is arranged that the worm shall work in a peripheral channel to whose sides the rollers are affixed, and that the blade shall engage also with a series of teeth which are cut in a centrally projecting edge; for lifts the racks are secured to the sides of the well, and an electrical or other motor may be employed to drive two worms mounted beneath the cage, a disc which engages with a recess at the worm's one end will serve as a brake.

6,217.—COVERINGS FOR WALLS AND CEILINGS: *D. Swanson.*—The walls are covered with sheets of felt or other suitable material, faced with cement, &c., which are hung upon boards, fastened with studs, nuts, and upright binders, to bolts that are built into the walls, the space between the walls and the lining sheets being filled in with concrete. When the concrete has become set the boards are unfastened and the stud-holes are filled in. For the facing-sheets is prepared a layer of plaster of Paris, lime, cement, or kindred plastic substance to which is applied a backing of hair or felt fabric, either with or without wire netting. The method is described as being applicable to walls of concrete or of brick.

MEETINGS.

FRIDAY, JULY 20.

Incorporated Association of Municipal and County Engineers.—Annual meeting, Westminster Town Hall, S.W. (continued).

SATURDAY, JULY 21.

Incorporated Association of Municipal and County Engineers.—Annual meeting (concluded).

MONDAY, JULY 23, TO SATURDAY, JULY 28.

Architectural Association.—Annual Excursion. Headquarters: the Angel Hotel, Bury St. Edmunds.

FRIDAY, JULY 27.

Institution of Junior Engineers.—Visit to the Generating Station and Depot of the Central London Railway, Shepherd's Bush. 6.30 p.m.

SATURDAY, JULY 28.

Architectural Association.—Fourth Summer Visit to Stowe House, near Buckingham.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 4.—By EDWARD BOND (at Aylesbury)

Whitchurch, Bucks. — Kempson's, and 11 a. 3 r. 16 p., f. £1,050

July 5.—By WHITE & SON (at Dorking).

Ockley, Surrey.—Main-rd., six plots of land, 3 a. 2 r. 26 p., f. 534

By BIDWELL & SONS (at Ely).

Chatteris, Cambs. — Langwood Fen Farm, 98 a. 2 r. 39 p., f. and c. 2,300

Two enclosures of arable, 7 a. 2 r. 0 p., c. 270

Ely, Cambs.—West End, three tenements, area 1,624 yds., f. 400

Back Hill, two freehold cottages 220

Stuntney, Cambs.—A copyhold house and 1 a. 1 r. 18 p. 270

July 6.—By R. IMESON & SON (at Bowes).

Bowes, &c., Yorks. — The Melwaters Estate, 191 a. 1 r. 31 p., f. 7,000

Trowhead's Estate, 34 a., f. 1,300

By T. W. GAZE (at Diss).

Rickinghall, Suffolk.—An occupation farm, 73 a. 0 r. 10 p., f. and c. 800

Three enclosures of land, 27 a. 0 r. 18 p., f. 155

Thelnetham, Suffolk.—A small occupation, 18 a. 0 r. 15 p., f. and c. 175

South Lopham, Norfolk.—A freehold windmill, house, cottage, and 9 a. 0 r. 17 p. 350

North Lopham, Norfolk.—A freehold house and cottage 155

Kenninghall, Norfolk.—House, cottage, and 1 a. 1 r. 27 p., f. 160

Besthorpe, Norfolk.—Five cottages and 3 a. 0 r. 26 p. 150

July 7.—By GRAIN, MOVES, & WISBEY (at Cambridge).

Little Abington, Cambs.—Lay Rectory Farm, 387 a. 2 r. 21 p., f. (including timber) 9,000

By Messrs. SPELMAN (at Norwich).

Barford, Norfolk.—The Manor Farm, 186 a. 0 r. 4 p., f. and c. 2,900

Blofield, Norfolk.—A small occupation, 4 a. 2 r. 13 p., f. 265

July 9.—By J. H. BETHELL.

Tottenham.—High-rd., the Waggon and Horses p.-h., &c., f.g.r. 87*l.*, reversion in 5 yrs. 6,000

Stratford.—17, 40, and 42, Cedars-rd., f. 1,130

By Messrs. BALLS.

Newton, Suffolk.—The manor or lordship of Butlers 150

By HAMPTON & SONS.

Winchfield, Hants.—A freehold building estate, 35 a. 3,500

By Messrs. KEMSLEY.

Epping, Essex.—Rye Hill, Rivett's Farm, 63 a. 3 r., f. 1,400

By W. W. READ & Co.

Sudbury, Middx.—Sudbury Court-rd., a parcel of building land, 1 a. 0 r. 32 p., f. 405

Sudbury Court-rd., Rosedale, f., e.r. 25*l.* 305

Ealing.—Western-road, a plot of building land, u.t. 92 yrs., g.r. 4*l.* 150

Baker's-lane, yard and premises, u.t. 15½ yrs., g.r. 3*l.* 130

Grange Park, a plot of building land, f. 340

By JOHN REVELL.

Deptford.—18 and 20, Gosterwood-st., u.t. 66 yrs., g.r. 10*l.* 590

By THURGOOD & SON.

New Sampford, &c., Essex.—The Bush Farm, 117 a. 1 r. 6 p., f. 1,010

By WEATHERALL & GREEN.

Fleet-st.—Fetter-lane, the Blue Lion b h., area 2,120 ft., f. r. 90*l.* 3,000

1 to 6, Nevill's-court, area 4,720 ft., f. 3,600

7, 13, 13a, 14, and 15, Nevill's-court, area 4,050 ft., f. 3,500

11 and 12, Nevill's-court, and a plot of land in rear, area 3,430 ft., f. 3,600

By W. N. WILLOUGHBY.

Dulwich.—9 to 12, Acacia-grove, u t. 49 yrs., g.r. 21*l.* 1,165

By NORMAN & SON (at Stratford).

Stratford.—6, 8, 16 to 24 (even), Broad-st., f. 1,350

22 and 24, Chapel-st., u.t. 46 yrs., g.r. 7*l.* 7s. .. 255

101 and 103, Major-rd., u.t. 66 yrs., g.r. 3*l.* 3s. .. 395

51 to 59 (odd), Chandos-rd., u.t. 79 yrs., g.r. 26*l.* 5s. 830

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5 to 13 (odd), Stanley-road, u.t. 66 yrs., g.r. 31*l.* 10*s.* £320
Forest Gate.—22 to 28 (even), Glenparke-road, u.t. 88 yrs., g.r. 20*l.* 625
July 10.—By DEBENHAM, TEWSON, & CO.
Honiley, &c., Warwick.—The Boot Inn and Farm, area 75 a. 1 r. 7 p., f. 2,500
Haseley, Warwick.—Five enclosures of land, 20 a. 0 r. 11 p., f. 405
Beausale, Warwick.—Cottage, blacksmith's shop, and 5 a. 3 r. 15 p., f. 420
By HAWES & CO.
New Malden, Surrey.—Poplar Grove, &c., three plots of building land, f. 740
1, Acacia-grove; also South View, f., r. 48*l.* ... 1,030
Wimbledon.—Cambridge-rd., two plots of building land, f. 310
By NOKES & NOKES.
Caledonian-rd.—No. 197, u.t. 40½ yrs., g.r. 8*l.*, r. 65*l.* 550
Nos. 439 and 443, u.t. 53 yrs., g.r. 24*l.*, r. 135*l.* 1,200
73, Blundell-st., u.t. 51 yrs., g.r. 5*l.* 10*s.*, r. 36*l.* 300
Pentonville.—22a, 22b, and 22c, Risinghill-st., u.t. 69 yrs., g.r. 30*l.* 2,260
By SIM & RANDALL.
Redhill, Surrey.—Upper Bridge-rd. (near), The Glen, u.t. 59½ yrs., g.r. 7*l.* 10*s.*, e.r. 42*l.* 310
Leyton.—4, Park-pl., f., r. 55*l.* 750
By C. P. WHITELEY.
Woolwich, Kent.—Parson's Hill, Parson's Hill Chapel, area 5,300 ft., f. 1,800
King's Cross.—63, Southampton-st., f., e.r. 50*l.* .. 705
Hackney.—19, Hassard-st., f. 430
By HERBERT PRICE (at Masons' Hall Tavern).
Islington.—Liverpool-rd., the Adelaide p.-h., with goodwill, r. 100*l.*; also l.g.r. 20*l.*, u.t. 4 yrs... 3,700
By Messrs. SPELMAN (at Norwich).
Thorpe-next-Norwich, Norfolk.—Thorpe Lodge, and 10a. 0 r. 30 p., f. 7,000
Thorpe-rd., a building site, 1 a. 3 r. 14 p., f. 1,250
Thorpe-rd., enclosure of pasture, 4 a. 1 r. 0 p., f. 3,000
July 11.—By BAXTER, PAYNE, & LEPPER.
Westerham, Kent.—London-rd., The Cottage, and 5 a. 2 r. 34 p., f. 990
London-rd., Meadowcroft, and 3 a. 1 r. 11 p., f. 760
London-rd., enclosure of meadow land, 2 a. 1 r. 31 p. f. 260
London-rd., enclosure of land with buildings thereon, 3 a. 3 r. 31 p. f. 280
London-rd., Buckhurst Cottage, and 1 a., f.... 455
South-st., freehold business premises, r. 35*l.*.... 490
By CANE & CO.
Peckham.—Rye Hill Park, a plot of building land, f. 400
By COLLINS & COLLINS.
Haymarket.—15, Rupert-st., f., r. 100*l.* 3,060
Camberwell.—203 and 205, Camberwell-grove, f., r. 105*l.* 2,330
211, Camberwell-grove, f., r. 110*l.* 1,500
By PETTITT, BYRNE, & SON.
Upper Tooting.—Hendham-rd., Heathfield and Highdown, f., r. 100*l.* 1,725
Hendham-rd., a piece of freehold land 770
Hackney.—Dalston-lane, the Lord Truro p.-h., l.g.r. 50*l.*, u.t. 51 yrs., g.r. 10*l.* 775
By ROGERS, CHAPMAN, & THOMAS.
Pimlico.—162 to 170 (even), Tachbrook-st., u.t. 31 yrs., g.r. 40*l.*, r. 300*l.* 2,625
Kensington.—4, Clarenden-mews, u.t. 44 yrs., g.r. 5*l.* 190
By C. SAUNDERS & SON.
Muswell Hill.—1 and 2, Colney Hatch-lane, f., r. 150*l.* 3,425
Camden Town.—11 and 13, High-st., u.t. 29½ yrs., g.r. 53*l.*, r. 250*l.* 2,350
Holloway.—94, Carleton-rd., u.t. 66 yrs., g.r. 10*l.*, e.r. 75*l.* 750
Wood Green.—Eastern-rd., f.g.r. 26*l.*, reversion in 96 yrs. 650
16 and 16, Eastern-rd., f., r. 64*l.* 830
By DOUGLAS YOUNG & CO.
Battersea.—197, 203 205, 207 and 231, Queen's-rd., u.t. 72 yrs., g.r. 33*l.* 10*s.* 1,825
1 to 19 (odd), Prarie-st., u.t. 76 yrs., g.r. 63*l.* 16*s.* 8*d.* 2,870
Clapham.—21, Rosebery-rd., u.t. 81 yrs., g.r. 6*l.*, r. 30*l.* 300
Preston, Middlesex.—Clay-lane, enclosures of land, 7a. 0r. 21 p., f. 550
Horsham, Sussex. — Bowner's Field, 6a. or. 23p., f. 520
By T. W. GAZE (at Lowestoft).
Lowestoft, Suffolk.—Oulton Broad-rd., enclosures of freehold land, 107a. 2r. 18p. 5,810
Oulton, Suffolk. — The Pond Farm, 154a. 1r. 28p., f. 3,050
July 12.—By DAVID J. CHATTELL.
Finsbury.—95, and 101, Lupus-st., u.t. 27½ yrs., g.r. 20*l.*, r. 180*l.* 1,915
Clapham.—33, Osborne-ter., u.t. 28 yrs., g.r. 7*l.* 10*s.*, r. 44*l.* 310
Regent's Park.—39, Upper Gloucester-place, and 1, Huntsworth-mews, u.t. 20½ yrs., g.r. 16*l.* 16*s.*, r. 99*l.* 640
Camberwell.—1, Ivanhoe-rd., u.t. 76 yrs., g.r. 5*l.* 10*s.*, r. 22*l.* 255
Anerley.—Worbeck-rd., a plot of building land, f. 100
By J. G. DEAN & CO.
Fulham.—136, Greyhound-rd., 2 and 4, Tasso-rd., f., r. 117*l.* 16*s.* 1,000
Wandsworth.—17, Nicosia-rd., u.t. 79 yrs. g.r. 9*l.* e.r. 50*l.* 430
Balham.—55 and 57, Sarsfeld-rd., u.t. 79½ yrs., g.r. 15*l.*, r. 72*l.* 750
Battersea.—2, Hauberk-rd., u.t. 80 yrs., g.r. 6*l.* 10*s.* 380
By GLASIER & SONS:
Haymarket.—7, Oxendon-st., area 2,150 ft., f..... 10,300
James-st., l.g.r. 250*l.*, reversion in 67 yrs..... 11,175
By C. C. & T. MOORE.
Mile End.—Mile End Gate, the Vine Tavern, f., r. 80*l.* 3,255
61 and 63, Gold-st., u.t. 26 yrs., g.r. 2*l.* 15*s.*.... 480
Limehouse.—39, Ackland-st., u.t. 73 yrs., g.r. 4*l.* 10*s.* 350
Whitechapel.—9, East Mount-st., f., e.r. 50*l.* 750
Hackney.—52, Rutland-rd., u.t. 52½ yrs., g.r. 4*l.*, r. 27*l.* 320
By NEWSON, EDWARDS, & SHEPHARD.
Gray's Inn-rd.—22, Ampton-st., u.t. 14½ yrs., g.r. 7*l.*, r. 45*l.* 230
Canonbury.—Wallace-rd., l.g.r. 36*l.* 15*s.*, u.t. 25½ yrs., g.r. nil £415
Shepherd's Bush.—23, Godolphin-rd., u.t. 53 yrs., g.r. 9*l.*, r. 38*l.* 310
Finchley.—2, Bedford-ter., u.t. 81 yrs., g.r. 6*l.*, e.r. 28*l.* 220
133, Station-rd., u.t. 79 yrs., g.r. 6*l.*, r. 38*l.* 375
Holloway.—4, Fairmead-rd., f., r. 48*l.* 745
By STIMSON & SONS.
Norwood.—31, Chestnut-rd., u.t. 71½ yrs., g.r. 10*l.*, r. 50*l.* 490
12 to 18 (even), Cobden-rd., u.t. 65 yrs., g.r. 16*l.* 16s. 505
Dulwich.—6, Whateley-rd., f. 370
Sydenham.—25, Russell-st., f. 200
Nunhead.—Banstead-st., f.g.r. 7*l.*, reversion in 54 yrs. 175
Brixton.—9, Brailsford-rd., u.t. 74 yrs., g.r. 6*l.* 10*s.*, r. 28*l.* 285
Sydenham.—Knighton Park-road, f.g.r. 14*l.*, reversion in 90 yrs. 360
Canning Town.—Hemsworth-st., an improved rental of 42*l.* for 16 yrs., with reversion 710
By J. A. & W. THARP.
Wanstead.—Cambridge Park, Mellendean Lodge, f. 2,200
Hackney.—187 to 195 (odd), Morning-lane, area 4,100 ft., f. 800
By J. D. WOOD & CO.
Birchington, Kent.—Haun and Thor and 5 acres, f. 12,000
By FAREBROTHER, ELLIS, & CO.
Hurley, Berks. — Knowl Hill, the Seven Star p.h., and enclosures of land, area 39 a. 3 r. 9 p., f. 3,430
Park Wood Estate, 166 a. 2 r. 24 p., f. 1,500
Warren-row, a freehold cottage and 1 a. 2 r. 31 p. 300
Cockpole Green, Goulder's Farm, 164 a. 3 r. 18 p., f. 4,300
Cockpole Green, a freehold cottage and 3 a. 1 r. 15 p. 360
By WORSFOLD & HAYWARD (at Dover).
Dover, Kent.—35 and 39, Lowther-road, f. 330
41 and 43, Wyndham-road, u.t., 993 yrs., g.r. 4*l.* 350
14, Alfred-road, f. 325
3 and 4, Catharine's-place, f. 400
10, Esplanade, u.t. 10 yrs., g.r. 14*l.* 15*s.*..... 110
July 13.—By J. S. BENT.
Hackney.—123, Hackney-road, beneficial lease for 20 yrs., r. 35*l.* 100

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

WOOD.*

Per Petersburg standard hundred.

	£	s.	d.	£	s.	d.
White Sea: first yellow deals	18	0	0	23	0	0
Second do.	16	0	0	18	10	0
Third do.	13	0	0	15	0	0
Battens, 40s., 30s., and 25s. less respectively.						
Petersburg: first yellow deals	15	10	0	19	0	0
Second do.	13	0	0	14	0	0
Battens, 30s. and 20s. less respectively.						
Petersburg, white deals	12	0	0	15	0	0
Do. white battens	11	0	0	12	0	0
Riga, white deals	10	0	0	11	10	0
Swedish mixed yellow deals	16	10	0	21	0	0
,, Third do.	14	10	0	17	0	0
,, Fourth do.	13	0	0	14	10	0
,, Fifth do.	12	0	0	13	10	0
Battens, 30s., 20s., and 10s. less respectively.						
Whitewood, 10 to 20 per cent. less.						
Finnish unsorted yellow deals	11	10	0	12	10	0
Battens, 10s. and 5s. less respectively.						
Whitewood, 5 to 10 per cent. less.						
Norwegian second yellow battens	8	10	0	9	0	0
Third do.	8	0	0	9	0	0
Fourth do.	8	0	0	8	10	0
Whitewood, 10s. less.						
Danzig, Crown Deck deals, per 40 ft. 3 in.	0	15	0	1	5	0
Brack	0	12	0	1	0	0
St. Lawrence Pine deals, &c., per P.S.H.:						
1st, Bright and Dry, regular sizes	22	0	0	29	0	0
,, ,, oddments	15	10	0	23	0	0
2nd ,, regular sizes	17	10	0	20	0	0
,, ,, oddments	12	0	0	16	10	0
3rd, ,, regular sizes	11	0	0	12	0	0
,, ,, oddments	9	10	0	10	10	0
4th ,, regular sizes	10	0	0	11	0	0
,, ,, oddments	9	0	0	10	0	0
St. Lawrence Spruce deals, &c.						
First, regular sizes	13	0	0	15	0	0
Second ,,	10	10	0	11	0	0
Third ,,	10	5	0	10	10	0
Fourth ,,	9	15	0	10	5	0
Oddments and battens at 20s., 10s., 7s. 6d., and 5s. less respectively.						
New Brunswick Spruce deals, &c.	10	0	0	12	0	0
Oddments, battens, and fourths	9	10	0	10	0	0
United States pitch pine planks and boards	11	10	0	15	0	0
Prepared Boards, per square						
2½ by 6½ and 7 in. 1st yellow		11	6		16	6
,, ,, 2nd ,,		11	0		13	6
1 by 6½ and 7 in. 1st ,,		10	6		12	6
,, ,, ,, white		9	6		10	6
,, ,, 2nd yellow		9	6		11	6
,, ,, ,, white		8	6		9	6

* The prices named are for the wood as imported and landed in the docks. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

PRICES CURRENT (*Continued*).

	£	s.	d.	£	s.	d.
⅜ by 6½ & 7 in. 1st & 2nd yellow		8	6		9	6
,, ,, white		8	0		9	0
⅜ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)		9	0		10	0
⅜ by 6½ and 7 in. 2nd yellow and white (ditto)		8	0		9	0
⅛ by 6½ and 7 in. 1st yellow and white (ditto)		7	0		8	0
⅛ by 6½ and 7 in. 2nd yellow and white (ditto)		6	6		7	6
Narrower widths at 10 per cent. less.						
3rd quality at 15 per cent. less than 2nd.						
Danzig and Memel Fir Timber—per load						
Best middling	3	13	0	3	15	0
Good middling and Second	3	0	0	3	5	0
Common middling	2	15	0	3	0	0
Undersized	2	15	0	3	0	0
Swedish and Norwegian Balks	2	5	0	2	10	0
Baltic Oak Timber—						
Danzig and Stettin—Large	3	17	6	4	10	0
Small	3	2	6	3	15	0
Quebec Timber per load						
Yellow Pine	4	15	0	6	5	0
Oak	4	0	0	6	0	0
Elm	5	5	0	6	5	0
Ash	3	5	0	4	0	0
Birch	3	17	6	6	5	0
New Brunswick, &c., Birch	3	12	6	4	10	0
American Pitch Pine Timber	2	17	6	4	5	0
Wainscot, per log, 18 cubic ft.—						
Crown (Eng. & Dutch) nominal	3	0	0	4	0	
Brack nominal	2	7	6	3	0	
Lathwood, per cubic fathom—						
Petersburg	4	0	0	6	10	0
Riga and Danzig	4	10	0	5	10	0
Norway Poles, per ft. run	0	0	1	0	0	1½
Oak Staves, per mille full size pipe						
Memel, Crown	£20	0	0	£30	0	0
Brack	19	0	0	20	0	0
Danzig	16	0	0	17	0	0
Bosnia, single Barrel (nominal)	28	0	0	30	0	0
United States, Pipe	37	10	0	45	0	0
Hogshead, extra heavy and double extra	30	0	0	35	0	0
Indian Teake per load	10	10	0	16	0	0
British Guiana Greenheart	0	0	0	8	0	0
Mahogany, per foot superficial—						
Honduras, cargo average	0	0	4½	0	0	5½
Nicaragua, do.	0	0	4½	0	0	5½
Tabasco, do.	0	0	4½	0	0	6
Mexican, do.	0	0	4	0	0	4½
Panama, do.	0	0	3½	0	0	4
African, do.	0	0	3½	0	0	5
Cuba, do	0	0	6	0	0	8
St. Domingo, do.	0	0	5	0	0	7½
Do. Curls (good to prime)	0	0	9	0	1	3
Walnut. American (logs)	0	2	9	0	4	9
Do. do. (planks and boards)	0	2	0	0	7	0
Italian, per foot superficial	0	0	3	0	0	7½
Black Sea, per ton	6	0	0	12	0	0
Satin Walnut (logs) per foot cube	0	1	0	0	1	6
,, (planks and boards)	0	1	9	0	3	0
Sequoia (Californian redwood), per foot cube	0	1	9	0	2	0
Whitewood, American (logs)	0	1	4	0	1	9
,, ,, (planks and boards)	0	1	9	0	2	9
Quartered oak ,, ,,	0	2	3	0	4	0
Kauri pine (logs)	0	1	9	0	2	0
,, ,, (planks)	0	2	3	0	2	0
Jarrah (planks)	0	2	0	0	2	6
Lancewood spars each, fresh and large	0	5	0	0	7	0
Lancewood spars, ordinary to fair	0	3	0	0	4	0
Degame spars	0	8	0	0	10	0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton.					
	£	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	9	7	6	.	.	.
Compound Girders ,, ,,	13	10	0	.	.	.
Angles, Tees and Channels, ordinary sections	12	10	0	14	10	0
Flitch Plates	12	0	0	0	0	0

METALS.

IRON—Pig, in Scotland ton	3	10	1½	0	0	0
Bar, Welsh, in London	9	0	0	9	15	0
Do. do. at works in Wales	8	10	0	9	0	0
Do. Staffordshire, in London	9	15	0	11	15	0
COPPER British cake and ingot	76	0	0	77	0	0
Best selected	76	15	0	77	15	0
Sheets, strong	83	0	0	0	0	0
Chili bars	72	17	6	73	2	6
YELLOW METAL lb.	6½d.			7d.		
LEAD—Pig						
Spanish ton	17	10	0	.	.	.
English Com. Brands	17	17	6	.	.	.
Sheet, English, 6 lbs. per sq. ft. and upwards	19	7	6	.	.	
Pipe	19	17	6	.		
ZINC—						
Vieille Montagne ton	25	0	0	.	.	.
Silesian	25	0	0	.	.	.
Spelter	19	2	6	.	.	.
TIN—Straits	149	0	0	.	.	.
Australian	151	0	0	.	.	.
English Ingots	153	0	0	.	.	.
Banca	.	.	.	.	.	.
Billiton	.	.	.	.	.	.

ENGLISH SHEET GLASS IN CRATES.

1 oz. thirds	2½d. per ft. delivered.
,, fourths	2d. ,, ,,
21 oz. thirds	3d. ,, ,,
,, ,, fourths	2¾d. ,, ,,
26 oz thirds	4d. ,, ,,
,, ,, fourths	3½d. ,, ,,
32 oz. thirds	5d. ,, ,,
,, ,, fourths	4½d. ,, ,,
Fluted sheet, 15 oz.	2¾d. ,, ,,
,, ,, 21 ,,	3¾d. ,, ,,

[See also page 67.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Reconstruction and Enlargement of Town Hall, &c...	Musselburgh Town Council	25 guineas and 15 guineas	Sept. 30

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Wards, &c., on Hospital Site at West End, Herne ...	Blean R.D.C.	H. T. Sidwell, Surveyor, Herne-street, near Herne Bay	July 23
House and Depot, Roath Park	Cardiff Corporation	W. Harpur, Civil Engineer, Town Hall, Cardiff.....	do.
Two Houses, Stabling, &c., Mount Tabor	.....	Jackson & Fox, Architects, 7, Rawson-street, Halifax	July 24
Stables, &c., Market-place	Bilston U.D.C.	C. L. N. Wilson, Civil Engineer, Town Hall, Bilston	do.
Additions to Farm, Kingsford, Auchterless	.....	J. Duncan & Son, Architects, Turriff.....	do.
Engineers' Stores, London	Madras Railway Company.....	J. Byrne, 61, New Broad-street, E.C.....	do.
Concrete Bacteria Tanks	Nuneaton, &c., U.D.C.	J. S. Pickering, Civil Engineer, Council Offices, Nuneaton	do.
Road Works, Hawthorne-grove.....	Beeston U.D.C.	J. P. Evans, Surveyor, Public Offices, Beeston	do.
Retort House Extension, &c.....	Atherton (Lancs.) U.D.C.	T. Newbigging & Son, Engineers, 5, Norfolk-street, Manchester	July 25
Large Shed, West Hartlepool.....	North Eastern Railway Company	W. Bell, Architect, York	do.
Gravel and Hoggin	Wembley U.D.C.	C. R. W. Chapman, Civil Engineer, Public Offices, Wembley	do.
Builder's Work at School, Milton-road	Gravesend School Board.....	Rayner & Bridgland, Architects, New-road, Gravesend.....	do.
Foundations for Fire Station, &c.....	Coventry Corporation.....	J. E. Swindlehurst, Civil Engineer, St. Mary's Hall, Coventry ..	do.
Boiler House, &c., Knutsford.....	Bucklow Guardians	R. J. M'Beath, Architect, Birnam House, Sale	do.
*Painting and Repairs	St. John's Foundation School	Sutton Patterson, Secretary, 1, The Sanctuary, Westminster Abbey	July 26
Store Buildings, Shawcross	Dewsbury Pioneers' Indus. Soc. Ld.	Holtom & Fox, Architects, Corporation-street, Dewsbury	do.
Additions to Schools, Herninglow	Burton-on-Trent (U.D.) Sch. Bd....	R. Churchill, Architect, St. Paul's-square, Burton-on-Trent	do.
Alterations to Market Buildings	Blackpool Corporation	J. Wolstenholme, Civil Engineer, Town Hall	do.
Making-up Culmington-road, &c.	Ealing U.D.C.	C. Jones, Civil Engineer, Public Buildings, Ealing, W.	do.
Road Works, Great Western-street, &c.	Moss Side (Lancs.) U.D.C.	H. B. Longley, Engineer, Council Offices, Moss Side, Manchester	do.
Chapel and School, Hendy, near Pontardulais.....	.....	W. H. White, Glyndwr House, Pontardulais	July 27
House, Park Croft, Willingdon	Eastbourne R.D.C.	J. H. Evans, Surveyor, St. Alban's, Polegate, Sussex	do.
Villa, Ackworth-road, Purston, Yorks.	Mr. J. Umpleby	E. W. Umpleby, Architect, Railway Hotel, Featherstone	do.
Tar Macadam, Victoria Park	Swinton & Pendlebury U.D.C.....	H. Entwisle, Surveyor, Council Offices, Swinton	do.
Additions to Police Station, &c., Haltwhistle.....	Northumberland County Council	J. Cresswell, Architect, Moot Hall, Newcastle-on-Tyne.....	July 28
Drill Hall, Lancaster	.....	Harrison, Hall & Moor, Architects, Lancaster	do.
Boundary Walls, &c., St. Andrew's Church, Stainland	.....	Horsfall & Son, Architects, Lord-street Chambers, Halifax.....	do.
House, East Pentire Estate, Newquay, Cornwall	.....	A. L. Martyn, Penmore, Falmouth.....	do.
Engineers' Stores, Dublin.....	Cavan and Leitrim Railway Co. Ld.	P. MacNulty, 37, College-green, Dublin	do.
Sewerage Works, Bowden-lane	Marple U.D.C.	Council's Engineer, 2, Ridgefield, Manchester	do.
*Library Fittings and Fixing.....	Hornsey U.D.C.	Surveyor, Council Offices, Southwood-lane, Highgate, N.	do.
*Stoneware Pipe Sewers	do.	Engineer, Council Offices, Southwood-lane, Highgate, N.....	July 30
Bridge, Hagg Beck, Middlefoot, Cumberland	Longtown R.D.C.	J. Murray, Architect, Alstonby Villa, Lyneside.....	do.
Two Houses, &c., Gibraltar, Halifax	.....	T. H. Tyson, Architect, 11, Fountain-street, Halifax	do.
House, Dyon	Distington (Cumberland) Sch. Bd.	W. Birkett, Distington.....	do.
Artisans' Dwellings, Bride's Alley	Dublin Corporation	C. J. MacCarthy, Architect, Municipal Buildings, Cork-hill, Dublin	do.
Fifty Cottages (Contracts Nos. 2 and 3).....	Burton-on-Trent Corporation	G. T. Lynam, Borough Engineer, Town Hall	do.
Police Court, Mountain Ash, Glam.....	Mr. T. M. Williams	Cook & Edwards, Architects, Masonic Buildings, Bridgend, Glam.	do.
Hotel and Stabling, Northgate, Darlington	S. Allsopp & Sons, Limited	G. G. Hoskins, Architect, Darlington	July 31
*Pulling-down Houses in Harrow-road, W.....	Paddington Guardians.....	F. J. Smith, Architect, Parliament Mansions, Westminster.....	do.
*Kerbing, Tarpaving, &c., Chalsey-road, Brockley	Lewisham Board of Works	Surveyor's Department, Town Hall, Catford, S.E.....	do.
*Kerbing, Tarpaving, &c., Eastern-road, Brockley	do.	do.	do.
*Kerbing, Tarpaving, &c., Pattenden-road, Catford ..	do.	do.	do.
*Kerbing, Tarpaving, &c., Pascoe-road, Lewisham	do.	do.	do.
*Painting and Decorating Town Hall	Staines U.D.C.	Surveyor, Town Hall, Staines	do.
Schools, Windsor-avenue, Lurgan	.....	H. Hobart, Architect, Dromore, co. Down	Aug. 1
Offices and Cabins, Cardiff	G. W. Railway Company	G. K. Mills, Paddington Station, W.	do.
Additions to Station Buildings, Bridgend, Glam.	do.	do.	do.
Additions to Infirmary.....	Stow-on-the-Wold Guardians	R. G. Francis, Union Offices, Stow-on-the-Wold	do.
Business Premises, Ilkley.....	G. H. Isitt & Sons.....	Adkin & Hill, Architects, Prudential Buildings, Bradford	do.
Pumping Station, Tower, 10 miles C.I. Mains, &c. ..	Southend-on-Sea Corporation	A. Fidler, Civil Engineer, Borough Engineer, Town Hall	Aug. 2
Additions, &c., to Borough Sanatorium.....	Gravesend Town Council	Borough Surveyor, Town Hall Buildings, Gravesend	do.
*Painting, &c., to Schools	St. Pancras Guardians.....	W. T. Farthing, Surveyor, 46, Strand, W.C.	do.
*Plastering Work	H.M. Office of Works	Storey's Gate, S.W.	do.
Offices, George-street.....	Glasgow Parish Council	Thomson & Sandilands, Architects, 241, West George-st., Glasgow	Aug. 3
*Girls' School	Ashby-de-la-Zouch Grammar Sch.	Barrowcliff & Allcock, Architects, Loughborough.....	do.
*Sewers	Romford U.D.C.....	See Advertisement	Aug. 4
*Sewerage Works	Blaby R.D.C	J. B. Everard, Engineer, 6, Millstone-lane, Leicester	do.
Footpaths, Kerbing, Channelling, &c.	Dartmouth U.D.C.	T. O. Veale, Borough Surveyor, Castle View House, Dartmouth..	Aug. 6
*Boiler House, Chimney Shaft, Pump & Engine Rooms	Poplar Union	Messrs. Clarkson, Architects, 136, High-street, Poplar, E.	Aug. 7
*Wood Paving.....	Brighton County Council	Borough Engineer, Town Hall, Brighton	Aug. 8
*Male Able-bodied Block at Workhouse	St. Marylebone Guardians.....	A. S. Snell, Architect, 22, Southampton-bldgs., Chancery-lane..	Aug. 10
*Public Library	St. Mary, Stratford, Bow, Vestry	See Advertisement	Aug. 11
*Baptist Chapel at Chesham.....	.....	J. W. Chapman, Architect, 11, Sutherland-avenue, W.	Aug. 13
Twenty Cottages, Afonwen, Caerwys	Denbighshire Portland Cement Co.	Secretary, 66, Watergate-street, Chester	No date
Reservoir Wall, Turner Lodge	Fairfield District Council	C. Flint, Council Offices, Fairfield	do.
Church, Shettleston, N.B.	.....	W. F. M'Gibbon, Architect, 221, West George-street, Glasgow ...	do.
School, High Brooms, Southborough	.....	H. H. & E. Cronk, Archts., 4, Mount Ephraim-rd., Tunbridge Wells	do.
Six Cottages, Neston	.....	Story & Hulme, Architects, 20, North John-street, Liverpool.....	do.
Granite Setts.....	Surbiton U.D.C.....	S. Mather, Civil Engineer, Council Offices, Surbiton	do.
*Engineering Work for Baths and Wash-houses	Fulham Vestry	H. D. Pearson, Architect, 27, Chancery-lane, W.C.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works.....	Ilford U.D.C.	3*l.* per week	July 23
*Architect's Assistant	Hull Corporation	110*l.* per annum	do.
*Surveyor and Inspector of Nuisances.....	Heysham U.D.C.	120*l.* per annum	do.
*Clerk of Works	Ilford School Board	3*l.* 3*s.* per week	July 25
*Clerk of Works	Hendon U.D.C.	4*l.* 4*s.* per week	July 30
*Architectural and Junior Architectural Assistant.....	London County Council	2*l.* 2*s.* and 1*l.* 5*s.* per week	do.
*Assistant Clerk of Works.....	do.	.....	do.
*Clerk of Works.....	Taunton Corporation	3*l.* 3*s.* per week	Aug. 4
*Architectural and Engineering Assistant.....	York Corporation	160*l.* per annum	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xviii. xix. & xxi.*

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PRICES CURRENT (*Continued*).

OILS, &c.

	£	s.	d.	£	s.	d.
Raw Linseed Oil in pipes, per ton..	36	10	0	-	-	-
" in drums, per gal.	0	3	1	-	-	-
Boiled, " in pipes, per ton..	38	10	0	-	-	-
" " in drums, per gal.	0	3	5	-	-	-
Tar—Stockholm.....barrel	1	6	6	-	-	-
Archangel.....	1	0	0	-	-	-
Turpentine, in barrels, per cwt. ..	2	0	0	-	-	-
" in drums, per gal.	0	3	2	-	-	-
Genuine Ground English White Lead.....	26	10	0	-	-	-
Red Lead	22	10	0	-	-	-
Best Linseed Oil Putty, per cwt. ..	0	9	0	-	-	-

VARNISHES, &c.

	per gallon. £	s.	d.
Fine Elastic Copal Varnish for outside work ..	0	16	6
Best Elastic Copal Varnish for outside work ..	1	0	0
Best Elastic Carriage Varnish for outside work	0	16	6
Best Hard Oak Varnish for inside work.....	0	10	6
Best Extra Hard Church Oak Varnish for inside work.....	0	10	6
Fine Hard Copal Varnish for inside work	0	16	0
Best Hard Copal Varnish for inside work	1	0	0
Best Hard Carriage Varnish for inside work....	0	16	0
Extra Pale Paper Varnish	0	12	0
Best Japan Gold Size	0	10	0
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	9	0
Berlin Black	0	15	6
Knotting	0	10	0
Best French and Brush Polish	0	10	0

BRICKS, &c.

	s.	d.			
Hard Stocks	33	0	per thousand alongside, in river.		
Rough Stocks and Grizzles.....	30	0	"	"	"	"
Smooth Bright Facing Stocks..	58	0	"	"	"	"
Shippers	42	0	"	"	"	"
Flettons.....	30	0	"	"	at railway depôt.	
Red Wire Cuts ..	34	6	"	"	"	"
Best Fareham Red	72	6	"	"	"	"
Best Blue Pressed Staffordshire ..	87	0	"		"	"
Best Stourbridge Fire Bricks	84	0	"	"	"	"
Best White Glazed Stretchers.....	260	0	"	"	"	"
Headers	240	0	"	"	"	"
Quoins and Bull-nose	340	0	"	"	"	"
Double Headers..	320	0	"	"	"	"
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	"	"	"	"
Quoins and Bull-nose	280	0	"	"	"	"
Double Headers..	280	0	per thousand at railway depôt.			
Seconds Quality White and Dipped Salt Glazed	40	0	per thousand less than best.			

	s.	d.		
Thames and Pit Sand	8	0	per yard, delivered	
Thames Ballast	6	9	"	"
Best Portland Cement	35	0	per ton	"
Best Ground Blue Lias Lime..	23	6	"	"

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s.	d.		
Ancaster in blocks	2	0	per ft. cube, deld. rly. depôt	
Bath "	1	7	"	"
Beer "	1	6½	"	"
Grittshill " ...	1	10	"	"
Brown Portland in blocks	2	2	"	"
Darley Dale "	2	1½	"	"
Red Corsehill "	2	5	"	"
Red Mansfield "	2	4½	"	"
Hard York "	2	10	"	"
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	7	per ft. super at rly. depôt.	
" " 6 in. Rubbed Ditto..	2	10½	"	"
" " 3 in. sawn both sides slabs (random sizes)	1	3	"	"
" " 3 in. self-faced Ditto	0	9	"	"

SLATES.

	£	s.	d.	
in. in.				
20 x 10 best blue Bangor..	11	5	0	per 1000 of 1200 at rly. dep.
" best seconds "	10	15	0	" "
16 x 8 best "	6	2	6	" "
20 x 10 best blue Portmadoc	10	18	0	" "
16 x 8 " "	6	0	0	" "
20 x 10 best Eureka unfading green.....	11	2	6	" "
16 x 8 " "	6	15	0	" "
20 x 10 Permanent green and Sedan green	10	0	0	" "
16 x 8 " "	5	12	6	" "

TILES.

	s.	d.	
Best plain red roofing tiles..	41	0	per 1,000 at rly. depôt.
Hip and valley tiles....	3	7	per doz. " "
Best Broseley tiles	48	0	per 1,000 " "
Hip and valley tiles....	4	0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000 " "
Do. ornamental Do.	60	0	" " "
Hip tiles.....	4	0	per doz. " "
Valley tiles.....	3	9	" " "
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000 " "
Hip tiles	4	1	per doz. " "
Valley tiles.....	3	8	" " "

TO CORRESPONDENTS.

R. & W. (Amounts should have been stated). F. B. (Below our limit).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ACREFAIR.—For erecting an English Presbyterian chapel, Acrefair, near Ruabon, North Wales. Messrs. Dalgleish & Dickens-Lewis, architects and surveyors, 19, Talbot Chambers, Shrewsbury. Quantities by the architects:—

R. Hopley.....	£811 3	Price & Sons.....	£770 0
J. Gethins	795 0	J. T. Jones, Cefn*	755 0

[Architects' estimate, £750.]

CAMBERLEY (Surrey).—For the erection of shop and house, High-street, for Mr. J. Williams. Messrs. Friend & Lloyd, architects, Aldershot:—

H. Charman .....†	£1,100	M. Bateman, Ash Vale, Surrey*	£960
J. Knight	1,025		
W. J. Snuggs	985		

FROME.—For the erection of science and art school buildings, Park-road, for the Urban District Council. Messrs. Silcock & Reay, architects, Milsom-street, Bath:—

Wills & Son ..	£2,395 0 0	Cock & Mac-Lean..	£2,109 18 6
Hayward & Wooster....	2,367 0 0	Hodder & Son.	1,727 0 0
Long & Sons	2,187 0 0		

LANCASTER.—For the re-erection of houses, Nos. 43 and 45, Church-street, for Messrs. Mansergh & Son. Mr. J. Parkinson, architect, 67, Church-street, Lancaster. Quantities by architect:—

Masonry.—Mawson & Son* .....
Joinery.—E. Thompson* ....
Slating and Plastering.—Hall & Son* ..... } £1,227 8 2
Plumbing and Glazing. J. A. Goad* .....
Painting.—Calvert & Heald* .....
[All of Lancaster.]

LLANDEWI.—For the erection of a vicarage house at Llandewi for the Rev. J. Hughes. Mr. Geo. E. Halliday, architect, Cardiff. Quantities by Mr. J. W. Rodger, 14, High-street, Cardiff:—

H. Billings ..	£1,925 10 6	J. Williams ..	£1,590 0 0
D. Jenkins ..	1,748 10 0	W. T. Lewis	1,445 0 0
Bennett Bros..	1,700 0 0	E. A. Thomas	1,230 0 0
Goodridge & Son	1,643 0 0	F. Gibbs, Reynoldston*..	1,154 7 4½

LLANGOLLEN (Wales).—For the erection of house and shop, for Mr. Ellis Evans. Mr. R. T. Jones, architect, Llangollen:—

T. A. Jones	£1,096 0 0
Evans & Sons	1,020 0 0
J. & D. Roberts, Aberadda, Llangollen*	995 12 6

LONDON.—For pointing, repairs, and painting 42, Nevern-square, Earl's Court, S.W. Messrs. Morley & Letts, surveyors, 185, Earl's Court-road, S.W.:—

Heath & Son* £142

LONDON.—For new roofs and sundry repairs, Kramer-mews, West Brompton, S.W. Messrs. Morley & Letts, surveyors, 185, Earl's Court-road, S.W.:—

T. Wells .....†	£440 0 0	Holdstock & Mould.....	£369 10 0
Smith & Son ..	381 10 0		
J. Whitaker....	375 15 0	T. Graves*	354 12 6

LONDON.—For pointing, decorative and sanitary repairs, and electric light installation, 25, Penywern-road, Earl's Court, S.W. Messrs. Morley & Letts, surveyors, 185, Earl's Court-road, S.W.:—

J. Whitaker* £314

LONDON.—For alterations and additions to the Lager Brewery and Cannon Brewery, Tottenham. Mr. G. Banyard, architect and quantity surveyor, Gydder-street, Cambridge:—

Cold Storage.

Downs	£4,160	Taylor & Kensitt, London*	£3,606
Dove Bros.	3,775		
P. Banyard	3,620		

Insulation.

Downs	£1,680	Banyard	£1,400
Dove Bros.	1,485	Taylor & Kensitt* ..	1,322

Boundary Wall.

Downs	£457	Taylor & Kensitt	£468
Dove Bros.	415	Banyard, Cambridge*	378

* Accepted subject to reduction if old glass bottles may be used in the concrete foundations.

LUDLOW (Salop).—For Ludlow sewerage and sewage disposal. Messrs. Pollard & Tingle, engineers, 31, Old Queen-street, Westminster, S.W.:—

Sewers.

	Contract No. 1.	Contract No. 2.
Ballard, Limited	£7,300 0 0	£5,000 0 0
Killingback & Co. ..	6,200 0 0	4,367 0 0
Thomas Adams	5,300 19 5	5,253 5 6
H. Williams.....	5,766 17 0	4,119 12 2
Thomas Harris	4,450 0 0	4,400 0 0
J. A. Ewart, Warrington*.....	3,950 0 0	3,980 0 0
H. Roberts	4,047 6 6	3,610 0 0
Engineers' estimate.....	£7,324 0 0	

Machinery.

	Contract No. 3.
Andrew & Co.	£1,040
Crossley Bros.....	966
Fielding & Platt.....	852
Dudbridge Iron Works, Limited	846
Glenfield & Kennedy, Limited	772
Forward Engineering Co., Limited.....	694
Campbell Gas Engine Co., Limited, Halifax*	620
Bird & Co.	605
Pollock, Whyte, & Waddel	598
Engineers' estimate	£800

NEWMARKET.—For carrying out work in connexion with the sewerage and surface water drainage of the district of Exning, for the Newmarket Urban District Council. Messrs. Beesley, Son, & Nichols, engineers, 11, Victoria-street, Westminster, S.W.:—

G. R. Mann	£15,749	0	0
F. W. Trimm	15,636	0	0
Johnson Bros.....	15,300	0	0
J. Jackson	14,564	0	0
G. Osenton	14,448	0	0
Saunders & Co.	14,434	0	0
Underwood & Bros.	14,210	0	0
T. Smart	13,769	7	2
E. Powell.....	13,557	6	0
J. & T. Binns.....	13,307	0	0
Bower Bros.	12,999	0	0
H. J. Linzell	12,937	0	0
Wilkinson Bros.....	12,500	0	0
W. Manders, Leyton*	11,832	0	0

REDDISH (near Stockport).—For dwelling-house and shop, &c., at the corner of Gorton-road and Thomas-street, Reddish, for Mr. W. E. Stevenson. Messrs. C. K. & T. C. Mayor, architects, 41, John Dalton-street, Manchester. Quantities by Mr. J. H. Stone, 51, King-street, Manchester:—

Smith & Mason, contractors, Reddish* £700

THORP PERROW (Yorkshire).—For electric light installation at Thorp Perrow, Yorkshire, for Mr. H. C. Allfrey. Mr. Morgan Williams, consulting engineer, 39, Victoria-street, Westminster, S.W.:—

J. C. Holmes & Co.....	£2,575
Ernest Scott and Mountain	2,504
Cox-Walkers	(1) 2,400 (2) 2,280
Bland Bros.	2,380
Walker & Hutton.....	2,250
Mavor & Coulson, Glasgow.....	(1) 2,051 (2) 2,030 (3) 1,995*

WAKEFIELD.—For the erection of a warehouse, &c., Providence-street. Mr. W. Wrigley, architect, 6, Westgate, Wakefield. Quantities by architect:—

	£	s.	d.
Building.—Bagnall Bros., Eastnoor, Wakefield	£366	1	6
Plastering.—J. Platts, Providence-street, Wakefield.....	25	0	0
Slating.—C. F. Rycroft, Park-street, Wakefield	62	10	0
Joinery.—W. Stead, Tavora-street, Wakefield	305	10	
Plumbing.—S. Atkinson, Calder, Vale-road, Wakefield	99	13	1
Painting.—Baines & Taylor, George-street, Wakefield	20	10	6
Engineering.—Oakes & Son, Westgate, Wakefield	26	16	6
	£906	1	7

LONDON.—For the erection of Coroner's Court, Mortuary, &c., White Hart-lane, Plumstead, for the Vestry Mr. Frank Sumner, Engineer, Vestry Offices, Maxey-road, Plumstead:—

	Coroner's Court. £ s. d.	Mortuary. £ s. d.	Disinfecting Station. £ s. d.	Total. £ s. d.
W. J. Hart, Plumstead*	2,641 19 1	2,343 2 9	1,177 9 3	6,162 11 1
E. Proctor, Woolwich	2,873 0 0	2,436 0 0	1,390 0 0	6,699 0 0
Martin, Wells, & Co., Vauxhall.....	2,857 0 0	2,592 0 0	1,579 0 0	7,028 0 0
Thomas & Edge, Woolwich.....	3,100 0 0	2,900 0 0	1,900 0 0	7,900 0 0

Patman & Fotheringham, Islington (Coroner's Court only) £2,821.

* Accepted except for Coroner's Court, which is held in abeyance.

[*See also next page.*

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LONDON SCHOOL BOARD TENDERS.

AT the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect :—

ACKMAR-ROAD.—Painting exterior (Boys', Girls', and Infants', and Special School) :—

Lorden & Son	£288 0	F. G. Minter	£200 0
R. S. Ronald	275 0	W. Hammond	189 0
C. Gurling	220 0	F. T. Chinchen*	186 15
White & Co.	219 0		

BROOMSLEIGH-STREET.—Painting interior (old and new portions) :—

T. Cruwys	£450 0 0	J. W. Dixon	£423 0 0
Marchant & Hirst	437 0 0	W. Chappell	420 0 0
		Hodgson & Co.*	350 18 6

CAMDEN-STREET.—Painting interior (old portion) :—

Wall & Co.	£449 10	J. W. Dixon	£385 0
Stevens Bros.	440 0	Hodgson & Co.*	328 18
T. Cruwys	428 0	W. Chappell	320 0

CRAWFORD-STREET.—Painting exterior :—

H. & G. Mallett	£219	W. V. Goad	£165
J. & C. Bowyer	204	Maxwell Bros., Ltd.	163
Rice & Son	174	J. F. Ford	147
Holloway Bros.	170	Holliday & Greenwood*	125

FIRCROFT-ROAD.—Painting interior and exterior :—

R. S. Ronald	£593 14 4	Johnson & Co., Ltd.	£431 0 0
Lorden & Son	522 0 0	Garrett & Son*	343 0 0
E. Triggs	502 0 0		

FLORA-GARDENS.—Painting interior :—

S. Polden	£495 0	W. R. & A. Hide	£262 0
W. Hammond	298 0	F. Chidley	260 13
W. Brown	297 5	Bristow & Eatwell*	251 0
F. T. Chinchen	286 10		

FOSSDENE-ROAD.—Painting interior and exterior :—

Hayter & Son	£478 10	E. Proctor	£392 0
W. Banks	463 0	W. Jolly*	355 15
H. Groves	408 0		

GLOBE-TERRACE.—Painting interior :—

Gibb & Co.	£445 0	Collis Willmott	£336 0
A. W. Derby	360 0	J. Haydon*	303 13
G. Barker	348 0		

HATFIELD-STREET.—Painting exterior :—

G. Brittain	£162	E. Flood	£147
Johnson & Co.	151	Holliday & Greenwood*	117

HIGH-STREET.—Painting interior :—

Silk & Son	£277 0	T. Cruwys	£198 15
G. Barker	229 0	Collis Willmott*	164 5
Barrett & Power	228 0		

OLDRIDGE-ROAD.—Painting interior :—

Bulled & Co.	£514 10	Unsigned	£440 0
Johnson & Co., Ltd.	499 0	Garrett & Son	440 0
J. & C. Bowyer	497 0	Rice & Son*	434 0
E. Triggs	479 0		

ROSEBERY-AVENUE.—Painting exterior :—

McCormick & Sons	£210	Bristow & Eatwell*	£105
Johnson & Co.	165		

SHERBROOKE-ROAD.—Painting exterior :—

W. R. & A. Hide	£207 10	Lathey Bros.	£139 0
C. Gurling	191 0	F. G. Minter	132 0
E. Flood	187 0	W. Hammond*	128 10
C. Curd	145 0		

THORNHILL-ROAD.—Cleaning interior (old portion) and painting interior and exterior (new portion) :—

McCormick & Sons	£717 0	Stevens Bros.	£618 10
F. Britton	700 17	Marchant & Hirst*	579 0

WALLER-ROAD.—Painting interior :—

Hayter & Son	£394 0 0	G. Kemp	£249 0 0
W. Banks	280 15 6	H. Groves	203 16 0
J. & C. Bowyer	266 0 0	H. J. Williams*	198 0 0

WILLIAM-STREET.—Painting interior (old school) :—

S. Polden	£522 0	W. Hammond	£316 5
T. Cruwys	359 10	Holloway Bros.	278 0
W. Hornett	331 0	F. G. Minter*	258 0
F. Chidley	318 19		

YORK-ROAD.—Painting interior :—

F. Britton	£658 16	W. Hornett*	£393 0
C. & W. Hunnings	570 0	W. Chappell	390 0
Marchant & Hirst	471 0		

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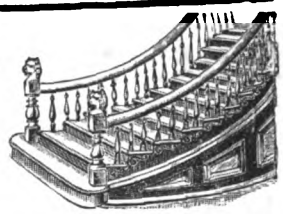

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LONDON COUNTY COUNCIL. Competent ARCHITECTURAL ASSISTANT REQUIRED. Salary 2l. 2s. to 2l. 12s. 6d. a week. Also JUNIOR ARCHITECTURAL ASSISTANT REQUIRED. Student just completing articles preferred. Aged between 18 and 23. Salary 1l. 5s. to 1l. 15s. a week.
Forms of application can be obtained from the Architect to the Council (Housing Branch), No. 18, Pall Mall East, S.W. and applications, duly filled up, must be sent in not later than TEN a.m. on MONDAY, the 30th day of JULY, 1900.
Applicants must state for which of the two appointments they are desirous of making application.
CITY of HULL.
WANTED immediately, in the Architect's Department, an experienced and thoroughly competent ASSISTANT. Applicants must be good draughtsmen, able to prepare working drawings and details, make surveys and take levels.
Salary, 110l. per annum.
Engagement to be terminable by one month's notice on either side.
Applications, stating age, experience, and qualifications, accompanied by not more than three recent testimonials, and endorsed "Architect's Assistant," to be sent to the City Architect, Town Hall, Hull, not later than 23rd JULY, 1900.
JOSEPH H. HIRST, City Architect.
Town Hall, Hull, July 9th, 1900.
ERITH SCHOOL BOARD.
CLERK OF WORKS.
The SERVICES of a thoroughly competent Man to act in the above capacity are REQUIRED by the Board re the erection of a new infant's school at Brook-street, Northumberland Heath.
The salary will be 3l. 3s. per week.
Applications, with copy testimonials, must reach the Board's Office not later than MONDAY, JULY 23rd.
Canvassing Members of the Board, directly or indirectly, will be deemed a disqualification.
By order of the Board,
H. W. SMITH, Clerk
School Board Office, Crescent-road, Erith.
July 11th, 1900.
HEYSHAM URBAN DISTRICT COUNCIL.
APPOINTMENT OF SURVEYOR AND INSPECTOR OF NUISANCES.
The above Council invite APPLICATIONS for the APPOINTMENT of SURVEYOR and INSPECTOR of NUISANCES to their district, which has an area of 1,774 acres, and a population of about 4,000.
The salary will commence at 120l. per annum, rising by annual increments of 10l. to a maximum of 200l. per annum, provided the accepted candidate is doing his duty satisfactorily to the Council.
The person appointed will be required to manage highways, streets, and general work of the Council, and to carry out the duties of Inspector of Nuisances; to examine and advise on building plans and construction, keep all necessary books and accounts, prepare estimates, plans, and specifications for works, and generally to discharge all duties appertaining to the office, and such other duties as the Council may from time to time suggest.
He will be required to devote the whole of his time to the work of the Council, and to reside within the district.
The Appointment will be subject to termination at any time by either party giving three calendar months' notice in writing.
Applicants must have had experience of the office, and must state when they will be prepared to enter upon their duties. The Appointment of Inspector of Nuisances is subject to the approval of the Local Government Board.
Applications, endorsed "Surveyor and Inspector of Nuisances," with copies of not more than three recent testimonials, must reach me not later than MONDAY, the 23rd day of JULY, at FOUR p.m.
By order,
ALFRED BATES, Clerk to the Council.
No. 26, Claremont-road, Morecambe, W.C.
ILFORD URBAN DISTRICT COUNCIL.
The above Council are prepared to receive APPLICATION for the APPOINTMENT of a CLERK OF WORKS for certain works of sewerage about to be commenced in their district.
Wages 3l. per week.
Applications only from candidates who have had considerable experience will be entertained. Particulars of past work, age, whether married or single, and if appointed how soon duties could be commenced, together with copies of three recent testimonials must be sent to me here not later than MONDAY, the 23rd instant, endorsed "Application for Clerk of Works."
Canvassing members of the Council either directly or indirectly will disqualify candidate.
JOHN W. BENTON, Clerk to the Council.
Council Offices, Ilford.
July 12th, 1900.
ARCHITECTURAL & ENGINEERING ASSISTANT WANTED in the City Engineer's Office, York.
Salary, 150l. per annum. Must be a competent designer and draught-man, and be able to prepare specifications, quantities, and estimates.
Applications, stating age and experience, with copies of three recent testimonials, together with samples of applicant's work, to be sent to the undersigned on or before the 4th of AUGUST, 1900.
A. CREBE, City Engineer and Surveyor.
LEYTON URBAN DISTRICT COUNCIL.
BUILDING INSPECTOR.
The Leyton Urban District Council are prepared to receive APPLICATIONS for the Office of BUILDING INSPECTOR for the district. He must possess a thorough knowledge of building operations and drainage construction, and must hold the Certificate of the Sanitary Institute.
He will be required to reside in the district, and devote the whole of his time to the duties of his office.
The salary will be 130l. per annum, rising by yearly increments of 10l. to 180l.
Applications in candidates' own handwriting, giving full particulars as to age, experience, previous occupation, &c. and accompanied by copies of not more than three testimonials of recent date, to be forwarded to Mr. WILLIAM DAWSON, M.Inst.C.E. Engineer and Surveyor to the Council, Town Hall, Leyton, not later than the 28th inst. from whom a list of the duties of the office may be obtained.
Canvassing members will disqualify.
By order,
R. VINCENT, Clerk to the Council.
Town Hall, Leyton, July 18th, 1900.

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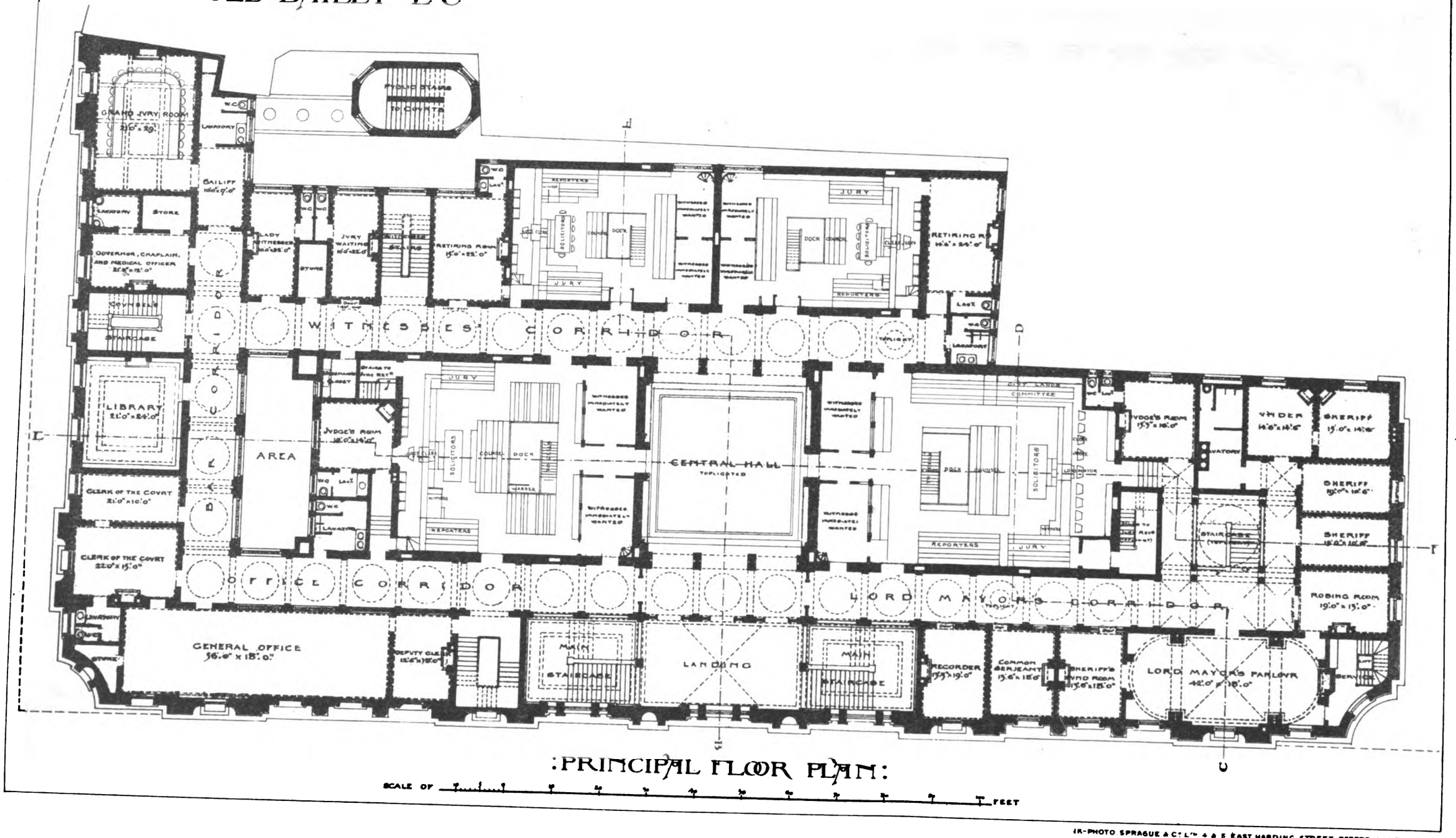
:NEW SESSIONS HOUSE:
:OLD BAILEY E.C.



:PRINCIPAL FLOOR PLAN:

SCALE OF FEET

(R-PHOTO SPRAGUE & Co. Ltd. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

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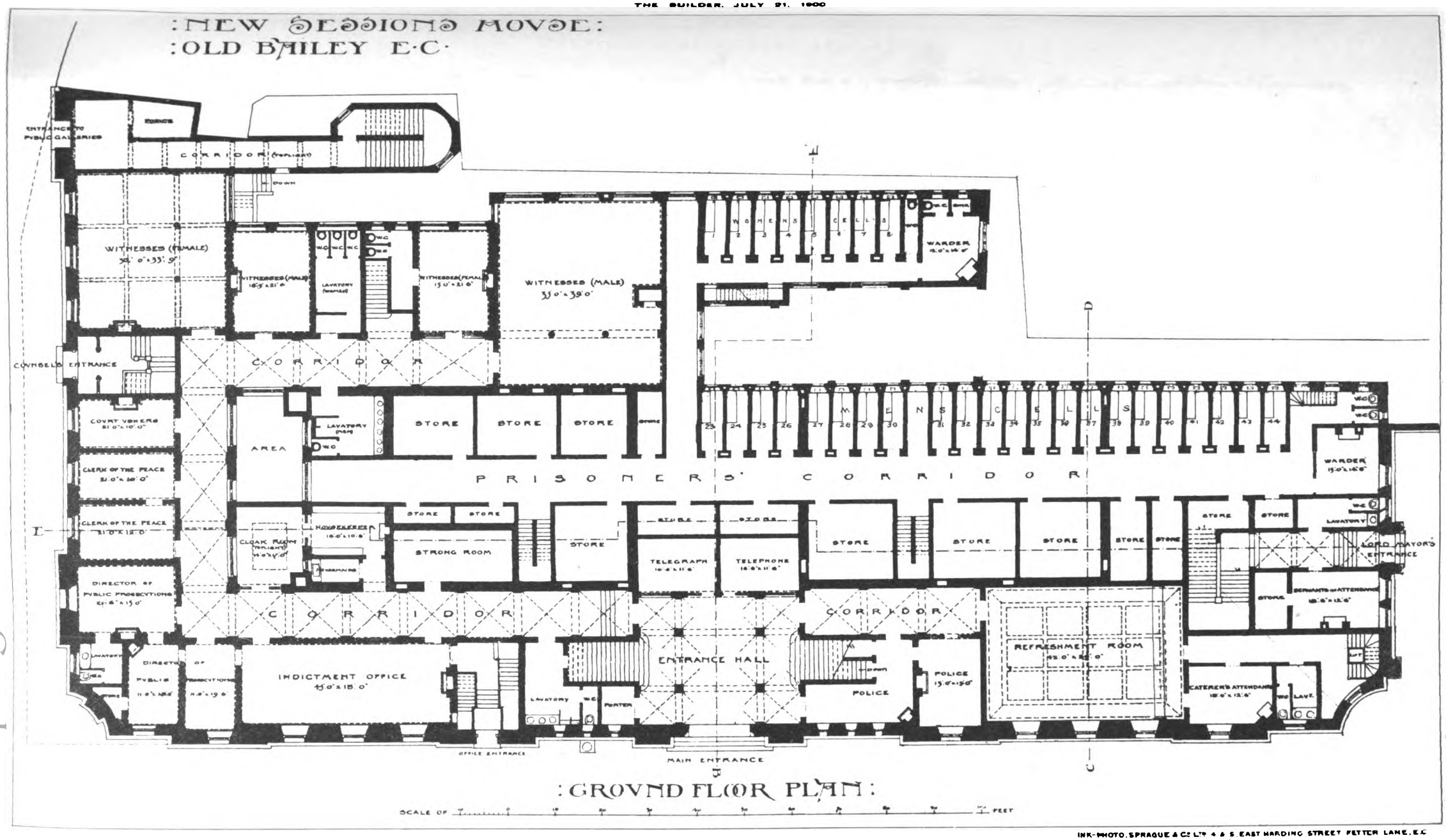

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OLD BAILEY SESSIONS HOUSE COMPETITION.—Design submitted by Mr. H. T. Hare, F.R.I.B.A.

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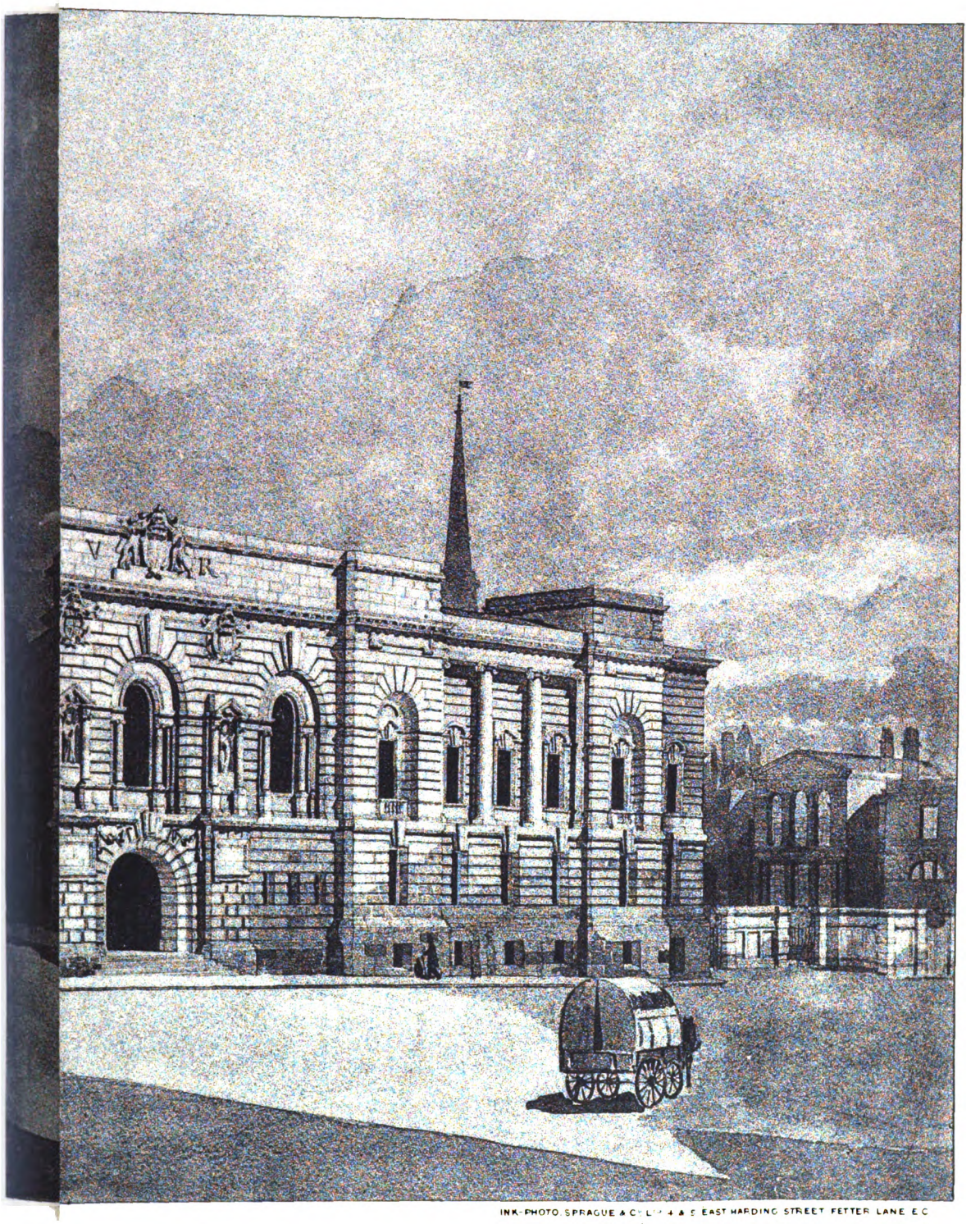

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H. T. Hare, F.R.I.B.A.

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The Builder.

VOL. LXXIX., No. 2999. JULY 28, 1900.

ILLUSTRATIONS.

Part of Lavenham Church, Suffolk.....*Double-Page Tone-Block.*
Sketches in Illustration of the Architectural Association Excursion :—
Melford Hall; Lavenham Cross; Porch, Hengrave Hall; Details, Long Melford Church .....*Double-Page Photo-Litho.*
Bardwell Manor; Stowlangtoft Church, &c.....*Double-Page Photo-Litho.*
Mildenhall Market Place; West Stow Hall; House, Clare, &c. .....*Double-Page Photo-Litho.*

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Outre-mer.

THE Report of the Proceedings of the Thirty-third Annual Convention of the American Institute of Architects, though it appears rather late, (the Convention having been held at Pittsburg in November last) contains matter which should still be of interest to architects on this side of the Atlantic. The Americans are at present paying more attention to architecture, showing more interest and we may perhaps say better achievement in the art, than any other nation except the French; and their views upon some of the problems of modern architecture should not therefore pass unnoticed.

The most important subject considered at the Convention, and reported in this volume,* is one which has been several times referred to in our columns, viz.: "The Influence of the French School of Design upon Architecture in America," on which three papers were read, followed by a discussion. The subject naturally includes the whole question of architectural aims and architectural training, for it is according to the view people take on these subjects that they will think the French influence on American architecture beneficial or the reverse. The existence of the "influence" seems to be tacitly admitted. Our own impression, which has been several times recorded, is that the devotion of the younger American architects to the Ecole des Beaux-Arts and to French training and ideas generally has had a pernicious effect on the American school, in injuring its chances of developing a new growth and school of its own in architecture. We are open to conviction, however, and it is at all events interesting to notice how the subject strikes the American architects themselves.

Mr. Brockway, the author of the first paper on this subject, is entirely optimist. His opinion is that the influence of the Ecole des Beaux-Arts training is "broad, noble, artistic, and healthy," and therefore that the training of American architects under it is much to be desired. In reply to the question, Why not give as good a training in America, he replies, "Some day, we hope, it may be as good. That is why we say—go to Paris," in order to learn to make it as good. This is a point in the question which more especially concerns the Americans themselves. The point of general interest is whether the nature of the training is the right one for developing architects. We extract the following remarks as bearing on the general question :—

"The men in the first class [at the Ecole] are a body of architects each of whom has had from three to five years' experience, and their knowledge, judgment, developed and inherent taste are veritable bulwarks for the new men of the second class. Moreover, this influence is always present in the "atelier" and is an invaluable part of the curriculum. Many of these men, in addition to the school work, are earning their living in the offices of various Government architects; some, even, are the sons of famous and prominent architects. During my period of study there, there were four men in our atelier (Ginain) who were sons of Government architects of prominence. Years of office practice here at home could not equal a year or two under such influences. When you add to this the surroundings of the school buildings, the books, photographs, casts, drawings, &c., the ever-recurring *concours* of the painters and sculptors, the expositions of which are held in the Salle Melpomene right at your door, so to speak, the result in the mind and heart of the student is an uplifting one, a loftier conception of architecture results, a devotion to one's chosen work is aroused, a sincerity of purpose, an increase of thoughtfulness, and the memory is stored with experiences to be drawn upon later. One realises that architecture is a fine art."

In a further passage Mr. Brockway remarks on the importance attached to plan in the Ecole system. "The plan is the point of most vital consideration as taught at Paris," and he considers that this influence of the Ecole has been most important in luring away the minds of his countrymen from flashy perspectives to considering the plan. This is no doubt a great thing, and if the Ecole has done that for American students they have reason to feel grateful. It is a point which may come home to the English mind, for we know the difficulty there is, in connexion with the Institute prize designs, in procuring anything like a really well-studied plan from our own students. If the Ecole can ensure this and we cannot, why is this?

Mr. Brockway's reply to the criticism as to the French character of many modern American designs (on which we have frequently commented) is that the conditions of life in civilised countries are getting more and more to an absolute level and similarity, "Government buildings, places of assembly and amusement, living apartments and dwellings, have come to be of a nature to afford about the same accommodations everywhere." This is no doubt true to a certain extent; but there are surely distinctive differences of climate, material, and associations still to be recognised. America, as a young country, is less troubled with associations, certainly, than older countries; but that is exactly the reason why we have always thought she had a chance of evolving something new in architecture, instead of adopting the training of an old country.

Mr. R. A. Cram, the author of the next paper, takes nearly the opposite view, and develops it with a good deal of spirit and point. He thinks that America has suffered from a perception of a want of style in her architecture, and has fled to French training as a training which tends to develop a feeling for style. "France is the only European country where there is a logical system of training, and France has preserved the style of the Renaissance with more vitality than has been elsewhere" (*sic*). In England, Germany, and America it was dead, "though unfortunately unburied;" the new scholasticism has made it thoroughly living in France, and it has been galvanised into life in the United States. It is no use, he thinks, to dispute whether Parisian Renaissance is a good or a bad style for France; it is inevit-

* Proceedings of the Thirty-third Annual Convention of the American Institute of Architects, held in the Monongahela House, Pittsburg, Pennsylvania, November, 1899. Edited by Glenn Brown. Washington: Gibson Bros. 1899.

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able or France; it expresses the time and the people and the thing they are pleased to call civilisation.

Let us grant this; let us confess that architecture in France is living, and that the style is just as appropriate to the time as was Doric to that of Pericles: what then? Is there any reason why we should seize upon it and force it on our own civilisation? Are we a province of France, are we in harmony with her ideals and her methods, are we French by instinct and sympathy? If not, wherein is the *culte* of the Ecole any less affected than we who borrow a style for church building from another land? Are they not dealing with an alien style? Are they not trying to express Anglo-Saxon ideas through the medium of a Gallic language?

* * * *

We want architecture that will be logical and national and expressive of the agency that calls it into being. We cannot create a style, for we have not finished creating a civilisation as yet, and that must come first, but we have various powers or agencies that exist more or less independently of national civilisation and are not consequent upon it."

Among these agencies, according to the author, is the Church, which is curiously ignored by the American students of the Ecole. They feel instinctively that the modern French Renaissance does not supply them, at all events, with appropriate church architecture. Hence it evidently cannot be the be-all and the end-all of modern American architecture.

The third paper, by Mr. H. L. Warren, of Boston, is we think the best and most philosophical of the three. He comes to much the same conclusions as Mr. Cram, but by rather a different road. He commences by drawing a picture of the manner in which American architecture suffered, during more than the first half of the century, by the want of trained practitioners There were few men able to design even respectable buildings. At the beginning of the century the architecture of the country was still mainly in the hands of simple craftsmen who were carrying on the tradition of the Colonial period; but their loss of traditional skill and the rival and confusing claims of the Greek and the Gothic revival produced a condition of chaos from which the advent of the professionally trained architect was the only way out. Into this chaos came, in the sixties and seventies, the educated architects; deriving their education from two sources, England and France. The English training, according to the author, resulted chiefly in an importation of the ideals of the English Gothic revival—not much (from the present point of view) to have presented to another country, but it no doubt assisted to some extent. The introduction of the French system, or of the regard for it, was largely owing to the influence of W. M. Hunt, and a number of American architects who are now leaders in the profession were trained in his atelier at New York (no doubt based on the French model), or, like him, went to Paris to study. Mr. Warren considers that, in view of the formless and chaotic condition of American architecture even twenty years ago, they owe an immense debt to the Ecole des Beaux-Arts; but the following is his further comment:—

"In spite of its fine qualities, almost unrivalled in the modern world, there has been constantly apparent in French architecture, since the time of Louis XIV., a note of extravagance, of theatrical display, of redundant, and sometimes tasteless, ornament, which has frequently injured some of its finest productions; but there have nearly always been men like Labrouste, Daumet, Vaudremer, who have, by precept and example, set their faces against this extravagance. But the wave of indiscriminate admiration of the vagaries and vulgarities of Rococo architecture, which has of late swept over the civilised world like a plague, has made itself felt nowhere more strongly than in Paris, and the mad craze for novelty for the sake of novelty has run riot in an extravagance of *hautes nouveautés* which is enough to make Labrouste and even André turn in their graves."

Like another of the speakers, Mr. Warren insists strongly on the value of the French training, as a system, on account of its insistence on composition, its excellence of proportion and mass, and its mastery of monumental planning. The imitation of French work he thinks is only a passing fashion. "The principles that have been learned we may hope to keep." That is, we think, the right way to look at it.

In the short discussion which, in the pages of the Report, follows these papers, it may be discerned that there was rather a general concensus of feeling in favour of the views expressed by Mr. Cram and Mr. Warren. The excellency of the French system of training, as training, was generally admitted; the excellence of French architecture, as an objective for imitation, was considerably called in question. There was also a general feeling that individuality in American architecture, even with every desire to preserve style, was by no means an impossibility or even hopeless, on the mere ground that each nationality had inevitably its own stamp in its own way of doing things. This, of course, was what was practically denied by the reader of the first paper, but Mr. W. R. Waie, in some remarks which closed the discussion, gives the following instance of this, which is not only interesting in itself, but also in the fact that our own Institute of Architects was the scene of the experience narrated:—

"I have no doubt that an American way of using these things will come, if it is not here already. I am confirmed in this by an experience which I had thirty-three years ago, when I had the honour of performing the part—the self-appointed but none the less the honourable part—of being an ambassador from this body to the Royal Institute of British Architects. I thought it would be a fine thing to travel around as a minister plenipotentiary, and I went to the President and to my friends who were then members of the Institute, and collected a portfolio of photographs, which I took to England with me. I engaged a cab and drove up to No. 9, Conduit-street, and presented them, in as great state as I could command, to the Secretary of the Royal Institute of British Architects. In a few weeks there was a meeting set apart to receive this distinguished gift, and the things I brought in the portfolio were hung up around the room.

These things were patent imitations of the Roman, German, Italian, French, and English architecture of the day, or of past days, and were pretty successful in imitating the manner and spirit of the originals. But you do not know how queer they looked when they got over there. They did not look French, English, German, or Italian, but they did look American; and greatly to their credit. These drawings were not unduly praised nor blamed, but the gentlemen said, 'How interesting these things are; how unmistakable a type; how perfectly obvious it is that these never could have been done in any other country than America.' That was not said in a spirit of derision, but of respect and regard. They saw the different way we had of doing things."

We are quite certain no remark would be made "in derision," but considering that this was thirty-three years ago, there may perhaps have been a sub-feeling, of a kindly nature, that the Americans at that date did not handle Classic or Gothic detail quite according to knowledge. Nowadays there is no doubt that, in the way of Classic detail at all events, they would probably make a better show than we do, thanks to Ecole des Beaux-Arts training. Still, the anecdote is not without its point.

Almost concurrently with this Report of the Convention of American architects there comes to us a book containing, among other matters of interest, a large number of illustrations of recent American architecture. This is the first issue of "The Architectural Annual."* This handsome volume contains a considerable number of essays by leading American architects, and a great number of illustrations. The whole of the California University designs are given in it—the whole of the second competition, that is to say, and it includes also a good many illustrations of the Paris Exhibition buildings; but the remainder are mostly of American architecture. The longest article in it devoted to a description and illustration of the works of a young architect, Mr. Wilson Eyre, jun., who, though born in Florence, is a Philadelphian by descent, and whose collective designs, in their variety and originality, justify the space bestowed upon him. We may presume that this method of illustrating the works of one man specially is intended to be a feature in future issues of the "Annual." A good many of Mr. Eyre's drawings consist of first studies and sketches for buildings and decorative details, and show a great deal of genius, originality, and variety. Moreover, they certainly afford evidence in favour of the view that there is, or is possible, a distinctively American treatment in architecture. A good many of these designs one would hardly connect with any other country but America; they are certainly for the most part neither French nor English in feeling. Two which are on facing pages strike us as particularly good in their very different ways; a sketch perspective of some offices for a firm in Philadelphia, and two small elevations of an upright piano, with outline sketches of two symbolical carved figures which are seated at each end of the top of the instrument. Some sketches for small centre medallions for stained glass are very noteworthy. The "House and Stable at Lansdowne," picturesque enough, represents that kind of return to the primeval architecture of the hut—in a more elaborated form—which is perhaps a little too much affected in some designs for American country houses. On the other hand, a design for the Borie Bank, Philadelphia, a building mainly in brick with a modillion cornice, is an excellent example of sober and restrained architecture suitable to a business building; it might be described as Queen Anne style, or based upon it; but in various details, such as the picturesque projecting iron balconies, it has a character of its own, and is not like an English building. The interior seems also to be treated in a sober but characteristic manner. Altogether, we feel indebted to the "Architectural Annual" for making us acquainted with the work of such a clever and, we gather, still young American architect. On the other hand, one or two illustrations

* "The Architectural Annual": Published under the auspices of the Architectural League of America, and edited by Albert Kelsey, late holder of the Travelling Scholarship in Architecture of the University of Pennsylvania. Issue for 1900. Philadelphia.

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contain a little gentle satire on foreign tendencies in American architecture; a very Parisian-looking hotel at New York is given with the addition "But not the French quarter," and "The Pennsylvania Institution for the Blind" is tagged with the question "Why Pennsylvania?" the query is to the purpose, for it would certainly be taken for a rather plain and unpretending Italian building. Two front elevations submitted in competition for the New York Custom House are exceedingly French in style and appearance, though these are not used to point a moral. The "U.S. Immigration Station, New York," by Messrs. Boring & Tilton, also shows much trace of French influence. In a note to the design it is stated that it "furnishes an object lesson in the advancement of Government architecture. It represents one of the few buildings" (one of the few Government buildings we presume is intended) "erected by private architects from a successful competitive design." This design with the comment, furnishes evidence of what has been already referred to in this journal, in connexion with a recent discussion at the Architectural Congress in London, as to the importance which, in the United States, is attached to the removal of Government architecture from the hands of official architects. Two designs of "high buildings," on the other hand, are distinctively American building—those of the Pabst Building, Milwaukee (Mr. S. S. Beman) and the Conduct Building, New York (Messrs. Sullivan and L. P. Smith). This latter, we see, is praised by Mr. Russell Sturgis and others as showing the true treatment of the lofty metal-framed building, but we have seen others we liked better; we presume that the piers are a casing, either of stone or terra-cotta, but if so, they look too thin for the material, and too much like an attempt to give the effect and proportions of metal to the casing, as a kind of indication of the metal structure behind it. Whether this is right in abstract principle is a long question; but the concrete effect in this case is disagreeably thin and wiry.

Among the subjects treated in the articles are "Street Pageantry, a New Field for the Architect and Sculptor"; "A Code Governing Competitions"; "City Bridges"; and "Transportation Architecture," or the architecture of city railway stations. Among the illustrations to this latter article the new railway station at Tours, by M. Laloux, is noticeable as a precisely logical treatment of a railway station front; it is somewhat like the idea of the King's Cross Station façade with sculptural and architectural detail added, and is a work highly creditable to the eminent French architect.

The "Architectural Annual" is beautifully printed and got up, and is in every sense a most interesting addition to illustrative architectural periodicals (if a work issued once a year is to be classed as a "periodical"), and we hope to welcome many more issues of it.

THE ROYAL ARCHITECTURAL MUSEUM.

(FROM A CORRESPONDENT.)

IN common, I presume, with the majority of the architects in London, I received a lithographic circular letter inviting me to attend the recent general meeting of the Royal Architectural Museum Society, or Company, as I believe it now to be. I made a point of attending the meeting, for old acquaintance sake, having known the Museum for more years than I care to remember, while my so doing was not of any particular merit, seeing that I happen to be a neighbour; but I confess I was startled at the unexpected poverty of the response to the circular in question. There was an entire absence of the younger men, who are usually to be found taking their part when some matter of architectural interest is in agitation, and it seemed to me as if only the representatives of the generation that founded the institution remained to take any interest in it. It appeared, moreover, from the proceedings, that this is admittedly the case, and that had it not been for the highly successful art school that has grown up within its walls, the doors must long ago have been closed.

To any one who knows, from such sources as Sir Gilbert Scott's autobiography, the efforts and struggles, the enthusiasms, indeed, that created the Architectural Museum, such a state of decay must appear sufficiently mournful.

The truth is that the promoters failed at a critical period—that at which they left the temporary shelter of the then newly rising South Kensington Museum—to realise the turn of the tide and to grasp the significance of the movement that was taking place around them, with the result that their rival filled up the gap, and, through the study of the Early Italian work promoted by them, exercised an extraordinary influence on subsequent architectural developments.

At the meeting I listened to some talk of an attempt to repair this blunder, and to restore the usefulness of the institution by obtaining casts to illustrate Classic work; but while no one would hesitate to advocate that course, one cannot but fear that it may be too late, at any rate so far as the Early Renaissance is concerned, seeing how splendidly, by the purchase of originals, by casts, drawings, and photographs, South Kensington has occupied that field.

Architects and students can only be attracted by catering for their most pressing wants. Without questioning the purity of the enthusiasm of the leaders who established the Architectural Museum, it must be borne in mind that a very real demand for examples of Gothic work existed at that time in connexion with the every-day office work of the revival period. This fact led the late G. E. Street rather to oppose the Museum as tending to "cribbing," while Sir G. Scott, in later life, came to realise that there was a fashionable side to the whole revival movement. The point, therefore, is, should not those who would restore the past architectural influence and life of the Museum proceed at once to provide for the most up-to-date requirements of the students and architects of to-day, relying on the real worth of the present specimens of Gothic art to attract their special devotees? It would seem to be a case with the authorities of "Rusticus Expectans," &c., while from another point of view they would be better advised in wrapping up their pill in the most modern jam.

In any enlargement of the scope of the Museum it will be hard to surpass the South Kensington Museum in Early Italian, or the British Museum in pure Classic; but in later phases of the Renaissance, and particularly in the work of our own country, much might be done that would give to the Royal Architectural Museum a special character, so that it would be a place which the modern student could not afford to neglect.

It is precisely that element of indispensableness that the directors in the past have failed to maintain, until by the natural flow of time they have found themselves deserted.

It is not a question of personal sympathies and beliefs, but of illustrating the best of all schools, and of serving each generation of students to the utmost of our abilities, not on the lines which we might prefer, but in the way of their own natural development. I am driven to dwell on this point because, on a reference to the proposed Classic casts, an old member stated they had already got them, which is true in the sense that on the topmost floor, and high up, is a most inadequate collection of some fragments of Classic detail, and I remember that there used to be some small and useless models of the orders.

It may be remarked that casts are not necessarily expensive; it is surprising how advantageously they may be obtained, at any rate abroad, while much may be done with drawings and photographs to illustrate a period.

I understand that the recent erection of some classrooms has removed another great drawback to effective study, namely, the former somewhat embarrassing monopoly of the Hall and its galleries by the fair students of the Art School.

Every architect must wish success to an effort to restore and increase the usefulness of this valuable Museum, which might grow, indeed, until it could challenge some comparison with the well-known galleries of the Trocadéro at Paris.

X. Y. Z.

NOTES.

The Westminster Improvement Scheme.

THE House of Lords Committee have quite rightly declined to sanction the scheme of the London County Council for Westminster Improvements as brought before them. The County Council, with that preference for the shortest route and utter ignoring of architectural alignment which is characteristic of nearly all public bodies in England when dealing with street improvements, proposed, in making a new street to the end of Lambeth Bridge, to bend the line of Abingdon-street where it starts from Old Palace-yard so as to take it by the shortest line to the head of the bridge, thereby not only destroying the vista from the south of St. Stephen's Porch, but (which to our thinking is even more important), destroying the parallelism of the west side of the street with the Houses of Parliament. It seems almost impossible to understand how the governing body of a great capital, suggesting a large and costly improvement, should have been so totally blind to the architectural conditions of the scheme as affecting the appearance and surroundings of our greatest modern building. It is a question, certainly, whether the House of Commons would have done any better, but this is one of the cases in regard to which even radicals who care at all about the architectural amenity of London may be grateful that we have a House of Lords, which contains some members who are not quite without perception on points of this kind. The Lords' Committee have required that the Abingdon-street line should be preserved

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parallel to the Houses of Parliament as far as they extend; after that it may take a slight angle towards Lambeth Bridge. We should have thought it best that the Abingdon-street line should have been continued further and Lambeth Bridge reached by a quadrant turn at the end, but for one consideration—the position of St John's Church. If this church is to be opened out in a symmetrical square according to the arrangement shown in the County Council Plan (and adopted without acknowledgment from a plan in the *Builder*), the new road should run, at this point, parallel with one face of the church. This has been overlooked in the Lords' Committee amended plan, where the road is very nearly at right angles with the axis of the church, but not quite; thus, in this respect, it is neither one thing nor another.

Architectural Congress at Paris.

THE International Congress of Architects, which will be held in Paris, at the Ecole des Beaux-Arts, from July 30 to August 4, is an occasion of some interest, and it is to be hoped that English architects will be well represented there. The questions to be discussed have been selected by the Paris Committee with the object of avoiding subjects of partial or local interest, and only treating of such as may equally concern architects all over the world. The subjects for consideration are: (1) "La Propriété Artistique des Œuvres d'Architecture," a question already partially discussed at the Brussels Congress in 1897; (2) "L'Enseignement de l'Architecture," a question which has already been before both the Paris Congress of 1889 and the Brussels Congress of 1897; (3) "Du Titre d'Architecte dans les diverses Pays," a subject included at the request of the "Société Academique d'Architecture" of Lyons; (4) "L'Habitation à bon marché dans tous les Pays," included at the suggestion of the Institute of British Architects; (5) "De la Conservation des Monuments," included in accordance with a suggestion received from Germany; and (6) "De l'Influence de la Réglementation Administrative sur l'Architecture Privée Contemporaine," suggested both by the German architectural societies and the Institute of British Architects. If these subjects are to be at all fully discussed, it must be admitted that the week will be pretty well filled up, independently of the projected visits to buildings in progress, to the great Exhibition, and to Chantilly. Those who have not seen the last-named place should not miss this excursion. Chantilly in its way is unique.

Architects in New South Wales.

THE twenty-eighth annual Report of the Institute of Architects of New South Wales shows that it has only yet attained a total of thirty-five members. These numbers surely are not any proportional representation of the number of architects in New South Wales; and if not, why do the others stand aloof? Much cannot be expected from a Society so limited in numbers; nevertheless it appears to be doing a creditable amount of work. During the session papers on the following subjects have been read, viz.:—

"1. 'Some Disputed Points in Building Construction,' by Professor Warren, M.Inst.C.E.

2. 'The Law of Building Contracts,' by H. de B. O'Reilly, B.A., LL.B.

3. 'Sanitation, as applied to House Building,' by J. M. Smail, C.E.

4. 'The London Building Act,' by N. Phelps Richards."

At the suggestion of the Council Professor Warren also delivered a lecture on the "Results of Tests made at the University upon Trachyte." These results were laid before a large meeting of architects and engineers, and the lecture in pamphlet form was printed and distributed gratuitously among those interested. The Council has been in communication with the Royal Institute of British Architects with reference to the establishment of the R.I.B.A. Examinations in Australia. Negotiations are now nearly completed, and it is expected that during next session the first of the examinations for that Associateship will be held at Sydney. On the proposal of the Council it has been arranged that a conference of Australian architects shall be held during 1900, in which all the Australian institutes have promised to co-operate. The subjects set down for discussion are those which interest the whole of the profession in Australia. In connexion with the conference there will be an exhibition of drawings illustrative of the growth of architecture in Australia during the nineteenth century.

Gas Testing by the L.C.C.

LAST Tuesday the London County Council had under consideration a Report from the Public Control Committee relating to gas testing, and agreed to the recommendation "That the Council do ask the Board of Trade to institute an inquiry as to the cause of the persistent differences between the results of testing the illuminating power of gas supplied by gas companies at prescribed testing places and of tests made with the portable photometer of identical construction of gas supplied to other buildings in the county." Reference is made in the Report to the employment of the portable photometer in Liverpool by Mr. Bellamy. It is stated that it has been "agreed between the gas company and the Corporation [Liverpool] that the testing in the various parts of the city by the portable photometer should be accepted as evidence of the quality of the gas." The natural inference from this statement would be that the gas company is subject to the same liabilities for low results obtained with the portable photometer as for similar results obtained at the ordinary testing stations. We believe, however, that the arrangement is a purely voluntary one, and that no legal action can be taken against the gas company for any results obtained with the portable photometer. We understand that when low results are obtained the company is informed as to the place in which the tests were made, and if satisfied that the tests were made under fair conditions, undertake to clean or alter the service-pipes until the photometer shows the gas to be of the same quality as that being sent out from the gasworks. We know of no reason why a similar arrangement should not be made in London, to the mutual benefit of consumer and supplier. The proposed inquiry could but elicit a repetition of the information recently obtained by the Parliamentary Committee already mentioned. It is not probable, however, that the gas companies will offer any opposition to the suggestion, since there is little doubt that the Board of Trade would merely confirm the policy adopted by the Parliamentary Committee.

The District Messenger Company.

WE regret to learn from the Report of the Directors of the District Messenger Company, that the Postmaster-General has intimated his decision not to renew the Company's licence to carry letters, but has suggested that the Company should collect them and hand them over to the Post Office to carry. A more absurd proposal could hardly be made; it is one which would unquestionably destroy the whole value of the Messenger Company's service, and in fact put it out of existence. The Messenger Company state that in order to satisfy the Post Office authorities that such a scheme was impracticable a series of experiments was made. Nine messages were sent, first by the present system, secondly by the suggested new system. The result was an average delay of eighteen minutes on each message (new system). The Messenger Company has therefore intimated to the Post Office that it is unable to accept the suggestion made, and has strongly urged the Postmaster-General, on grounds of public convenience, to make the Company its agents, not only to collect urgent letters, but also to carry them when collected. A scheme to destroy the whole usefulness of the District Messenger Company by making it subordinate to the Post Office service comes, we may add, with a particularly bad grace from the Post Office Department at the moment when there is a general complaint of the disorganisation of its own system and of the constant delay of letters.

Metropolitan Railway, Paris.

LAST week the Chemin de Fer Métropolitain was opened to the public, although all the stations are not yet available for use. Extending from Porte Maillot, at the entrance of the Bois de Boulogne, to the Cours de Vincennes, this line will prove of inestimable value to the inhabitants of Paris and to visitors attending the Exhibition. During the intolerable heat of last week the new line was the only place where one could enjoy a reasonable temperature for a few minutes, and the contrast on emerging into the open air was particularly striking. Although the stations are at present somewhat difficult of discovery, and no publicity seems to be courted by the administration, the trains have been crowded ever since the opening of the line. The tunnel is almost immediately beneath the ground level, and contains both the up and down lines. Electric traction has naturally been adopted, propulsion being effected by motors attached to the vehicles, which are of first and second class. So far, the whole of the arrangements appear to be very satisfactory, but the length of the trains is decidedly insufficient. The Champs Elysées station adjoins one of the principal entrances to the Exhibition, and at Vincennes there is a regular service of electric trains to and from the Annexe.

St. Anne's Church, Soho.

DR. TRISTRAM, Q.C., Chancellor of the Diocese of London, after hearing the petition of the Rector and Churchwardens in the Consistory Court on the 19th inst., agreed to issue a faculty authorising a conveyance of a portion of the churchyard to the Strand District Board of Works. The Board seek to widen a portion of Wardour-street, on its eastern side, by taking a strip of the churchyard—its length being 155 ft., and its width, tapering from north to south, from 9 ft. 4 in. to 7 ft. 4 in.

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—and will pay 490*l.*, which sum, it was stated in court, the Rector will devote to church purposes. The burial-ground, closed in respect of interments in August, 1853, was leased to the Board for a term of twenty-one years from March 25, 1892, as an open space, and was then laid out by the Metropolitan Public Gardens Association for a public recreation ground. The Board undertake to remove and re-inter any human remains, graves, or vaults that the site in question may contain, to build a new west wall with gates and steps for the churchyard, and to make good any damage that they may do to the trees, plants, and walks of the ground. The parish was taken out of that of St. Martin-in-the-Fields, and the church—dedicated to St. Anne in compliment to the Princess Anne of Denmark—was completed in 1686, having been erected in Kemp's-field. The tower, as depicted in the view by B. Cole in Maitland's "History of London," 1756, had originally four angle vases and carried an ogee-shaped eight-sided cupola, which supported an open octagonal lantern, surmounted with a concaved base bearing a bulbous-shaped spire and finial. Those features were taken down in June, 1800, and in pursuance of an Act 42 Geo. III., c. 72 (1802), a sum of 6,000*l.* was raised by annuities to meet the cost of rebuilding the tower, vestry-rooms, watch-house and engine-house, and of various repairs. These works were carried out by S. P. Cockerell, and finished in 1803; *teste* Malcolm's "Londinium Redivivum." The existing singular spire, of which the copper globe contains the clock's dial-plates, is due, perhaps, to Cockerell; its design is often, but not authoritatively, ascribed to Henry Hakewill the elder (1771-1830). The fabric of the church was restored by the late Sir Arthur Blomfield. In the Crace Collection are another view—by B. Cole (1754)—of the church from the north, and W. Pearson's drawing (1810) of the west front.

The Liverpool Cathedral Scheme.

A CORRESPONDENT points out, what we find is the case, that we were not quite accurate in stating in our note of last week, that Mr. Emerson "won" the original Liverpool cathedral competition, as the assessor, the late Mr. Ewan Christian, avoided making any distinct award; his taking this course was, in fact, the weak point in connection with the competition. His Report on the designs, however, practically amounted to a preference for and recommendation of Mr. Emerson's design, and we took it as such at the time, as we find on reference to our pages of that date.

THE ARCHÆOLOGICAL INSTITUTE AT DUBLIN.

THE annual meeting of this Institute, which is this year held in Dublin, opened on Wednesday, July 18, with the President's inaugural address. The address was read in the "Round Room" at the Mansion House, before a large audience of members of the Institute.

Alderman Flanagan, the Lord Mayor's deputy, bid the members welcome to Dublin's capital, and, whilst regretting the Lord Mayor's absence in London on municipal business, he trusted they would take with them on their return pleasant recollections of the ancient city. He asked Lord Rosse to take the chair as President of the meeting.

The Earl of Rosse then took the chair, and, after welcoming the members on behalf of the Royal Irish Academy, delivered an address. In calling the members' attention to the various antiquities they would examine, he said that Ireland had not been invaded by as many nationalities as England. The Romans were never here. The Danes, or Northmen, made, however, many descents and had their quarters for some time in Dublin, where the Royal Barracks are now situated. A bloody battle was fought between the inhabitants, under Brian Boru, and the Danes upon the plain of Clontarf.

Scattered over the country were numerous earthworks, circular in outline, known as "Raths," locally termed Danish forts, although there was no evidence to show that the Danes penetrated far into the interior. The members would visit buildings of more meagre history, dating back to the supposed time of St. Patrick. In the Isles of Arran erections supposed to be of the first century might be seen, although not included in the official programme of the excursion. In the largest and middle islands of Arran there were eight forts of unhewn stone, circular in form, with walls 12 ft. thick and 20 ft. high. The "Cloghauns," or beehive dwellings, could be found in Kerry. The paper would be incomplete without reference to the bogs so common in Ireland, and which rivalled the ashes of Pompeii in connecting the past with the present. Canoes, articles of clothing, gold ornaments, and bog butter were often discovered in excellent condition, and the body of a woman dating from pre-Christian times had been found in such preservation that an inquest was held, the jury returning a verdict of "Found dead." The Arran Isles possessed most curious customs, the inhabitants still wearing raw cowhide soleless boots, sewn like a bark canoe, and put on wet to adapt themselves to the shape of the foot. A good example of a pointed church would be found near the Rock of Cashel, and was worthy of study, as also was the more ancient Cormac's Chapel adjoining. Attention should be drawn to the Round Towers, about the origin and use of which so much controversy raged. The Irish castle was generally a square tower, with no ornament, having one room on each story, usually vaulted, and was a most uncomfortable dwelling in every way. The members would doubtless visit the National Museum, in which was stored a splendid collection of Irish art, and they would find unique examples of illumination, such as the "Book of Kells." It would be observed that the architecture of the country was exceptionally plain, owing to the material at hand, which consisted of granite or carboniferous limestone of a very durable nature. The hardness of these stones made carving difficult, but when found the work was naturally very sharp and well defined.

Sir Henry Howorth, President of the Institute, said they had come to Ireland with the greatest delight. He expressed, on behalf of the meeting, their thanks for the address the Chairman had delivered.

The meeting then adjourned for luncheon, and in the afternoon the members, under the guidance of the Cathedral architect, Sir Thomas Drew, visited St. Patrick's Cathedral, and afterwards drove to other places of interest in the city, including Dublin Castle and Trinity College. In the latter place they were shown through the library and inspected the valuable manuscripts therein.

The Antiquarian Section of the Institute opened on Wednesday evening in the rooms of the Royal Irish Academy, which have been lent for the use of the various sections. There was a large attendance when Lord Rosse took the chair at 8.30, and called upon Sir Thomas Drew, R.H.A., to read a paper upon "Dublin for Archæologists."

The lecturer, after welcoming the visitors on behalf of the Royal Society of Antiquaries of Ireland, said: "There is a note of sadness in thinking that this meeting in Ireland has been deferred so long. It seems but so few years since amongst the hosts of the Institute might have been some of the greatest of Irish scholars and archæologists, now, alas, but great names. There is, perhaps, the cheering side that to-day is the day of popular archæology; that for one profound archæologist of the past there are now ten, perhaps, unprofound, but interested followers of the science. The oak trees have fallen, and the aftergrowth of the woods is not quite the same. [The speaker having referred to the scientific works of Sir William Wilde, Sir Samuel Ferguson, Dean Reeves, George Stokes, and Sir John Gilbert, and the gaps their loss had created in the ranks of Irish archæologists, proceeded]: And now for a paradox. You have not come to visit an Irish city at all! You are not now even in the city of Dublin. The ancient city formed but a small part of the area of the present. Somewhere about 850 A.D.—allowing a discount of four hundred years or so to Irish chroniclers—the now interesting marauders, white 'gaels' or black vikings, Northmen, Ostmen, makers of history in these islands, ran their long galleys into the Liffey estuary, and made a footing on Irish soil. It was in a time when in the wide delta of the river spring tides would have rippled up to the walls of the Chapel of All Hallows, where the modern belfry of Trinity College stands on the site of the old one. But a few months since I uncovered the old river margin in the college and its landing stage for boats. The Northmen liked such low estuaries where they could run in and beach their galleys; and here, according to custom, they did so, and set up the 'Great Steyne,' a standing pillar-stone, which gave its name to Steyn in Scotland, Staines near Windsor, and probably Brighthelmstone or Brighton.

This record of the Danes was standing within the century. The Dune of Dublin—a crest of strategic capability, now crowned by the ancient City Cathedral—they made their circumvallated fortress. It is to be remembered that Dublin gives up its own internal evidence that it had no existence as a city—Ptolemy and the guide-books to the contrary, notwithstanding — until the Danish pirates made it their *pied-à-terre*, and held it grimly against the natives until 1038. In that year the battle of Clontarf weakened their hold on Dublin, but did not dislodge them. In that year Sigtryg Silkbeard, the Danish king of Dublin, actually founded a Christian church, which he called Christchurch, and you may walk to-morrow in the crypt surviving of that church.

At Dublin, Waterford, and Limerick we have still the separate Danish communities, surviving in their own walls until the Anglo-Norman invasion of 1169, when the history of present Ireland may be said to start. The wave of settlement of the dominant and masterful people of Anglo-Norman ascendancy was as inevitable as fate. It was the destiny of an Imperial race to pass over a narrow sea to the mastery of a rude and divided people."

Sir Thomas Drew then explained at some length the cause of the presence of two cathedrals in Dublin—Christchurch and St. Patrick's—and related the history of the foundation of the former by Strongbow, Fitzstephen, Raymond-le-Gros, and Laurence O'Toole — an Irishman of gentle birth who was educated at one of the famous Irish seminaries still surviving. There was also Basilia, the sister of Strongbow, who assisted in the work, and whose effigy was found in the place of honour in the chapter-house in 1886. Laurence O'Toole, who knew Italy and the church building of the Comacine brotherhood beyond Ireland, brought over a foreign architect, a Comacine master from Parma. In the last few months Dublin Cathedral has given up the name of its Italio-Spanish architect—one John. An inscription long misunderstood, and long preserved and traditionally honoured, has been translated by modern students of Norman French. An illustration of the inscription was thrown upon the screen; the translation runs thus: "John, the master builder of the brotherhood of Parma, and Dame Ramez Perez of S. Salvador of Asturias;" and another hand has added: "His wife and all his family who died in this land lie here." It is to this masterly John that the unique plan of Christchurch may be ascribed. A fair remnant of his church survives in the transept and part of the sanctuary.

"Strongbow, having died, was buried in the lines of the then unbuilt nave, and so lies until this day. Comyn, who succeeded Laurence O'Toole, on his arrival in Ireland, did not take kindly to his metropolitan church and its independent clergy. He thereupon conceived the idea of a new and grand church, a collegiate church, destined to be *the* cathedral. He adopted an ancient church of St. Patrick de Insula as a nucleus, and apportioned and mapped out the manses of his coming dignitaries, but did not build any part of St. Patrick's now visible. The building is from thirty to sixty years later." The lecturer having described the building of and materials used in Christchurch, said that its records were an epitome in illustration of Dublin history, of its Danish origin, its Anglo-Norman possession, of the Protestant Reformation in Ireland under Queen Elizabeth, the rule of Queen Mary, of Oliver Cromwell, of James II.

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and the Revolution, of the Huguenot immigration after the Revocation of the Edict of Nantes, which brought the arts, chief industries, and commercial enterprise into Ireland. The cathedral treasures were buried and its architecture obscured for centuries, awaiting their resurrection in 1886. St. Patrick's was in a similar plight until 1864. There was another mediæval church of which remains survived, St. Audoen's, within the City walls. In conclusion, the lecturer pointed out that the parish names within the walls, as St. Audoen or Owen, St. Werburgh, St. Michael and St. John, and St. Andrew indicate English fashion and connexion. Those without the walls, St. Patrick, St. Bride (or Bridget), and St. Kevin indicate Irish sympathies. The suburbs are mostly in association with Danish Dublin.

On the motion of Sir Henry Howorth a vote of thanks to Sir Thomas Drew for his address was unanimously carried.

Mr. J. T. Micklethwaite said he did not quite agree with the lecturer's remarks anent the inscription found in Christchurch Cathedral. There was absolutely no suggestion thereon that John of Parma was the architect of the building, only that he and his family were buried there.

Optical Illusions in Mediæval Architecture.

Mr. G. Coffey then delivered an address on "Optical Illusions in Mediæval Architecture." The lecturer said these illusions, which were thought to be peculiar to Classic architecture, were discovered in Romanesque architecture by Professor Goodyear, of New York, in 1894, and in 1895 he brought these facts before the British Association in Liverpool. The Professor's statements were received with some scepticism at first, but after doubtful cases were ruled out there was a residuum which showed there was some truth in the matter. The subject was certainly important, and was perhaps more deeply thought of on the Continent. In any further work on church plans these principles revealed by Mr. Goodyear must be considered. The curved lines of the Parthenon were well known. Vitruvius wrote in the time of Augustus that a stylobate should not be horizontal, but should rise from the ends to the centre. The capitals of the columns should not be in a straight line, but should rise in proportion to the curve of the stylobate.

Pennethorne in 1833 went to Egypt, and found that the lines of the inner court of the Temple of Medinet Habou were not straight. There was a curve of 4½ in. in 104 ft. on two sides, and 8 in. in 80 ft. on the other two. This discovery reminded him of the remarks of Vitruvius, and he afterwards looked to this in Athens. He did not publish his discoveries at the time, and in 1846-47 Mr. Penrose measured these curves. The lines of Egyptian temples curved on plan, those of the Greeks in elevation. The Temple of Neptune at Pæstum has curves on plan at the sides and in elevation on the pedimental ends.

Professor Goodyear went to Egypt in 1892, and verified the curves in other temples as at Luxor, Karnac, and Edfou. He also noted that the Maison Carrée at Nimes had a curve on plan of 5 in. in the length of the building. This established the theory that the curves were in provincial Roman work as in Greek. He next studied the Italian early churches, and found a similar state of things existing. In fact the buildings had all received, as it were, a freehand touch, which, though almost imperceptible, softened the geometrical outline.

These differences were often put down to error in setting out or of execution, but from accurate measurements it was found that the two sides of the Parthenon only differed by $\frac{1}{20}$ in. Mr. Coffey then, by means of numerous photographs thrown upon the screen and by diagrams, demonstrated his theories. He showed the three chief refinements adopted by mediæval architects, viz., the horizontal curve, the leaning front, and the diminishing arcade from the west end to the choir.

A vote of thanks to the lecturer terminated the proceedings.

The second day was devoted to visiting places of archæological interest round Dublin. The members assembled early at the Shelbourne Hotel and drove to Swords, where they inspected the Round Tower, which is in excellent preservation, and the ruins of the Archbishop's Palace close by. The latter covers a large area, but very little is left standing. Both the tower and the ruins were described by the Rev. Canon Twigg. The party then drove to Malahide Castle, where they were received by Mr. Dillon, agent to Lord Talbot de Malahide, and the Rev. Mr. Lindsay, the rector. Having viewed the fine collection of family and other pictures in the Castle, they proceeded to the ruined Abbey Church, in which is the tomb of Maud Plunkett, "maid, wife, and widow on the same day." The visitors then drove to St. Doulough's Church, and spent much time in that interesting building. It is small, but is two stories in height, having a stone roof of steep pitch, and service is still held therein. The party next saw St. Doulough's Well, an octagonal building, also stone roofed, the well being in the centre. They then proceeded to St. Doulough's Park, where they were entertained to tea by Mr. Hone, who showed them over the house and gardens. After a very pleasant day they returned to town, the few showers which fell having in no way interfered with the carrying out of the programme. In the evening the Royal Irish Academy and the Royal Society of Antiquaries, Ireland, gave a *conversazione* in the Science and Art Museum in honour of the visit of the Institute.

In the Central Court there are many valuable examples of architectural work and sculpture, which were of considerable interest to the visitors. The relics, such as the Ardagh Chalice, the Shrine of the Bell of St. Patrick's Well, the Tara Brooch, and the Cross of Cong attracted much attention. Mr. George Coffey described the most important contents of the Irish Section. The band of the Royal Irish Constabulary played various selections during the evening, and added much to the enjoyment of the guests.

A more extended excursion to Trim and Tara was arranged for the third day. The violent storm which broke over Dublin in the morning did not deter the members from joining in the trip, as a party of close upon one hundred left the Broadstone station at 9.30. On arriving at Trim it was found that the rain was over, and the roads were in a most favourable condition for driving. The first point of interest selected was Newtown Trim and the ancient Abbey of SS. Peter and Paul, a short distance away. This building dates from the early thirteenth century, when it was founded by Bishop Simon Rochford, who adopted the title of Bishop of Meath. The ruins have been sadly neglected. In the little parish church adjoining is a fine altar tomb with effigies of Sir Lucas Dillon and his wife. The party, having carefully inspected the Abbey under the guidance of the Rev. Canon Healy, returned to Trim, and were conducted to the parish church, in the ruined chancel of which are some interesting slabs and monuments. The building was erected in 1449 by the then Lord Lieutenant, and has a picturesque ivy-clad tower. The nave and chancel are of modern construction, but some of the earlier fragments remain. The next visit was paid to King John's Castle, founded in 1170 by Hugh de Lacy, who came over in the reign of Henry II. The Rev. Canon Healy gave a descriptive account of the ruin and its history, and that of the adjoining building, St. Mary's Abbey. At the conclusion of the Rev. Canon's remarks, Sir Henry Howorth returned thanks on behalf of the visitors.

After luncheon in the Courthouse, the party visited the Hill of Tara, where Mr. Robert Cochrane read a number of extracts descriptive of the spot. According to the chronology of the Four Masters, the Hill was first used as a Royal residence in the year 80 B.C., and was so used for 533 years. The speaker referred to the excavations carried on by Mr. Groom in search of the Ark of the Covenant. The results of the work were few, whilst the damage done to the King's chair was great. On the property belonging to Earl Russell nothing was allowed to be touched unless under archæological supervision, but Mr. Briscoe, the other owner, had given Mr. Groom his own sweet will with the place.

Sir Henry Howorth, in proposing a vote of thanks to Mr. Cochrane, said that as President of the Institute he protested with all the emphasis he could command against the great archæological crime of which they were witness. It was perfectly monstrous that custodians of property should tolerate such a thing as had been done here. They were standing in the presence of the greatest act of vandalism that had occurred in his long memory.

Sir John Dillon, having shown a few sketches and photographs he had made during the progress of the excavations, the party drove to Kilmessan station for Dublin.

A conversazione was given in the evening by the Lord Mayor and Lady Mayoress, at the Mansion House. In the Lord Mayor's absence Alderman Flanagan and his daughter received the guests. Many ancient Corporation documents were exhibited, the illumination of some examples exciting much admiration. The chief object of attention, however, was the gold cup recently presented to the city by the Queen as a memento of her visit. The guests were most hospitably entertained, and a very pleasant evening was spent.

The early part of Saturday morning was devoted to the annual business meeting, and it was almost noon before the members assembled for an excursion to a number of interesting buildings in the city.

The party first proceeded to Christ Church Cathedral, where they were welcomed by the Dean, and afterwards were conducted round the edifice by Sir Thomas Drew, the cathedral architect. Many of the points raised in his paper of the preceding Wednesday were here explained. After briefly describing the history of the building, from its foundation by Sigtryg in 1038 to its restoration by Street in 1886, Sir Thomas Drew led the party into the crypt, where an animated discussion was raised over the "master builder's stone" and its curious inscription. Sir Henry Howorth thanked Sir Thomas Drew, on behalf of the visitors, for his interesting description of the building, and said how thankful archæologists should be that the cathedral had attracted the attention of Mr. Roe, who gave the money, and Mr. Street, who had restored it.

In the afternoon, at four o'clock, the members drove to the Royal Hospital, Kilmainham, where they were received by Captain Fielding, and proceeded first to the great hall, where there is a magnificent display of armour and ancient arms. The library of the seventeenth and eighteenth century books was pointed out, together with the original charter of the hospital, granted by Charles II., subsequently lost in 1688, and not refound until 1848.

The chapel, opening out of the great hall, was next visited, and its ornamental iron gate (supposed to have been presented by Queen Anne), and the stained glass window attracted much attention. This window originally stood in the gable of the monastery of St. John, and had been there for eight hundred years. The angles of the chancel contain some fine oak carving by Grinling Gibbons, and the ceiling is ornamented with some masterly designs in stucco by Cipriani. The President, in thanking Captain Fielding for his reception of the party, said he hoped that conservative Ireland would not follow the example of revolutionary London, and injure the old hospital, the only really old one that remained intact.

The members then drove to the Record Office, where they inspected the old manuscripts which are there carefully treasured, and thence to the Four Courts and the Custom House, where they were received by the Chairman of the Board of Works, Mr. Robertson, and Mr. R. Cochrane. Some fine volumes of photographs were here shown the party. In the course of the visit the chairman stated that the Board had in their care the Ancient and National Monuments of Ireland, under the Church of Ireland Act, 1867, the Ancient Monuments Protection Act, 1882, and the Ancient Monuments Amendment Act, 1892.

Ancient Irish Records.

The Historical Section opened in the evening at the rooms of the Royal Irish Academy. The President, Sir Henry Howorth, took the chair at 8.30, and called upon Dr. Joyce to read his paper upon "The Truthfulness of Ancient Irish Records."

Dr. Joyce said that he proposed to prove that the ancient Irish records—at all events from the fourth century—were absolutely trustworthy. Of these records there were many classes, of which he would deal with three—historical and romantic tales, annals, and genealogies. Modern writers had to depend on statements of writers of the middle ages, whose testimonies were of the same character as Irish tales, a mixture of truth and fable. All mediæval writers believed in charms and magic, and mixed up these beliefs in their writings, and these had to be weeded out.

"Historical Tales," from the eighth to the ninth century, and even to recent times, had truth and fiction intermingled; the latter gene-

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rally introduced for embellishment. These formed part of Irish history, and had been incorporated in the same manner as Hume used them, by sifting out unimportant matters. With regard to the "annals," there were annalists from the fourth or fifth century who made it their business to record notable events, and who recorded but few events which did not occur in their own lifetime, or had been actually witnessed by their predecessors. The result was that their records were the most trustworthy in Europe. A noted annalist was Tigernach O'Brien, 1088 A.D., who wrote in Irish and Latin.

The genealogies would naturally be most trustworthy, as upon their correctness important points of law and possession often turned.

The chief tests of the accuracy of these writings were three:—References to physical phenomena, as eclipses, &c.; testimonies of foreign writers; and consistency of the records amongst themselves. With regard to the first series of tests he would mention the solar eclipse of 664 A.D., which was recorded by the Venerable Bede as occurring on May 3. In the "Annals of Ulster" it was recorded as May 1, and scientists had proved the latter right. In the whole of the annals, extending from 490 to 1000, there were twenty-five records of eclipses, and modern astronomers found they were all accurately dated. An incident noted in the wars of the Gaels with the Gauls was worthy of notice. In an account of the battle of Clontarf (April 23, 1014) the writer stated that the fight raged from sunrise, when the tide was full, until the tide was yet again full. This statement was merely introduced to explain the great slaughter of the Danes, who were unable to return to their ships. Dr. Todd, when editing the book, went to some trouble to check this statement, and found from scientists that the tide actually was full at 4 a.m. on that morning. The lecturer next instanced many examples of foreign writers corroborating the Irish analysts, and of the consistency of Irish records amongst themselves. In concluding Dr. Joyce said the more ancient records were examined the more correct they proved to be, and it was instructive to mark the sober and respectful tone of modern writers in dealing with the Irish annals, only broken by bursts of admiration when some new and totally unexpected proof of their accuracy revealed itself.

Sir H. Howorth, in thanking Dr. Joyce for his admirable paper, said that Anglo-Saxon chroniclers from 857 to 885 were three years wrong in their chronology. Whenever this period was dealt with in the "Annals of Ulster" no error was found. Dr. Munro, Mr. G. Coffey, Mr. O'Neill Russell also spoke, and the meeting terminated with a hearty vote of thanks to the lecturer.

Sunday having been left free in the programme, the members of the Institute spent the day in the city. On Monday morning the party assembled at Amiens-street Station, at seven o'clock, and proceeded by train to Kells. Carriages were in waiting, and the visitors drove to Cairan, where are situated St. Kieran's Well, the Termon Crosses, and the Ogham Stone, all of much interest. After lunching at the Courthouse at Kells, the rest of the afternoon was devoted to inspecting the antiquities of the neighbourhood, including the Round Tower and Crosses. There are four of the latter—one in the town and three in the churchyard. St. Columba's House was also visited. There is a semicircular vault over a portion of this building, and between the arch and the roof is an apartment, 6 ft. in height, which appears to have been originally divided into three. The larger of the divisions was lighted by a small aperture in the east end. In this chamber is a flat stone, 6 ft. long, known as St. Columba's bed. The various points of interest were described by the Rev. Canon Healy, the Rector of Kells.

In the evening the Antiquarian Section met at the Royal Irish Academy, the Vice-President of the Section, Mr. E. W. Brabrook, in the chair. There was a very large attendance. The Chairman said he wished to express their thanks to Sir Henry Howorth for his outspoken words of protest on the Hill of Tara. He trusted they would see some legislation which would prevent such misdeeds in the future.

Signs of the Zodiac, Muredach's Cross.

Miss Margaret Stokes read a paper on "The Signs of the Zodiac on the base of Muredach's Cross Monasterboice." She said that the representations of figures associated with groups of stars were almost constant ornaments of ancient religious edifices. Mr. Fowler had shown, in an eloquent passage in the conclusion of his essay on "Mediæval Representations of the Months and Seasons," that such subjects in Christian ecclesiastical architecture had a mystic and symbolic importance. The churches were to be the books of the unlearned, as St. John Damascene had said of sculptured images. The "Speculum Naturæ," beginning with the creation of the world, included the subject of the zodiacal representations, a subject which manifested the enthusiasm and love of Nature, and the delight in God's works that formed a most important moral element in the Gothic mind. The signs were as naturally associated with the actions of the every-day life of our forefathers as the months and days of the year were with our own, and as naturally suggested to the devout the duties and obligations of the seasons, when that, for instance—

"the yonge sonne
Hath in the Ram his halfe course i-ronne."

The first volume of the "Ancient Laws of Ireland" told how the King of Heaven ordained the procession of the sun through the twelve signs. The next Irish authority upon the signs was four centuries later, and the third extract was from an astronomical tract in the Academy library about 400 years old. In the Byzantine painter's guide was told how to represent the elusive seasons through life. The method was to show the sun passing through the signs of the zodiac. In early Christian basilicas it was customary to ornament the building with calendars of stone, and these were, or were until recently, to be found at Aosta, Ainay, Lyons, and St. Remi. Mr. Fowler, in his works, gave many representations of these calendars up to the fourteenth century, but had omitted the Irish one in the library of Basle. Miss Stokes explained very fully, by means of drawings, the various characters of this curious calendar, each of the twelve signs having its name upon it, accompanied by the name of a pagan god, a Jewish tribe, and an Apostle. A similar occurrence was found in the paintings of Giotto in the Hall of Padua, where an Apostle presided over each month. The manuscript of Basle was probably of the eighth century. A century and a half later the Bishop of Monasterboice carved the base of the high cross at that place. No effort had been made to discover what the various figures represented until recently. Miss Stokes said she had been able to trace on the eastern and northern sides of the cross, which were the best preserved, the zodiacal signs of the spring and winter months—Aries, Taurus, Gemini, Sagittarius, Capricornus, and Aquarius. The western side was greatly ruined, but by comparison with earlier works she had been practically able to trace the remainder of the months. The lecturer exhibited many drawings and rubbings of these carvings, which attracted much attention from the audience. Miss Stokes, in conclusion, said that the zodiac most corresponding with that of Monasterboice was to be found in mosaic at Piacenza. Although the reading she had given of the friezes might not be a true one, yet two sides were so clear that she felt she could rightly consider the other sides were carved to finish the twelve zodiacal signs. The lecturer then quoted the works of Dante, Chaucer, Spenser, and Shakespeare in reference to the subject.

Mr. E. Brabrook proposed a hearty vote of thanks to Miss Stokes for her valuable paper, and Sir Henry Howorth and Mr. J. T. Micklethwaite also spoke. The resolution was unanimously passed, and as the hour was late, Mr. J. R. Garstin postponed the reading of his paper upon "Some Antiquities of Drogheda." Miss Stokes subsequently explained many drawings of Irish crosses which were exhibited on the walls.

On Tuesday, the 24th, about eighty members assembled at Amiens-street Station to visit Drogheda, at which town they arrived at 9.50. The party immediately drove to Monasterboice, where much time was spent in minutely examining the old Celtic crosses, which are the best specimens of their kind in the country. Mr. G. Coffey, Curator of the National Museum, gave a lucid description of the carvings on the principal cross of Muredach. The members were much impressed with the clear reading of the sculpture at the base, which had been set forth by Miss Stokes in the preceding evening's paper. The other monuments and the Round Tower were next inspected, and the party then proceeded by road for Mellifont Abbey, which they reached at 12.30.

The Abbey is situated in a valley on the banks of a small stream, known as the Mattock, a tributary of the Boyne. The name Mellifont implies "sweet fountain," or "honey fountain." The Abbey was founded about the year 1141 by St. Malachy, Archbishop of Armagh, afterwards martyred at Tyburn. The members having assembled at the ruins, Mr. Anthony Scott, of Drogheda, at the request of the President, gave a description of the excavations and general architectural features of the monastic buildings, of which the baptistry and chapter house are in excellent preservation. Mr. J. T. Micklethwaite and Mr. C. R. Peers, hon. secretary of the meeting, also contributed a few remarks. After examination of the many relics stored in the chapter house, the party left for Dowth. During the drive the visitors passed through Townley Hall demesne, the residence of Mr. B. T. Balfour, who showed them an ivory-handled sword said to have been used by King William III. at the battle of the Boyne. Having proceeded along the beautiful valley of the Boyne and reached Dowth, Mr. Coffey gave a short description of the stone markings which are found on the unhewn slabs forming the roof and sides of the caves and passages leading thereto. He compared these markings with those found in Scandinavia of the bronze age, which are of similar character and design, differing entirely from those found in the neighbouring and superior mound and caves of New Grange. The President brought an interesting day's proceedings to a close by a pithy and lucid description of this class of antiquities met with in the United Kingdom and the Continent. The party then drove back along the Boyne valley to Drogheda, and returned to town by the 5.25 p.m. train.

The concluding meeting of the visit was held in the rooms of the Royal Irish Academy at 8.30 in the evening. Sir Henry Howorth presided, and moved a vote of thanks to Lord Rosse, president of the meeting, who had done so much for science in his own land. The motion was seconded by Dr. Munro and carried with applause.

The Chairman next proposed a vote of thanks to the Lord Mayor of Dublin for his reception of the Institute and the hospitality offered by him and the Corporation on the occasion of the visit. In no city of the Empire had he witnessed such marked progress during recent years as in Dublin, and nowhere would architects find finer sites for their buildings. The motion was unanimously passed.

The thanks of the Institute were also offered to the various bodies who had assisted to make the visit so profitable, and to those ladies and gentlemen who had read papers and acted as guides on the various excursions.

Finally, Mr. Rice proposed that a hearty vote of thanks should be passed to Mr. E. Green, the director, and Mr. C. R. Peers, the hon. secretary of the meeting, upon whose shoulders all the responsibility and work had fallen. The motion was carried amidst hearty applause, and the gentlemen having replied, the proceedings terminated.

The last day of the meeting was devoted to a trip to Glendalough, the home of St. Kevin, where the remains of seven churches and a Round Tower are to be found. The party left Harcourt-street Station at 10.10 a.m., and proceeded by rail to Rathdrum, where they were met by cars to convey them to their destination. The drive of seven miles, in the most beautiful part of county Wicklow, was much enjoyed, the route being through the Vale of Clara. On arrival at Glendalough, lunch was served at the Royal Hotel, after which the members explored the many interesting ruins in the neighbourhood. A small stone-roofed building, locally known as St. Kevin's kitchen, attracted much attention, the apex of the roof at one end being finished with a small round tower, a feature but rarely found in Irish work. The churches are in a ruined state, that of St. Saviour, by the roadside, being in the best preservation. This church has two naves, separated by a wall running the length of the building. The Round Tower is one of the loftiest in the country and is well preserved. The detached fragments of stone found in the neighbourhood and other relics are stored in St. Kevin's kitchen, and these were closely

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inspected. The party having driven again to Rathdrum, returned to Dublin at 7.30.

This excursion closes this year's meeting, which judging from the various expressions let fall by the members, has been one of great interest and enjoyment. The weather, with the exception of a few showers, was all that could be desired; and it is to be hoped that the Archæological Institute, having now broken comparatively fresh ground in Ireland, will shortly return to finish what they have begun. In the north, south, and west of the island are many buildings of interest to the archæologist and antiquarian, and the excursion of the past few days has dealt with but a small district in the east.

THE ANNUAL EXCURSION OF THE ARCHITECTURAL ASSOCIATION:

Bury St. Edmunds.

AFTER a lapse of sixteen years the Architectural Association are again visiting the ancient county town of Bury St. Edmunds, and, although the ground to be covered is almost precisely the same as on the former visit, none of those who were then present appear otherwise than well pleased to revisit the old scenes.

The members, as usual, assembled on Saturday and Sunday in preparation for the week's work, a good many going down from London by the train and reserved compartments arranged by the junior Hon. Secretary, Mr. A. W. Hemmings.

On Sunday the usual informal programme was followed, a quiet morning partly in church and partly in the Abbey grounds; in the afternoon a party drove out in a direction not included in the official programme, and visited first of all the Church of St. Mary, Rougham, remarkable for its exceedingly fine western tower, the excellently preserved hammer-beam roof of the nave, and the magnificently carved benches. The tower is of considerable height, simple and broad in treatment, well proportioned in mass, with its ornament concentrated in flint panelling and battlements at the top, the only blemish in the design being perhaps the smallness of the belfry windows and the too great amount of wall above them. The nave roof is of good hammer-beam treatment, ornamented by carved angels with folded wings, and niches on the wall posts still filled with figures, albeit these are now headless.

The chancel, with a good reticulated five-light east window, and the south porch, with excellent side windows of somewhat unusual form, are of the Decorated period, and therefore of earlier date than the nave, the aisles, and the western tower. Other features worthy of notice are the battlemented parapets, with alternate carved and pierced merlons, the simple but very effective roof of the south porch dated 1632, and an interesting and well-drawn brass to Sir Roger Drury and his wife, the date of the latter's decease, September 4, 1405, being engraved on the brass, but that of the squire, who died in 1418, being left blank.

The next halt of our party was made at Hessett, where is another interesting church dedicated to St. Ethelbert, again with a good western tower, not perhaps equal to that at Rougham, but still vigorous and sturdy, and with a fine battlemented parapet and band of panelling below. The south porch is very charming, with three canopied niches and flint panelling. The chancel has suffered from restoration in a very thin spirit, the more distasteful by comparison with the sturdy character of the old perpendicular building. There is an interesting chantry chapel built by "John Hog and Katryne hys wyf" on the east end of the north aisle. The battlemented parapets here show a variation in design, with alternate open and pinnacled merlons. Internally there is much to note and study, a rood screen with the type of colour scheme, although restored by inexpert hands, that marks Early Fifteenth Century work, and some remains of tooled gesso not of high-class workmanship. The chancel floor is below that of the nave in level, a treatment not uncommon, or at any rate not without numerous correlative instances, some of which have been wiped out in restoration. The original roofs remain to nave and aisles, and are of simple treatment. There are remains of old frescoes, and numerous fragments of good old glass. The font is a good example of the favourite Suffolk type. The greatest curiosity, however, is a fine lace chalice veil and burse found in an old chest and preserved in the vestry. In the churchyard is a fragment of the ancient cross.

From Hessett the party proceeded to the objective of the drive, Woolpit Church, another mainly Perpendicular work, the chief beauty of the exterior of which is the magnificent south porch, vaulted below and with parvise, or perhaps more strictly a cell, over. The clearstory is graceful and modest in stone and flint, panelled and chequered. The west tower and spire are modern and bad in detail, though fair in outline. Internally is the very fine hammer-beam roof, with wide-spreading winged angels, that is a Classic type in our national architecture. The screen has been a fitting companion to the roof, but appears to have been rebuilt, modified, and not beautified in the year 1750, the date inscribed. A fine old brass lectern is, perhaps, due to the zeal of the same period. The nave pews are excellent examples of the Suffolk type of carved fifteenth-century benches. The chancel has suffered from zeal without knowledge, particularly in the conception of the east window, a small reticulated five-light collection of absolutely awful glass.

On the way back to Bury a slight detour was made for the sake of a glance at Elmswell Church, with its grand west tower, worthy of study for its beautiful parapet of flint and stone and good belfry windows. Here is an excellently-restored churchyard cross with remarkably beautiful ancient base. A curious example of clerical spite is the large house and lodge built by a former incumbent, and tarred all over from ridge to ground line by him on leaving the parish in high dudgeon.

Monday.

By Monday morning the number of excursionists had risen to its normal level, and a start was made in the regular work of the week. A cloudy sky gave the old hands an opportunity of lecturing the novices on the advisability of always carrying a waterproof garment on an Architectural Association excursion. The new chums, however, smiled serenely on their return in the evening after a beautifully fine day, the sun's heat tempered by occasional clouds and pleasant breezes. Sun, clouds, and breezes were all alike gentle, and hence the climatic conditions as perfect as could be expected in July. With the wisdom born of experience the secretaries had arranged the first day's programme to be wholly a driving day, and so carriages were taken for the first journey to Pakenham Manor House, picturesque with its triple gables of curved outline and semi-octagonal porch, its red brick walls and chimneys, and its mullioned windows. The said windows and other features have their dressings apparently of stone, but really of Roman cement, even the date—1622—over the front door being in this material. This work is palpably palimpsestic, but probably follows with sufficient fidelity the not uncommon East Anglian rendering of the stone type of mullioned window, usual in the sixteenth and seventeenth centuries, wherein the features are executed in brick, covered with a thin coat of stucco. The windows have casements of a later type than 1622, possibly coeval with the Roman cement, say, at a guess, 1822; the porch windows are even later, double hung sashes with thin bars. Still, these little vagaries do not utterly spoil the charm of Pakenham Manor House. Internally there is not much old work remaining, a massively treated stair balustrade and some panelling from an evidently older house being almost the only instances. The church at Pakenham has an octagonal tower on a square base over the crossing of its cruciform plan, but its artistic interest is greatest at a distance. There are, however, for the archæologically disposed, a couple of late Norman doors and a good font of the usual Suffolk type.

Leaving Pakenham with pleasant memories the party drove on to Ixworth, where the church was set down for study—a simple, unobtrusive, and good example of East Anglian Perpendicular treatment. Of the remains of the Augustinian Priory founded by Gilbert de Blund in 1100 scarcely a vestige now remains, the church belonging to the times of the ascendency of the Abbey at Bury, the tower being attributed to Robert Schot or Coote, who was abbot at Bury in 1470. This tower, western as usual, is built of flint and stone, the buttresses freestone faced with incised panels decorated in flint flakes. The parapet and band below are excellent, and there are a couple of curious enamelled tiles, each 11 in. square, built into the wall, the inscription on which is now all but illegible. The porch is in accord with the rest of the design, simple and good. Within we see the old flat-pitched roofs of nave and aisles, whose adorning angels have very highly conventionalised wings. In the chancel—which has suffered, the church having been restored in 1854—is a curious tomb of Richard Coddrington, who died in 1567, and to whom the priory was given by Henry VIII.

A short drive from Stow took the party to Norton Haugh for the final work of the day. Here the hall, an eighteenth century house with very excellent internal work, formed the *pièce de resistance*. Well cared for and kept up by Mr. Gurney, the banker, whose residence it is, and furnished with a remarkable collection of paintings and engravings of the date of the house, this proved a great treat, not lessened by the charming garden or the hospitality of the owner. Most of the party visited the church, a modest example of the local Perpendicular work, with fragments of stained glass, a few old stalls and benches, hollow octagon shafts to the nave, and, unluckily, a new roof by a local builder and architect. This concluded the day's programme, and the party then returned to Bury St. Edmunds.

Tuesday.

The morning gave promise of a fine and possibly warm day and the promise was not belied, yet still a pleasant breeze tempered the heat, and with due regard to a selection of shady spots, the day turned out a perfect one for excursionising. As the *locale* of the day's proceedings was in the southern borders of the county of Suffolk, a railway journey to Stoke by Clare was the first item, then came a pleasant drive of some three-quarters of an hour, passing the county boundary and landing the excursionists over the Essex border at the striking and remarkable seventeenth-century house of Moyns, whose front is of the type that Mr. Ernest George has repeatedly adopted for the modern large country house. Exquisitely proportioned, simple in form, restrained in detail, Moyns on its entrance front is entirely admirable. Four gables in three stories, the outer ones wider and higher than those intermediate, and between the gables three semi-octagonal two-story bays, with the entrance in the centre, plain but perfectly proportioned mullioned and transomed windows, are all the features, but the dignity and breadth, due in considerable measure to the extreme distance of upper sills from lower window heads, is indescribable. Red brick in masses, stone, or rather stucco simulating stone, in the window mullions, transomes, and jambs, with never a moulding beyond a simple label, Renaissance, of course, in form, are all the material elements of the design; proportion is the spiritual essence. At the rear of the house on the back elevation are some of the finest examples of cut-brick chimneys with octagonal shafts and moulded caps concave on plan that East Anglia can show. On this front red brick is practically the only material, and a little play of fancy in outline has been permitted to himself by the able designer. Internally, beyond the dignity and lofty proportions of the rooms, there is not much to remark save some most admirable brass fire-dogs, which partake in character of the general feeling of the design. Mention must be made of the older house in half-timber and red brick, a sixteenth century building, which now looks small and dwarfed into insignificance by the stately pile in front of it, but which with its excellent composition and well-carved barge boards is of itself worth a long journey to see. The garden, with its old-world flowers and fragrance, though by no means posing as a formal creation in the eighteenth century manner, is yet very charming and sufficiently formal, with all its lack of pretension, to be completely in sympathy with the house. Altogether a more perfect conception of dignified homeliness than Moyns it would be difficult to find.

Leaving Moyns, after lunch, with regret, a hot drive took the party to Clare, where the church of S.S. Peter and Paul was first visited. This is a grand example of the open and well-lighted town church of the Perpendicular period, almost too well lighted to-day with white glass, instead of stained, and no colour decoration. A six-bayed nave and aisles to the chancel with north and south porches and western tower open by a great arch to the nave form a strikingly open interior. The

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CLARE

detail is somewhat late and lacking refinement, but the treatment of the nave arcade with moulded, embattled, and carved string course above the arches, and vertical lines carried up to the wall poster of the roof with the lofty clerestory, forms a striking and admirable treatment. Collected in the east window are some very charming fragments of old glass of heraldic character. The old screen has disappeared, unless some remains which now form a private pew are part; these, however, do not seem of sufficient importance or character to have been part of a wood screen, and, although beautiful in detail, are more likely to have been part of a chantry or side screens. The notorious Dowsing has been at Clare, and records his vile work of destruction. Very excellent are the carved doors of the church from the north and south porches, which as detail are far more satisfactory and less debased than the mason's work of the church. A beautiful eagle lectern was presented by Queen Elizabeth, and is said to have been made from the guns of the Spanish Armada. This may be so, as the metal is of peculiar beauty, and is an alloy of different character to ordinary brass. Also from the Spanish Armada, and presented by Queen Elizabeth, is said to be the beautiful silver-gilt chalice. This bears every evidence of being Spanish work of sixteenth-century date, is of cast silver, chased, and with Renaissance detail and figure work that in its classicality is almost undoubtedly Spanish. Although the rood screen has vanished, some clergy stalls of Jacobean date, and now facing eastward take its place and are interesting. Externally the design of the church is somewhat thin in detail, though the mass of the building saves it from insignificance.

In the town of Clare are several highly interesting old houses, one in particular with remarkable cut-brick chimneys, another with half timber treatment, partly in paint, of apparently Georgian date, and yet a third with the rude yet piquant, modelled plaster (see lithograph) of which there is so much in Essex and Suffolk on the border line of which counties stands the town of Clare.

This place, which is of great antiquity, derived considerable importance during the Saxon Heptarchy from being on the frontier of the Kingdom of East Anglia; and after the Conquest it was distinguished for having given the title of earl to the family of De Clare, and that of duke to Lionel, third son of Edward III., who was created Duke of Clarence, and who is said to have been buried in the church. To the south of the town are the ruins of a castle, formerly the baronial residence of the Earls of Clare, and equal to any of those structures in feudal grandeur and magnificence, but now a mere collection of mounds, although the site of the fortifications may be distinctly traced. These comprehend an area of thirty acres divided into an outer and an inner ward, of which the latter only was enclosed by walls; the whole was surrounded with a deep fosse. On the summit of a high mount, evidently of artificial construction, were within the present century the remains of the ancient keep, a circular building of flint, strongly cemented with mortar, and strengthened with buttresses, which, from its situation near the frontier, was supposed to have been erected either prior to or during the Heptarchy.

To the south-west of the town are the remains of Clare Priory, founded by Eluric, or Alfric, Earl of Clare, for secular canons, which Gilbert de Clare, in 1090, gave to the Benedictine Abbey of Bec, in Normandy, to which it was a cell till 1124, when his son Richard removed the monks to the village of Stoke. Joan d'Acre, daughter of Edward I., wife of Gilbert St. Clare, who was a great benefactress to this establishment, is traditionally said to have been interred in the chapel, which has been converted into a barn. The priory, now a private residence, though it has undergone considerable repairs and alterations, still retains much of its original character. A monastery for Augustine monks is said to have been founded in 1248, but by whom is not known. To the north-west of the town are evident marks of a Roman camp.

From Clare a short half-hour's drive brought the party to Cavendish. This village is situated upon the river Stour. It was the birthplace of John Cavendish, who, being in attendance upon Richard II., assisted Walworth, Lord Mayor of London, in slaying the rebel Wat Tyler, which the populace at this place having heard, they, under John Raw, a priest, and Robert Westbroom, seized his uncle, Sir John Cavendish, Lord Chief Justice of the Court of King's Bench, and beheaded him at the market-cross in Bury, with the prior of Bury; but Dr. Spencer, the warlike Bishop of Norwich, raised forces and slew many of them immediately after. The noble family of Cavendish, of which the Duke of Devonshire is the representative, derives its name from this place, which at an early period was in their possession.

The church at Cavendish is a very pleasing composition, and the more so by its position on high ground overlooking the village. Although a Decorated porch on the south side gives evidence of an earlier church, the main building, nave, aisles, chancel, and western tower are Perpendicular. The tower has at the south-east angle a stair-turret carried up above the battlements, a feature now seen for the first time on this excursion, and adding greatly to the piquancy of the design. Unusual forms in the tracery of the windows, a very well-designed priest's door, the excellent treatment of the buttresses, and the purity of the mouldings, are also points worthy of special notice. Though much smaller than that at Clare, in point of design and interest this village church shows remarkable genius and individuality on the part of the man who conceived the grouping and worked out the details of the building. Internally there is but little of interest, save for a fine brass lectern similar in detail to that at Clare, and the interior treatment of the priest's door already referred to. From Cavendish a six-mile drive to Long Melford Station and thence by train brought the excursionists once more back to Bury.

[The account of the excursion will be concluded in our next. Three of the plates in the present issue are devoted to sketches from various buildings on the line of route. The plates in our next week's issue will be devoted to further illustrations of the buildings visited.]

ROYAL ARCHITECTURAL MUSEUM AND WESTMINSTER SCHOOL OF ART.

THE annual general meeting of the above was held at the Museum, Tufton-street, Dean's-yard, Westminster, on the 20th inst., Mr. Aston Webb, A.R.A., presiding.

In their annual report the Council deplored the great loss the institution has sustained by the death of its President, the late Duke of Westminster, K.G., who manifested so keen and generous an interest in its welfare. They also recorded with deep regret the death of Sir Arthur Blomfield, A.R.A., a warm and liberal supporter of the Museum from its earliest days, who at the last annual meeting was elected one of the Vice-Presidents. The report proceeded :—

"The Council have further to record the loss which not only they, but all lovers of Art in its varied forms, have sustained by the death of Mr. John Ruskin, who was an early and enthusiastic supporter of the Museum, who enriched it by his gifts of examples of Florentine art, and on various occasions gave its supporters the advantage of his eloquent and learned disquisitions. The Westminster School of Art continues to justify its high reputation as one of the most important schools of art in the kingdom. In the examinations held in 1899 the students acquitted themselves satisfactorily, especially in the most advanced subjects. In drawing from the life no fewer than sixty-four students of this school sat for examination, with the following results, which are placed side by side with the figures for the whole of the United Kingdom :—

	Westminster School of Art.	United Kingdom.
Excellent	9	113
First class	17	225
Second class	29	770
Failed	9	419
Total candidates	64	1,527

It will thus be seen that in this School of Art 14 per cent. attained the highest award (excellent), against 7·4 per cent. for the kingdom generally, and that only 14 per cent. failed, against 27·4 per cent. Two of the students were bracketed third amongst the 1,527 candidates who sat for drawing from the life, and were awarded Queen's Prizes. In the national competition, in which all schools of art take part, the awards to Westminster students included the following :—

William Batchelor	Silver Medal for modelled design for a mirror frame.
" "	Bronze Medal for modelled design for a panel.
John Bart. Higgins	Bronze Medal for modelled design for a book cover.
" "	National Book Prize for modelled design for a finger plate.
Henry Jas. Strutt	Bronze Medal for modelled design for a panel.
Edgar G. Perman	Prize for design for surface decoration.
Isabel M. Smith ...	Prize for design for surface decoration.

Mr. Strutt's panel was afterwards purchased by the Department of Science and Art. In concluding their report the Council venture to hope that some recruits may be found to fill the constantly recurring gaps in the list of subscribers caused by the death of the early supporters of this invaluable Museum, unequalled as a repository of the choicest examples of Gothic architecture."

Mr. M. B. Adams, the Hon. Secretary, said he desired to make a few remarks on his own behalf. He had been associated with the Institution a great many years, and he was glad to say that impecuniousness was a thing of the past with it. They had, however, only been

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able to steer the ship through the storms by the aid of the School of Art. At the same time they must realise that the Museum was founded for a more specific purpose than to carry on the work of a general school of art, and he thought the time had arrived when they should consider whether it was not desirable, by enlarging the character of the collection and by making it more representative of architectural and artistic work, to bring back the Museum to its original purpose. It seemed to him that, with their new classrooms and the resources they already possessed, they might rely upon their architectural friends to rally around them. It would be far better if they could encourage young men, instead of going in for black and white — the ranks of which were already crowded—to take up the applied arts. That was the end he had in view, and if by retiring and allowing others to come forward he could facilitate this, he would be happy to do so. The financial statement was very gratifying. The School of Art yielded 1,765*l.* 10s. 3d., making the year's total receipts 1,840*l.* 17s. 11d. There was a surplus of income over expenditure of 100*l.* 5s. 2d.

Mr. Seth-Smith (President of the Architectural Association) moved the adoption of the report and balance-sheet, and expressed a hope that the suggestion thrown out by Mr. Adams would be considered. He was sure there were plenty of examples in the Museum to engage the attention of their best draughtsmen. Gothic architecture was just now under a cloud, but he was convinced that the cloud was a temporary one. It was quite lamentable to hear students speak of the lack of opportunity to study Gothic ornament, and that all the art schools were giving attention to strict Classic work.

The Chairman, who seconded, said they were the inheritors of a great trust, the outcome of a wave of enthusiasm thirty or forty years ago. It was associated with the Gothic revival, and some of them well remembered the interest with which the casts were collected. Enthusiasm for this phase of art had undoubtedly been on the wane for some years, and young men were not to be found studying Gothic as they used to.

The resolution was adopted.

The Chairman next proposed that Mr. William Emerson, President of the Royal Institute of British Architects, be elected President. By electing Mr. Emerson they hoped that he would bring the Museum more closely in touch with the members of his great profession.

Mr. J. Hungerford Pollen, who seconded, said he regarded Mr. Emerson's election as the precursor of a great accession of strength to the Museum.

The motion was adopted unanimously.

Mr. Emerson, on succeeding Mr. Aston Webb in the chair, briefly returned thanks. He remarked that when he looked at the list of Presidents who had preceded him he realised how great was the honour that had been bestowed upon him. There had preceded him in that chair such eminent men as the late Mr. Beresford Hope, Lord Alwyn Compton, the Bishop of Ely, and the Duke of Westminster. He had very pleasant recollections of Mr. Beresford Hope when he (the speaker) was with the late Mr. Burges.

Mr. Sidney W. Lee moved the election of the following as Vice-Presidents, namely—Messrs. Aston Webb, A.R.A.; John Belcher, A.R.A.; G. F. Bodley, A.R.A.; G. Frampton, A.R.A.; Mr. J. P. Seddon; the Duke of Norfolk; the Duke of Rutland; the Marquis of Ripon; Earl Fortescue; the Earl of Wemyss; and Lord Grimthorpe.

Mr. Bell seconded the motion, which was agreed to.

Mr. Brindley moved the re-election of the Hon. Secretary (Mr. Adams) and the members of the Council, viz., the Earl of Wemyss; Messrs. Aston Webb, A.R.A.; G. Forster Hayward, F.S.A.; Sydney W. Lee, F.R.I.B.A.; Wm. Pain, F.R.I.B.A.; J. Hungerford Pollen; and J. P. Seddon, F.R.I.B.A. Also Messrs. L. H. Hayter, W. R. Lethaby, Dr. Garnett, and Mr. A. L. Leon, J.P., as representatives of the London County Council.

Mr. C. F. Hayward seconded, and expressed a hope that the Chairman would, during his year of office, get up a little more Gothic enthusiasm.

The motion was adopted.

Mr. Arthur Cates proposed the re-election of Mr. E. L. Somers Cocks as treasurer, and of Mr. P. D. Leake and Mr. Wm. Paine as auditors. The collection at the Museum should, he remarked, be of the greatest value to students. He was surprised to find the smallness of the annual subscriptions, but, on the other hand, it was satisfactory to know that the earnings of the art-school were so large as to meet the demands of the institution. These earnings, in fact, had enabled them to keep together the magnificent collection of architectural examples, which he hoped would be made to meet the more active uses of art and architectural students. Some of the best selections of mediæval art could be studied at the Museum in a way that they could not be studied elsewhere.

Mr. H. H. Statham seconded the resolution, which was adopted unanimously.

The President said it was obvious that there had been a little stagnation in the affairs of the museum, which was shown by the falling subscriptions. These had decreased from 126*l.* in 1889 to 69*l.* in 1899. The diminishing support from this source was due to deaths rather than to want of a renewed support from existing subscribers. As had already been remarked, the Museum was founded amid an outburst of enthusiasm for Gothic architecture. So far as students were concerned, he thought the study of Gothic together with Classic was an absolute necessity for a man who wanted to qualify for the present generation, with its enormously complicated wants. This Museum could do a great deal to encourage this, particularly if they enlarged its scope. His idea was that if they could ally the museum to the Royal Institute of British Architects, either now or when they located themselves in sufficiently capacious premises, its usefulness would be immensely increased. Pending that they might go on collecting casts which were not of purely Gothic style. He had received a letter from Mr. Francis Hooper on behalf of Mr. Francis Moore, of Urbino, offering a collection of casts from the palace of that city. These might be presented to the Institute or to the Museum as might be wished. He had provisionally accepted the gift on behalf of the Institute, and should bring the matter before the next meeting of the Council of the Institute and ask them to arrange to house the collection. The time had come when they should enlarge the sphere of usefulness of the Museum, and he thought this could be done and the income increased by appealing to architects, sculptors, and painters.

The meeting concluded with a vote of thanks to Mr. Aston Webb for acting as chairman during the early part of the meeting.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE annual meeting of this Association was opened on Thursday last week in the Council Chambers at Westminster Town Hall, and in our last issue we gave a summary of the address by the President, Mr. C. H. Lowe, C.E., of Hampstead.

The President having read his address,

Mr. J. Patten Barber, Islington, moved that it be referred to the Council to consider and report upon the desirability of altering the articles of association and by-laws for the under-mentioned purposes:—(1) The admission to the Association of Assistant Surveyors and the principal Engineering Assistants to Municipal and County Engineers. (2) The making of alterations in and additions to the by-laws by resolution of the members at an annual general meeting on the recommendation of the Council. (3) Limiting the period during which a Past-President shall be a member of the Council. (4) Reducing the number of names nominated by the Council for Vice-Presidents.

The resolution, which was moved in four separate sections, was generally approved and adopted.

Sewage Farms.

Mr. H. Royle contributed a paper on the conditions necessary for successful purification of sewage by land treatment, which, in the absence of the author, was read by Mr. Greatorex. The author said it was well known that a good soil was of the utmost importance for the proper treatment of sewage, and must be combined with efficient under-drainage in order to produce a good effluent; nevertheless, when these two essentials were at hand the desired results were not always obtained. His object was to endeavour to show why this was so from the experience gained on the Stretford sewage-farm, which was undoubtedly a first-class farm and justly considered as the model sewage-farm in the watershed of the Joint Committee of the Rivers Mersey and Irwell. The conditions essential to success, he considered, were that no drain should be laid, if possible, less than 5 ft. deep; the cutting-off of old draining tiles and spit drains within 4 ft. on either side of the new trench; and the drains should be well and truly laid with close joints, while the filling-in and ramming could not be too well done. A fatal error on some sewage-farms was the placing of gravel, sand, or cinders, or using perforated tiles, with the object of giving, as was generally supposed, a better filtering medium. This practice was, of all the mistakes that could be made in regard to sewage treatment, the most disastrous. In the management of a sewage-farm it was essential that the manager should keep a strict watch on his effluent and his drains. In the laying-out of a sewage-farm, he would impress on all who were called upon to undertake the work that all drains should be laid in parallel lines and in the direction of the greatest slope of the land. On no account should the work be let by contract, except the trench-cutting; also every care should be taken in laying the tiles and filling in and ramming solid, for unless this be done a satisfactory effluent was an impossibility; and even when these precautions had been taken it would be found that frequent imperfections and unsatisfactory effluents would occur during sewaging of the land through worms, rats, and other causes.

Colonel Jones said the subject of sewage-farm management was one upon which he had been harping for many years. The main difficulty was the education of farm managers to understand the proper treatment of a sewage-farm. The ordinary farmer had to contend with the effects of the weather, but the sewage-farm manager had infinitely more to contend with, and he regretted that attention had been given so much to the theory to the neglect of the practical management. There was too much desire to lay down fixed rules, irrespective of the land, the sewage, and the circumstances; whereas a great deal of discretion must be left to the manager, and he must be encouraged to take an interest in his work.

Mr. Spencer, Newcastle-on-Tyne, considered that if any good were to come from a discussion on the education of managers of sewage-farms it would be well for the Council of the Association to formulate suggestions and forward them to the various County Councils, so that in technical education classes on agriculture attention should be given to sewage-farm management. Technical education was at present a fashionable matter, and sums of money were devoted by County Councils and County Boroughs to instruction in almost every subject but that in which the county and boroughs were so vitally interested—that of sewage-farms. If they discussed the subject for weeks it would have no practical effect, whereas a suggestion to the County Councils might be acted upon with good results.

Mr. Angell, Bermondsey, said his objection to the broad irrigation system of sewage disposal was that often too much attention was given to the crops at the expense of the sewage. It was frequently the custom when the crops were in full growth to stop the pouring of the sewage upon the land.

Mr. Walker, Croydon, referred to the experience of the Croydon sewage-farm—a very stiff clay land. He had a hole dug recently on the farm. There were 10 in. of soil, and 12 in. below the surface there was not the slightest mark of sewage. They discharge into a very shallow outfall, practically making the brook into which the effluent flows. At present there was no water passing down except their effluent. That land had been dealing with sewage for thirty-six years and was doing efficient work to-day.

Mr. E. G. Mawbey, Leicester, contended that with intermittent downward filtration the great thing was to keep the sewage off the top of the drains.

Mr. A. M. Fowler, Manchester, thoroughly endorsed the views of Mr. Royle, because however well an engineer might design his work, if he had not a good manager, it failed. They ought to have as little pressure upon the drains as they possibly could, and the wider the drains were apart the better the filtering media.

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Mr. W. Harpur, Cardiff, said he was employed on the first intermittent downward filtration works carried out by Mr. Bailey Denton at Merthyr Tydvil. These works had been in operation for thirty years, and while the farmer managed his work as he did to-day they would have an absolutely perfect effluent. There was no surface water that came within 4 ft. or 6 ft. laterally of the drains. To get a perfect effluent they wanted to avoid having any drains directly under the land which they were sewaging.

Mr. Willcox, Birmingham, said he could not agree with Mr. Harpur as to having no drains under the land which was sewaged. He knew cases where drains were laid under the land and where good results were obtained. It depended more upon the area available and the quantity of sewage to be disposed of on the area the method of disposal being the least important point.

Mr. A. D. Greatorex, West Bromwich, said he quite agreed with Colonel Jones as to the management of sewage-farms. He thought all sewage-farms should remain under the absolute control of the Borough Engineer who laid out the farm. He was rather pleased to have the entire management of a sewage-farm of 250 acres. He had no farm committee; the farm bailiff was entirely under his direction; and therefore, he got good results. He thought if sewage-farms generally were placed under the control of the Engineers to the Local Authorities they would be able to educate the farm bailiffs to carry out their work properly, and sewage-farms would not have such a bad name as at present.

Bacterial Treatment of Sewage.

A vote of thanks having been accorded to Mr. Royle,

Mr. G. Thudichum, F.C.S., contributed a paper on the last twelve months' experience in the bacterial treatment of sewage. He said that in reviewing advances that had been made during the past year in the methods employed for the bacterial purification of sewage the observer was struck by the fact that such improvements or alterations related entirely to matters of detail and not to new modes of applying the principles laid some years ago. No startling innovation such as the Sutton coarse-grain bacteria bed on the septic tank had been brought forward; and the fine-grain bed, whether worked intermittently by alternate filling and emptying, or by the intermittent-continuous method, still stood as the acknowledged best means of final purification. There had, however, been very many novelties introduced in the way of automatic arrangements for controlling the filling and emptying or the distribution over the surface of filter beds. The much-argued question as to whether the preliminary breaking-up of solids and preparation for final oxidation is necessarily anaërobic had not yet been settled. It was contended by some that such primary simplification of complex bodies and solutionising of solid matters could only take place in the absence of air, and that a coarse-grain Sutton bacteria bed was only a septic tank in which the anaërobic organisms were employed in the most disadvantageous manner possible. But the investigations of Dr. Clowes at Crossness on a high coke bed proved conclusively that (1) aërobic organisms were at work, since the proportion of oxygen in the air contained in the beds was gradually reduced whilst the beds were filling and emptying; and (2) anaërobic conditions were never produced, since such reduction had not been found to exceed 25 per cent. of the original amount. It appeared to him that the preliminary liquefaction could be satisfactorily accomplished by either, and in the case of the coarse-grain bacteria bed the action was aërobic in the main, helped to a small extent by anaërobes, whilst in the septic tank it was purely chiefly anaërobic, although a certain amount of the work was effected by aërobes. He was aware that this view was in conflict with those of many observers, but the fact remained that the Sutton bacteria bed did digest and solutionise the solid organic matter. Another proof of the possibility of purifying sewage matters without the intervention of any septic process, reference might be made to experiments by Dr. Dupre, who found that if crude London sewage were mixed with thirty volumes of fully aërated water no fouling took place and the organic matter was finally oxidised without any preliminary putrefaction. In practice, however, the use of a tank placed between the sewer and the first set of bacteria beds had much to recommend it. In the first place, the nature of the inflowing sewage could be to some extent equalised; secondly, extreme variations in the rate of flow could be to a considerable extent controlled; and thirdly, no screening was required. For all these reasons a preliminary tank treatment was desirable, and further, it was not necessary that such tank should be covered, since air and light were sufficiently excluded naturally to enable the anaërobic organisms to perform their functions. The possibility of nuisance arising from an open tank was, however, another question, which could only be solved by time and actual experience. A strong argument in favour of covering the tank was undoubtedly that by so doing it might be rendered possible to make a profitable use of the evolved gases. At the Belleisle works, Exeter, the gas produced in the septic tank was employed for lighting purposes, and there could be no doubt that with further experience and improved appliances a result of considerable economic value could be obtained. Of improvements in mechanical means of filling and emptying bacteria beds, one of the most important was that recently introduced by Messrs. Cameron, Commin, & Martin. By this new gear a bed could be made to stand full for any required time before discharge, and between fillings the sewage was headed back in the tank, so that when the inlet valve to a bed was opened the tank effluent escaped with great rapidity and speedily filled the bed. He had recently had an opportunity of examining a Whitaker-Bryant installation, in which the sewage after passage through an open septic tank containing about twenty-four hours' flow was sprayed on to a bed of coarse coke by means of a patent automatic sprinkler, the septic-tank effluent being lifted by a pulsometer pump and warmed by the exhaust steam. The results obtained were very satisfactory, except that the filter effluent contained some black suspended matter, which, however, was readily separable by deposition, the resulting final effluent being in all respects good. Other distributors, such as the Candy tank, were said to work very well, but he had had no opportunity of making personal inspection. Of sewage works opened during the past year attention should be specially drawn to those at Hampton-on-Thames. Owing to various local circumstances an exceptionally good effluent was demanded there, and the method of treatment adopted was three purifications by aërobic beds. The effluent produced was of the highest quality, but in accordance with regulations it had to be passed through land after leaving the third set of beds, with the result that the organic matter which it contained in solution was practically doubled.

Mr. E. G. Mawbey, Leicester, proposed a vote of thanks to Mr. Thudichum for his paper. Mr. Thudichum, with Mr. Dibdin, had given very great thought and labour to the consideration of the question. He (the speaker) had been carrying out experiments in Leicester, the results of which were embodied in a report. Those experiments had proved, first of all, it would not be possible to clarify their sewage without making sludge. He had not tried to put the raw sewage on to the bacteria beds. He put it through a settling tank first, and then put it on the grass, but they made a lot of sludge that way and fouled the grass because they did not get sufficient clarification. Then in another experiment they ran the sewage from the tanks through a coarse-grain bacteria bed on the intermittent system, three fillings a day, and then put it on the grass. That gave them a very excellent result, but they made a lot of sludge in the detritus and settling tank. Then they dropped the settling tank and sent it straight from the detritus tank on to the grass with a perfect result. Then they tried a septic tank, air-tight and trapped at the outlet and inlet, and they found, contrary to expectation, that they were making about the same sludge in the septic tank and the detritus tank. Another thing they found was that after it had gone through the detritus tank, the septic tank, and coarse-grain bacteria bed the effluent was not so good as when they did not use the septic tank at all. Another experiment with the detritus tank, the septic tank and then on the land, fouled the grass and the farm. The result of all their experiments showed that the best way to clarify the sewage was to send it through a detritus tank, then through a coarse-grain filter on the intermittent system, and finish it off on the old pasture or rye grass. He had designed works at a cost of 168,000*l.* for carrying out this process.

Mr. MacBrair, Lincoln, said they had a very strong sewage and a very small farm upon which to treat it. During the last few months he had begun to allow the sewage to settle in a settling tank all night, and then run it on to the bacteria beds in the morning. His best results were obtained in that way. What he could not put on the contact beds he was putting on the polarite, and the remainder on the farm. The farm took the position of residuary legatee. To sum up, the best results were obtained from double contact beds after the sewage had been standing in settling tanks for twelve hours.

Mr. Chambers Smith, Sutton, said that, so far as they at Sutton were concerned, but little advance had been made in the bacterial system over the previous twelve months. He might, however, say he had substituted a detritus tank for the rotary screen which he formerly used to intercept solid pieces, paper, and so forth. Two old precipitation tanks, the inlets and outlets of which had been trapped, were used as detritus tanks. After running probably 300,000 gallons of sewage a day into those tanks, the sludge was probably 3 in. deep at the bottom of the tanks. These tanks were equal to holding a two hours' flow of the sewage of the district. With respect to the material to be used for coarse-grain beds, his experience was that burnt ballast which was used at Sutton for economical reasons had a tendency to go back to clay. He had used clinker, granite, broken crockery ware and glass, and old iron and tin, all of which had given good results. In a district with free stone the material might be used for coarse-grain beds, and where coal could be got cheaply it could be used for fine beds. The improved automatic methods of applying the sewage on to the filters—he specially referred to those of Messrs. Cameron, Commin, & Martin, and Messrs. Adams—had the advantage in small districts of doing the work at infinitesimal cost. He was now carrying out considerable extensions at the Sutton works, at a cost of 3,000*l.*, not by loan sanctioned by the Local Government Board but by the mortgage of the sewage works under Section 235 of the Act of 1875.

Mr. Dennis, Aldershot, complained of the action of the Local Government Board in compelling the Local Authorities to pass the effluent over land when they had got excellent results from the bacteria beds. They were at present treating 300,000 gallons of sewage a day on the bacteria system. They first intercepted the mineral matter in the sewage in a detritus tank, and then passed it over primary and secondary beds composed of clinker. On February 8 their analysis for the secondary beds was—total dissolved solid matter, 49·0; chlorine as chlorides, 5·3; ammonia free and saline, ·49; alluminoid ammonia, ·04; nitrogen as nitrates, 1·4; and oxygen absorbed in three hours ·190. The atmospheric temperature was 27 deg.; the temperature of the sewage 46 deg.; the temperature of the first filter 46 deg.; and of the second filter 41 deg. On January 1 and June 10 tests were made of the capacity of the beds, and they were practically the same, varying only between 27,500 gallons and 27,800 gallons. The sewage occupied 40 per cent., and the filtering material 60 per cent. of the beds. The District Council were so satisfied with the result that they intended to complete the system to deal with the whole of the sewage.

Mr. Campbell, Huddersfield, said he had given the bacteria system a fair trial at Huddersfield. Two beds were constructed—a coarse and a fine bed; the filtering material consisting of clinker. The sewage was well distributed over the surface of the beds in troughs, and both beds were well drained by land tiles. The sewage, before running on the beds, was thoroughly screened, first by a ½-in. screen, and second by sheet zinc with one-sixteenth of an inch perforations. The beds were never charged above twice a day, and were given one complete day's rest a week. The capacity of the coarse bed, when started on August 9, 1898, was 19,000 gallons, and on January 24, 1900, 4,800 gallons, a loss in seventeen months of 75 per cent. of the capacity. The purification effected by the beds continued satisfactory throughout the trial. Almost the whole of the suspended matter was removed and a large quantity of the soluble organic matter oxidised. The analysis showed the reduction of free ammonia was 72 per cent.;

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of albuminoid ammonia 80 per cent.: and of oxygen absorbed 80 per cent. When the material of the coarse bed was dug out it was found that the interstices within a foot from the bottom were entirely filled with a dark spongy substance; above that height they were only partially filled. This dark spongy substance had a not unpleasant earthy smell, and contained a large number of various low forms of animal life, especially worms. When dried it consisted of 63·7 per cent. of mineral matter and 36·3 per cent. of organic matter.

Mr. J. S. Pickering, Nuneaton, said his experience with bacteria beds was directly opposite to Mr. Campbell's, although dealing with sewage almost exactly similar to Huddersfield, being largely composed of trade refuse. His experiments at Nuneaton had extended over two years, and the authorities were so satisfied with the result that they were going to launch out with a big scheme of treatment on the bacterial system. He could not possibly understand Mr. Campbell's coarse grain filter blocking up as it had done. He had gauged by meter the flow from both the coarse and fine beds at Nuneaton, and there was practically no diminution of the flows during that time, while the coarse bed had silted up only to the extent of 33 per cent. With regard to the filters he said that experience had proved it was not so much the material as the degree of coarseness, and good results could be obtained from a variety of materials. They were certainly not justified in using coke at its present price. He thought it misleading to give the result of one particular analysis as a result of a system. Isolated analyses were no use whatever, and ought to be disregarded.

Colonel Jones said the experiments carried out by the Manchester Corporation showed no difference whatever between the covered septic tank and the open ordinary tank of deposition. That he regarded as the most important fact which had come out respecting the bacterial systems this year. The poor they had always with them, and sewage sludge they would have always with them. They could not expect to get rid of it without trouble and without labour. There was one point which appeared to be established, and that was the horrible nature of the effluent that came from the septic tank. Mr. Mawbey, in the report on his experiments at Leicester, said it was evident that the septic effluent could not be treated on old pasture or rye grass without causing a nuisance. Mr. Mawbey went on to say: "It seems to me that in sewage treatment offensive putrefaction should be reduced to a minimum, and that the more the disintegration is done in the presence of air, and the less the retention or stagnation of sewage, the less will be the land required. There is not sufficient evidence to show that the liquefaction with the closed detritus tank exceeded that with the open one. It is certain, however, that, whether closed or open, the detritus tank, in order to retain its efficiency, should be frequently emptied. The closed septic tank used for 125 days yielded 7·03 tons of sludge per million gallons flow of sewage." He had been preaching for thirty years that in treating sewage they must be cleanly, and these tanks to be cleanly should be frequently emptied.

Mr. Smith, Kettering, and Mr. Lacey, Oswestry, having spoken, a vote of thanks was accorded to Mr. Thudichum for his paper.

Rate of Rainfall.

Mr. J. P. Dalton, Engineer to the Rylon-on-Tyne District Council, read a paper on the rate of rainfall. He said the subject was of the greatest importance to drainage engineers. He had been engaged several years in making careful observations with the view of ascertaining the different rates at which rain of varying degrees of intensity was deposited. The gauges used were of the direct reading type: the relative area of funnel and tube being so proportioned that one-hundredth of an inch of rain on the funnel raised the water level in the tube about three-tenths of an inch. Mr. Dalton proceeded to give a number of records of rainfalls which he had observed, the highest rate observed (which he had frequently noted in thunderstorms) being 2·40 in. per hour. The varying influences of local circumstances and conditions of the porosity of the soil and extent of paved and imperviously covered surfaces, of the length of sewers and velocity of flow obtainable in them, rendered the application of any general principle necessarily subservient to the judgment of the engineer in each individual case; but it appeared that the probable amount of rain as falling on the ground, should not be estimated at less than 1 in. to 1½ in. in depth per hour, while the possible contingency of rain falling continuously during periods of several hours at higher rates up to 2 in. and even 2½ in. per hour should always be considered.

Mr. E. G. Mawbey, Leicester, in proposing a vote of thanks to Mr. Dalton, said he agreed with his conclusion that 1 in. to 1½ in. of rainfall per hour should be provided for in the sewers, though he did not say that the sewers should be capable of carrying off that quantity. His predecessor at Leicester, Mr. Gordon, proved that only one-half of the rain found its way in the sewers during the time it fell, and he had since made experiments which confirmed that conclusion. They might take it roughly that they ought to calculate for the storm and foul water sewers each carrying off a volume equal to a quarter of an inch of rainfall per hour, and if only one-half reached the sewers then that would provide for 1 in. of rain per hour. It was no use attempting to design sewers to carry off an exceptional flow, for they had records of 1 in. of rain falling in twenty minutes.

Mr. W. Nisbet Blair, St. Pancras, who seconded, said the paper was very useful to them, because they had at some time or other to make provision for dealing with exceptional rainfalls. Although, as Mr. Mawbey said, there was no obligation on the part of the Local Authority to have sewers sufficiently large to carry off the entire rainfall, there might be circumstances which would render it desirable to do so.

A vote of thanks was unanimously accorded to Mr. Dalton for his paper, and the meeting adjourned.

In the evening the annual Association dinner was held at the Criterion Restaurant, the President (Mr. C. H. Lowe) presiding, and there was a large attendance of members of the Association.

[A report of Friday's proceedings will be given in our next issue.]

BUILDING TRADES' GIFT TO THE NATION:

HOMES FOR DISABLED SOLDIERS.

WE are asked to announce the following further list of contributions:—

	£	s.	d.
The Nottingham Master Builders' Association (per Mr. W. G. Barton)	100	0	0
The Clerk of Works' Association (per Mr. J. A. Spooner)	22	1	0
Collected by Messrs. Langford & Ward from Employers and Builders of Wisbech	18	14	10½
Employees of Messrs. Patman & Fotheringham	16	0	0½
Messrs. Smith & Co.	15	0	0½
Messrs. Raffety, Thornton, & Co., Limited	10	10	0
Workmen of Messrs. B. Ward & Co.	10	7	3
Workmen of Messrs. Malcolm, Macleod	10	0	0
Messrs. Isherwood Brothers (Salford)	5	5	0
Messrs. C. E. Todd & Co. (Hackney)	5	5	0
Messrs. Sheffield Brothers	5	0	0
Messrs. Peacock Brothers and workmen	3	16	5
Workmen of Messrs. W. H. Dews (Leeds)	3	6	4
Workmen of Mr. John Marsland (Walworth)	3	1	6
Mr. Alfred Dowling and workmen (Bristol)	2	17	0
Workmen of Messrs. Sheffield Brothers	2	15	9
Workmen of Mr. Thomas Coie	2	10	9
Workmen of Mr. J. Ashley (New Brighton)	2	10	0
Mr. J. Davis and workmen	2	10	0
Workmen of Messrs. C. E. Todd & Co.	2	8	0
Workmen of Messrs. E. A. Roome & Co.	2	7	0
Mr. George Humphreys (Bristol)	2	2	0
Mr. S. H. Blackstone (of Messrs. B. Ward & Co.)	2	0	0
Mr. W. J. Keene and workmen	2	0	0
Messrs. J. Hebblethwaite & Sons and workmen	1	13	6
Workmen of Messrs. Alfred Goslett & Co.	1	10	0
Mr. C. B. King and workmen	1	8	9
Employees of Mr. J. C. Noakes (Wolverhampton) (per Mr. C. Vincent Vale)	1	6	0
Workmen of Mr. George Humphreys (Bristol)	1	6	8
Mr. W. H. Bach and workmen (Kilburn)	1	6	6
Workmen of Messrs. A. Goslett & Co.	1	5	6
Workmen of Mr. F. W. Rhodes (Stoke Newington)	1	5	6
Workmen of Messrs. E. R. Burtt & Sons	1	2	6
Workmen of Messrs. T. Rider & Sons	1	1	0
Messrs. M. Cockerell & Sons	1	1	0
Employees of Mr. William Smith, jun. (Wolverhampton, (per Mr. C. Vincent Vale)	1	0	0
Workmen of Messrs. J. & M. Patrick]	0	10	5½
Workmen of Mr. H. Cresswell (Brighton)	0	10	0
Workmen of Messrs. G. A. Browne & Co.	0	7	0
Workmen of Mr. C. W. Collins	0	5	0
Mr. W. Hammond (Battersea)	0	2	6

PASS EXAMINATION LISTS, INSTITUTE OF ARCHITECTS.—In the list in our last issue of those who had passed the Intermediate examination, the name of Mr. J. N. Randall Vining was incorrectly printed "Vine." The mistake was not ours, it arose from an imperfection in the lithographed list sent to us from the Institute.

Illustrations.

LAVENHAM CHURCH.

THE illustration of the south porch and a portion of the south side of this celebrated example of a late Suffolk church is given this week in connexion with the account of the Annual Excursion of the Architectural Association.

Lavenham is, as every one knows, one of the finest examples of the stone and flint churches of Suffolk, and is as remarkable for the rich character of its architectural decoration as for the excellent condition of preservation in which most of it remains.

The tower, 140 ft. in height and with the main portion of the walls entirely built in a small masonry of round flints, is a remarkable example of solid monumental building in what seems at first sight a very unmonumental material.

SKETCHES IN ILLUSTRATION OF THE ARCHITECTURAL ASSOCIATION EXCURSION.

THE sketches of various picturesque buildings or details on the route of the Architectural Association excursion, contained in these three plates, were specially made by Mr. Curtis Green.

A good many of these belong to the portion of the excursion of which the description will not appear till next week. Among the more interesting details we may call attention to the sketch of the curious plaster-decorated house at Clare; to the picturesque corner from West Stow Hall, on the same plate; to the porch at Hengrave Hall; the market-place at Mildenhall; the characteristic but unpretending village street house at Ixworth; and the curious roof-ridge from the same place, decorated with figures and animals which form integral portions of the ridge tiles.

COMPETITIONS.

ASYLUM, CARDIFF.—A meeting of the Asylums Committee of the Cardiff Corporation was held recently, the only item on the agenda being a number of applications from architects for an extension of time in preparing the designs in the preliminary stage of the competition in connexion with the new asylum buildings for Cardiff. On the motion of Alderman Ramsdale, seconded by the chairman (Mr. W. H. Veall), it was decided that twenty-one days' extension be granted, the date fixed for sending in the designs being September 15.

MUNICIPAL BUILDINGS, BLACKBURN.—It is stated that about fifty architects have expressed their wish to take part in the competition for the new municipal buildings at Blackburn and the additions to the Town Hall. In due time half a dozen will be selected, and from the designs prepared by those firms a final choice made.

BERKHAMSTED GIRLS' SCHOOL.—Sixty designs have been sent in for this competition. The assessor, Mr. H. H. Statham, after spending three days in examination of the designs, awarded the first premium, of 50*l.*, to the design numbered 55; the second premium, 35*l.*, to No. 1; and the third premium, 15*l.*, to No. 40. At a meeting of the Committee on the 20th inst. the corresponding envelopes were opened, and it was found that the author of No. 55 was Mr. R. H. Spalding, of 15, Queen-street, Cheapside; the authors of No. 1 were Mr. Curtis Green and Mr. Archibald C. Dickie, of 7, John-street, Bedford-row; and the authors of No. 40 were Mr. W. J. Tapper and Mr. H. D. Crouch, of 12, Gray's Inn-square. The designs were to be on view at Berkhamsted Town Hall on Thursday, Friday, and Saturday of this week. As the Committee were unable to arrange for the complete hanging of so large a number of drawings, and they could only be placed round the hall in sets, a small charge has been made for entry, to protect the drawings from any rough handling.

HULL CENTRAL LIBRARY.—The foundation-stone of the new Municipal Central Free Library, which is to be erected in Albion-street, Hull, was laid on the 21st inst., by Sir James Reckitt, Bart. The new library will include a newspaper reading-room, a ladies' reading-room, a room for the perusal of magazines, and a reference library. Mr. J. S. Gibson, of London, is the architect.

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ARCHITECTURAL SOCIETIES.

YORK ARCHITECTURAL SOCIETY.—The third meeting of the summer session, arranged by this Society, took place on the 21st inst., when by permission of the owner, Mr. Sidney Leetham, a visit was paid to Elm Bank. This family residence has recently undergone extensive alterations and improvements (under the direction of Messrs. Penty & Penty, architects. The visitors were received on their arrival by Mr. and Mrs. Leetham, who accompanied them through the various apartments, and afterwards entertained them. Mr. Arthur J. Penty, in explaining the structural alterations, stated that although the exterior of the house presented much the same appearance, it had internally being entirely remodelled. The principal alteration consisted in the placing of a large hall, two stories in height, in the centre of the house, from which access is obtained to the principal rooms on the ground and first floors. The dining-room, drawing-room, morning-room, and smoke-room have been replastered, panelled, and decorated. The vestibule, hall, staircase, smoke-room, and dining-room are finished in oak; the remainder of the rooms are painted. Mr. George W. Milburn is responsible for the sculpture and carving.

ARCHÆOLOGICAL SOCIETIES.

BIRMINGHAM ARCHÆOLOGICAL SOCIETY.—The third excursion of the Society for the present season was held on the 14th inst. The two churches of Arley and Astley formed the archæological basis of the journey. Of Arley it can only be said that the exterior is more attractive than the interior. The latter has undergone restoration with the usual results. Almost every semblance of antiquity has been obliterated, and the manner in which the principal remaining monument and the piscina have been framed in oak is, and it is to be hoped will remain, unique. The exterior, on the other hand, has been reverently treated, and the massive battlemented tower is fine and stately. The church of Astley has many points of great interest, and although it has suffered egregiously from the neglect and rapacity of former lords of the manor, yet the minutes are of so long-standing as to have been partially condoned and covered by time. What exists now is but a fragment of the noble edifice once known far and wide as the chief landmark—"The Lantern"—of the Forest of Arden. The beautiful tracery of the windows, the finely-finished buttresses and corbel table all testify to the departed grandeur of the original church. The interior is singular from being really only a portion of the architect's design, the height being out of all proportion to the present extent of the building. The stalls are decorated with very curious carvings of saints, and the walls retain the quaint Jacobean Scriptural quotations which do not now appear so much out of harmony with the architectural style of the building as they must once have seemed. The traces of a demolished side chapel are still very evident, and in digging a grave recently a very interesting discovery of a tiled pavement belonging thereto has been made.—*Birmingham Post.*

LONDON AND MIDDLESEX ARCHÆOLOGICAL SOCIETY.—The annual excursion of this Society took place on the 14th inst., and was to Wantage, in Berkshire. About fifty members assembled at Paddington terminus, and took the 9 a.m. train, under the leadership of Mr. T. W. Shore, assisted by Mr. C. Welch, hon. secretary, Mr. Herbert C. Welch, and Mr. W. F. Ivatts. On arriving at Wantage the statue of King Alfred the Great, by Count Gleichen, was inspected, and then the church, one of the largest in Berkshire, containing the tomb of Sir William Fitzwarin, A.D. 1361, was visited. Here the visitors were received by the vicar, Canon Archer Houblon, who described the church and pointed out the monuments and brasses. The large brass to Sir Fitzwarin, 1414, attracted much attention, this knight's daughter was married to Sir Richard Whittington, and his will has just been found in the library of Lambeth Palace, and translated by Mr. Challenor Smith; it was read by the vicar. The members then ascended the tower of the church, from which Mr. Shore pointed out the site of the ancient palace of the West Saxon kings, in which King Alfred the Great was born; it is on a rising ground to the north-west of the church Subsequently the party proceeded in brakes along the Ikleton-road (the ancient "Ichenilde Strete") via Letcombe, mentioned in Parker's Glossary, to the famous "Blowing Stone" at Kingstone Lisle. This stone is described by Scott in "Kenilworth." It is a large grey sandstone about 2 ft. cube, with a hole or channel right through it, so that it can be blown to sound like a horn. Here several of the party "blew" the stone, and then proceeded to "Wayland's Smithy," locally known as Wayland Smith's Cave, which Mr. Shore said was probably a dolmen of the Neolithic period, and known by this name in Saxon times in association with the extremely ancient Teutonic legend of Weland, the mythical smith of old German literature. The "wide geat be eastan Welandes Smippan" is mentioned in an Anglo-Saxon charter in 955. This dolmen is a collection of stones, with a large one on top formed not unlike a miniature Kit's Coty House. The next drive was to Uffington Church, where, unfortunately, time did not permit a long visit. The station was then reached, and by 6.40 p.m. train the party returned to town.

SURREY ARCHÆOLOGICAL SOCIETY. — The annual excursion of this Society for the present year took place on Thursday, the 19th inst., to Guildford, Ockham, Ripley, Send, and Sutton Place. Assembling at Guildford railway station at eleven, where brakes were in attendance, a party of about seventy, under the guidance of Mr. Ralph Nevill, Mr. M. S. Giuseppi, hon. secretary, and Mr. W. P. Ivatts, drove off to Ockham Church, where a paper was read by Mr. H. St. John Bashall, who said it was just thirty-six years ago since the Society last visited there, and since 1875 this church had been restored. It was dedicated to All Saints, and it stood in Ockham Park, about one hundred yards from the Mansion House. It consisted of a nave, chancel, and north aisle. In the latter stood the large monument of Lord Chancellor King and his family. The church was mentioned in Domesday Book, but the only feature now remaining of that period was the arch at the entrance of the tower. There were very slight traces of any work older than the thirteenth century. In the fifteenth century the church underwent extensive remodelling. It formerly contained seats from 6 ft. to 8 ft. high and a gallery, but these had been cleared away.—The party then went on to Ripley, where the church was visited and described by Mr. Philip M. Johnston. He said it was a contrast to the church they had just visited, as Ripley Church was nearly all modern, the nave dating only from 1845-6, which superseded one erected about 1790. But the chancel was a fragment of the ancient Chapel of Ripley, which was attached to Send, this not being a separate parish. It was, in the main, Norman work, and dated from about 1140 to 1150. The chief features of interest were the chancel window, which is in the Early English style, and the string course running round the chancel. The drive was then continued to Send, where the curious old church was visited, and also described by Mr. P. M. Johnston. He said this church was mentioned in Domesday Book. There was probably some building on the site of the present church, and possibly it was a wooden one. There was, however, not a single stone in the present building which could be dated back to Norman times when Domesday was compiled. The earliest portion of the present church was the chancel, which represented the width of the whole of the original building. The nave was widened in the fifteenth century. Having examined the rood screen, which is a fairly perfect specimen, and the seats, which are for the most part of the original fifteenth century work, and the porch and the inner door with its ironwork all of the same date, the visitors drove away to Sutton Place. Here they were received by Mr. Leonard F. Harrison and Mr. Frederic Harrison, the latter gentleman describing the house and escorting the visitors over it. He said he had resided there twenty-five years, and it was just eighteen years ago since the Society visited the house, and he read a paper thereon, which will be found published in the ninth volume of the Society's Transactions. Sutton Manor, he said, was granted by Henry VIII. in 1521 to a favourite servant named Sir Richard Weston, knight, who built the present house somewhere about 1523-5; the turret bell on the roof was dated 1530. Henry VIII. frequently dined in the large hall, and among the visitors were Cardinal Wolsey and Thomas Cromwell. Sir Richard Weston lived here till he died in 1542. The Manor remained in his family for nearly three centuries down to 1782, when it was left to a distant connexion of the family, who devised it to his grandson, Mr. Francis Salvin, the present owner. Queen Elizabeth was a frequent visitor to the house. The architecture was of a kind almost unique—not a bit of stone was used; the house was built entirely of brickwork and terra cotta. The latter, though over 400 years old, had lasted so well and was so sound that casts had been taken of it for the purpose of restoration. The large quadrangle was 81 ft. 6 in. square, and the gate tower, which used to stand in the middle, was 70 ft. high before it was pulled down in 1786. The visitors soon after returned to Guildford, and thence to London by the 8 p.m. train.

BRITISH FIRE PREVENTION COMMITTEE.

THE concluding series of fire tests of the present session conducted under the auspices of the British Fire Prevention Committee were undertaken on Wednesday at the testing-station near Regent's Park, this being the last occasion on which this testing-station can be used, as the committee have to move their plant by the autumn to make room for an extension of the Great Central Railway, which has obtained Parliamentary powers over the property in question. The occasion was marked by the chairman of the committee entertaining a party at luncheon, among whom were: Mr. Arthur Cates, the Crown Surveyor; Major-General Festing, of the South Kensington Museum, and several other officers of the committee.

There was a large attendance of district surveyors, government and municipal officials for the actual tests, which comprised a continuation test with a patent floor which had already been subjected to a preliminary investigation a fortnight ago, one with a partition, as well as two tests with iron doors.

The door tests were of considerable importance as comparative tests, as one of the doors was built in accordance with the requirements of the London Building Act, and the other in accordance with the requirements of the insurance companies. It was found that although the Building Act door was of better construction than really required by the Act, the insurance door, in which only the minimum requirements were observed, was the more efficient.

The floor in question was constructed by the Mural and Decorations Syndicate. The preliminary test lasted one and a-quarter hours at a temperature up to 2,000 deg. Fahr., followed by an application of water. The continuation test was for another hour at similar temperatures, with a further application of water. The problem was to see what the resistance of this floor would be after having passed through one ordeal of fire, the matter being of the highest importance to insurance companies as a question of reinstatement.

The partition under investigation was the "Cunnah-Wright" partition constructed by the Fireproof Syndicate. The test was of one hour's duration at temperatures up to 2,000 deg. Fahr., with a final application of water.

As regards the iron doors, these doors were simultaneously subjected to fire up to 2,000 deg. Fahr., followed by the application of water, the test being of one hour's duration.

The results of the tests will no doubt be issued by the Committee in due course.

BUILDERS' BENEVOLENT INSTITUTION:

ANNUAL MEETING.

THE fifty-third annual general meeting of the subscribers and donors of this charity was held at 35, Southampton-row, Bloomsbury-square, W.C., on Wednesday, the 18th inst. Mr. J. T. Bolding presided, and there were also present Mr. T. Stirling, Mr. T. Gregory, Mr. A. Ritchie, Mr. R. Perkins, Mr. G. J. Lough, Mr. C. Bussell, &c. The secretary (Major R. A. Brutton) read the annual report, in which the committee expressed regret that the Institution, in common with most charities, had suffered somewhat in the amount of annual subscriptions on account of the lamentable war in which the country is now engaged. It was hoped, however, that on the conclusion of the war

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the subscriptions would revert to the average amount. But, while regretting this falling off, the committee were pleased to say that the total receipts for the year would be equal to those of last year, owing to the exceptionally successful appeal made by the President, Mr. A. E. Parker, at the annual dinner, which made it a record year. In consequence of this result they were again enabled to elect all the eligible candidates. The Committee also reported that there had been nine deaths during the year amongst the pensioners, and six new pensioners had been elected.

The report and balance-sheet were unanimously adopted. The Chairman moved that Rule III., section I., be amended by altering the age of candidates for pensions from 60 to 55 years of age. The proposed alteration, he said, had had the consideration of the Committee at several of their meetings, and had after much consideration received their unanimous approval. He had had an experience of over thirty years of the candidates who applied for the benefits of the charity, and he had known many cases where unsuccessful builders, worthy of the relief this Institution afforded, had had to pass even more than five years of most miserable existence waiting till they reached sixty years of age to obtain a pension. In the early days of the Institution, half a century ago, he thought sixty years of age was a reasonable limit; but now he ventured to say that with increased competition and the many troubles, difficulties, and liabilities connected with the building trade, an unsuccessful member of that business, after possibly a long and severe struggle to maintain his position, was as old to-day at fifty-five as a man in a similar position was at sixty half a century ago. The committee would be most careful to see that no advantage was taken of this change by any candidate who was able to get his own living.

The resolution was unanimously agreed to.

Mr. Deputy Greenwood, C.C., was elected President for the current year, and it was announced that the annual dinner will be held at the Carpenters' Hall on Thursday, November 22.

Votes of thanks were passed to the President, vice-presidents, trustees, treasurer, auditors, and committee; and a similar compliment to Mr. Bolding for presiding closed the proceedings.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday afternoon in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend the Battersea Vestry 14,000*l.* for electric lighting purposes, and 1,750*l.* for street improvements; the Fulham Vestry 15,000*l.* for the purchase of Swan Wharf and a site for the extension of stables; the Lee District Board 1,125*l.* for pipe sewers; Shoreditch Vestry 15,140*l.* for paving and sewer works; the Camberwell Vestry 7,000*l.* for paving works; the St. James's Vestry 8,997*l.* for paving works; the Poplar District Board 20,000*l.* for paving works; and the Shoreditch Vestry 30,000*l.* for electric lighting purposes.

The Clerk's Resignation.—Mr. McKinnon Wood, on the reception of the General Purposes Committee's report announcing the resignation of the clerk, moved a resolution expressing the committee's regret at Mr. Stewart's departure, and thanking him for his past services. The resolution having been agreed to,

The Clerk (Mr. C. J. Stewart) briefly replied, and thanked the Council for its vote.

Gas Testing.—The Public Control Committee expressed their surprise at the rejection by Parliament of the Council's proposals for testing the London gas supply by photometer, and recommended:—"That the Council do ask the Board of Trade to institute an inquiry as to the cause of the persistent differences between the results of testing the illuminating power of gas supplied by gas companies at prescribed testing-places and of tests made with the portable photometer of identical construction of gas supplied to other buildings in the county."

The recommendation was adopted.

Albert-square, Commercial-road.—The Parks and Open Spaces Committee recommended and it was agreed, "That the Council do approve the estimate of 7,000*l.* submitted by the Finance Committee, and do resolve to purchase the garden of Albert-square, Commercial-road, for the purposes of an open space."

By-laws as to the Removal of Offensive Matter.—On the recommendation of the Public Health Committee, the following was agreed to:—

"(*a*) That the Council do make by-laws under section 16 of the Public Health (London) Act, 1891, in the following terms, and that the seal of the Council be affixed to copies of such by-laws—

LONDON COUNTY COUNCIL.

By-laws made by the London County Council under the Public Health (London) Act, 1891.

By-laws under Section 16 (2) For prescribing the times for the removal or carriage by road of any fæcal or offensive or noxious matter or liquid in or through London, and providing that the carriage or vessel used for the removal or carriage by road or water of any such matter or liquid in or through London shall be properly constructed and covered so as to prevent the escape of any such matter or liquid, and as to prevent any nuisance arising therefrom.

1. Every person who shall remove or carry, or cause to be removed or carried, by road or water in or through London any fæcal or offensive or noxious matter or liquid, whether such matter or liquid shall be in course of removal or carriage from within or without or through London, shall use or cause to be used therefor a suitable carriage or vessel properly constructed and furnished with a sufficient covering so as to prevent the escape of any matter or liquid therefrom, and so as to prevent any nuisance arising therefrom.

Such person shall not remove or carry, or cause to be removed or carried, such matter or liquid by road in or through London except during the following periods, viz.:—

Between five o'clock a.m. and ten o'clock a.m., or during the period commencing two hours before sunset and ending one hour after sunset, in any day during the months of March, April, May, June, July, August, September, and October.

Between six o'clock a.m. and eleven o'clock a.m., or during the period commencing two hours before sunset and ending one hour after sunset, in any day during the months of November, December, January, and February.

This by-law shall not apply to any person removing or carrying manure consisting only of horse-dung with a sufficient proportion of straw to render it inoffensive, and shall not apply to any person removing or carrying in a suitable carriage or vessel as aforesaid manure consisting of horse-dung and litter other than straw.

2. Every person who shall offend against the foregoing by-law shall be liable for every such offence to a penalty of 5*l.*, and, in the case of a continuing offence, to a further penalty of 40*s.* for each day after written notice of the offence from the Sanitary Authority.

Provided, nevertheless, that the justices or court before whom any complaint may be made or any proceedings may be taken in respect of any such offence may, if they think fit, adjudge the payment as a penalty of any sum less than the full amount of the penalty imposed by this by-law.

Repeal of By-law.

3. From and after the date of the confirmation of these by-laws, the by-law numbered 1 (one) in the series of by-laws which was made by the London County Council under Section 16 (2) of the Public Health (London) Act, 1891, on June 22, 1893, and was confirmed by the Local Government Board on June 28, 1893, shall be repealed.

(*b*) That the clerk be instructed to advertise notice of the Council's intention to apply to the Local Government Board for confirmation of the by-laws, and be also instructed to take the other steps prescribed by Sections 184 and 185 of the Public Health Act, 1875."

Salaries of Sanitary Inspectors.—The same Committee reported as follows, the recommendation being carried:—

"On the 3rd instant, the Council, on our recommendation, decided to address a letter to the Local Government Board expressing the opinion that the salary of 100*l.* per annum proposed to be paid to Mr. T. Mitchell, a sanitary inspector appointed by the Paddington Vestry, was inadequate, and stating that the Council hoped that the Board would not in future sanction the appointments of sanitary inspectors unless adequate salaries were paid. On the 16th instant the Local Government Board acknowledged the receipt of the Council's letter, and stated that they noted the opinion of the Council expressed therein. On the same day they forwarded a letter stating that they had sanctioned another appointment (that of Mr. S. H. Kemp, Stoke Newington) at a salary of 104*l.* per annum. We regret that the Board have not insisted in this case on the payment of an adequate salary, and we recommend—That the Local Government Board be informed that the Council observes with regret that they have sanctioned the appointment of Mr. S. H. Kemp as a sanitary inspector, in the parish of Stoke Newington, at the inadequate salary of 104*l.* per annum."

Westminster Improvement Scheme.—An Urgency Report was brought up by the Improvements Committee respecting the improvement scheme at Westminster which has recently been before a Committee of the House of Lords. The Committee had found the preamble of the Bill proved, but did not approve of the suggested plans, although an alternative plan met with their sanction. If the improvement should be carried out in accordance with the decision of the Committee of the Lords the effect would be to add to the Victoria Tower Garden an area of about three-fourths of an acre, the greater part of which would otherwise have been available for recoupment. The line of the street would have a bend near the southern end of the present garden, with the result that, in approaching from the south, a finer view of the Houses of Parliament would be obtained, and, conversely, any one going south from the Houses of Parliament would obtain a better view of any buildings to be erected upon the southern portion of the new street. The Victoria Tower Garden would be scarcely touched, and a fine row of some twelve trees would be preserved. The extent of the property to be compulsorily acquired was not altered, but land that would otherwise have been available for recoupment would now be added to the garden, and it was estimated that the selling value of this land would be about 60,000*l.* As against this there was a small set-off in the engineering works, which would be somewhat less expensive, the estimated gain being about 4,000*l.* Therefore, to carry out the new scheme would cost the Council about 56,000*l.* more than the scheme embodied in the Bill. The Committee felt that the Council was in a difficult position; but nevertheless thought they should proceed.

A Report of the Parliamentary Committee on the same subject was taken with the urgency Report, the recommendation being that the Council should not accept the alterations.

After a long discussion, during which several amendments were considered, the following amendment, moved by Mr. Shaw-Lefevre on behalf of the Improvements Committee, was agreed to:—

"That the Council do proceed with the Bill subject to the Select Committee of the House of Lords agreeing that the new street from the southern end of Abingdon-street to Lambeth Bridge shall be carried out in general accordance with the route shown upon the plan approved by the Improvements Committee on June 7, 1899, sanctioned by the Council on July 4, 1899, including the widening of the northern end of Abingdon-street as already arranged."

Asylums.—On the recommendation of the Asylums Committee it was agreed to carry out the following works:—

Laundry Block, Banstead: Alteration of thirteen rooms on the three floors and the associated dormitory on ground floor, and heating, 260*l.*

Main Kitchen, Banstead: One cutting-up table and hot plate, 120*l.*

Extension of Vegetable Shed, next Steward's Store, Banstead: Van and cart shed, brick and slate, 200*l.*

Gas Works, Banstead: Additional gas holder capacity, 650*l.*

Sinking a Well, Claybury, 800*l.*

Apparatus for removal of steam from laundry, Colney Hatch Asylum, 600*l.*

Alterations to wards Nos. 17, 21, and 23, Colney Hatch, 2,667*l.*

Provision of cottages for cowman and gardener, Hanwell, 750*l.*

Provision of vegetable store, Hanwell, 280*l.*

Additional lavatory accommodation, Hanwell, 150*l.*

Horton Estate—Central station for the supply of water and electricity, 14,340*l.*

Horton Estate—Lining of well, 2,100*l.*

Tenders.—The following tenders have been accepted:—

Reinstatement of No. 4, Spring-gardens, after damage by fire. Mr. F. Bull, 266*l.*

The wiring and fittings from electric light installation at the Fulham Fire Station. Messrs. Tamplin & Makovski, 235*l.* 4*s.* 6*d.*

Work at the Kentish Town Fire Station. Mr. F. Bull, 411*l.*

Electric light, &c., wiring, Horton Asylum. Mr. T. Scott Anderson, Sheffield, 8,700*l.*

The construction of a subway between the generating station and the existing subway of the Victoria Embankment, in connexion with the electric light installation, Victoria Embank-

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ment and Westminster Bridge. Mr. S. Kavanagh, 323*l.* 14s.

Improvements.—The following recommendations of the Improvements Committee were agreed to:—

"That the estimate of 1,055*l.* submitted by the Finance Committee be approved, and that, subject to the Vestries of St. Luke and Shoreditch each contributing one-fourth of the net cost of the improvement, the Improvements Committee be authorised to take the necessary steps to widen Old-street at the junction with City-road by the setting back of the frontage of the City and South London Railway station, as shown upon the plan approved by the Improvements Committee on January 24, 1900.

That the estimate of 700*l.* submitted by the Finance Committee be approved, and that the Improvements Committee be authorised to acquire the leasehold interest in Nos. 304 and 306, Mare-street required in connexion with the widening of Mare-street between the North London Railway and the Triangle, in respect of which the Vestry of Hackney are to pay one-fourth of the net cost.

That the estimate of 1,225*l.* submitted by the Finance Committee be approved, and that, subject to the terms of an agreement to be prepared by the solicitor, and to the Wandsworth District Board contributing one-third of the net cost, the Council do accept the offer of the owners of the Althorp-lodge estate to give up, for 600*l.*, the land required for widening Garratt-lane, Wandsworth, to 54 ft. at the Althorp-lodge estate, as shown upon the plan approved by the Improvements Committee on July 11, 1900.

That the amount of the Council's contribution to the Greenwich District Board in respect of the widening of South-street, Greenwich, be 232*l.* 14s."

Commences, Leicester-square Gardens.—The Parks and Open Spaces Committee recommended, and it was agreed—

"That the Council do grant permission to the Strand District Board to make up the northern entrance of Leicester-square Garden to the level of the path outside, which has been raised in connexion with the construction there of underground conveniences, subject to the whole of the work being done to the satisfaction of the chief officer of the Parks department; and that the District Board be permitted to retain the drain ventilating grating that they have had fixed within the boundary railings of the garden, subject to their giving an undertaking, in terms to be approved by the Solicitor, to remove the grating whenever called upon by the Council to do so."

The Council adjourned at 8 o'clock.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

At the meeting of the London County Council on Tuesday, the following applications under the London Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

Proposed Building on Site of Nos. 35, 37, 39, and 41, Sylvester-road, Hackney.

Hackney, Central.—(*a*) Recission of the resolution of the Council of June 26, 1900, consenting to the erection of a building on the site of Nos. 35, 37, 39, and 41, Sylvester-road, Mare-street, Hackney, to abut also upon Pigwell-path (Messrs. Ford, Son, & Burrows for Messrs. Stapley & Smith). (*b*) A building on the site of Nos. 35, 37, 39, and 41, Sylvester-road, Mare-street, Hackney, to abut also upon Pigwell-path (Messrs. Ford, Son, & Burrows for Messrs. Stapley & Smith).—Consent.

Lines of Frontage.

Lewisham.—Houses with one-story shops on the east side of a house known as Tremorvah, Lewisham Hill-road, and one-story shops in front of that house and also one-story shops southward of such house, on the east side of Tyrwhitt-road (Mr. J. Webster for Messrs. G. R. and C. C. Storey).—Consent.

Chelsea.—A heating-chamber and a coal-cellar, in the area in front of the school on the south side of Marlborough-road, Chelsea (Mr. T. J. Bailey for the School Board for London).—Consent.

Lambeth.—Houses with shops on the site of Nos. 21, and 22, Camberwell Green, Camberwell (Mr. L. Solomon for Mrs. A. Gabriel).—Consent.

Lewisham.—A warehouse on the east side of Thorpe-road, Lewisham, at the corner of Avenue-road (Messrs. Wiltshire & Thurgood for Mr. E. B. Cornish).—Consent.

Wandsworth.—One-story shop on part of the forecourt of No. 1, Ashlone-terrace, Lower Richmond-road, Putney (Mr. S. G. Warner for Messrs. J. & R. Lamb).—Consent.

Hackney, North.—A warehouse on the north side of Barrett's-grove, Stoke Newington-road, Stoke Newington, at the corner of Cressington-road (Mr. T. J. Wetherall for Messrs. E. Austin & Sons).—Refused.

Hackney, South.—A house with shop on the west side of Chatsworth-road, Lower Clapton, to abut upon Elderfield-road (Mr. J. W. Dunford for Mr. H. Bowler).—Refused.

Brixton.—Twenty houses on the eastern side of Coldharbour-lane, Brixton, at the corner of Vaughan-road, and houses on the eastern side of Vaughan-road (Messrs. Shoebridge & Rising for Mr. J. Pearman).—Refused.

Greenwich.—A coach-house and stable on the west side of Park Villa, Westcombe Park, Greenwich, to abut upon Humber-road (Messrs. Hards & Bradley for Mr. R. Kingston).—Refused.

Islington, South.—A wall and railing to the goods yard on the north side of Barford-street, Liverpool-road, Islington (Mr. R. Venner for the Royal Agricultural Hall Company, Limited).—Refused.

Islington, West.—Buildings at the proposed new tramway depôt, No. 321, Holloway-road, Islington (Mr. G. R. Bayliss for the North Metropolitan Tramways Company).—Refused.

Norwood.—A public hall, one-story shops, and houses with shops, on the west side of Norwood-road, West Norwood, between York-road and Harpenden-street (Mr. J. S. Quilter for the freeholders).—Refused.

Camberwell, North.—A building at the rear of Nos. 232, 204, and 206, Camberwell-road, to abut upon Mansion-street (Mr. J. Weir for the Davis Gas Stove Company, Limited).—Refused.

Projections.

Hampstead.—A wood and lead canopy at the entrance to a house in course of erection on the north-east side of Ferncroft-avenue, Hampstead (Mr. W. A. Burr for Mr. J. Tomblin).—Consent.

Holborn.—Oriel windows on the first, second, third, and fourth floor levels, and projecting cornices in front of Nos. 101 to 107, High Holborn (Mr. W. C. Waymouth for Mr. O. Owen).—Consent.

Islington, East.†—The retention of two wood and glass show-cases on the pilasters of Nos. 412 and 414, Holloway-road, Islington (Mr. J. R. Quilter for Mr. T. Lee).—Consent.

Lewisham.—A projecting vestibule and portico at the entrance to No. 10, Leyland-road, Lee (Mr. R. Williams for Mr. A. Gant).—Consent.

Marylebone, East.—A five-story bay window, and balconies on the second, third, and fourth floor levels, in front of No. 7, Harley-street, Marylebone (Mr. R. J. Worley for Mr. J. S. Beale).—Consent.

Paddington, South.—An additional story to the bay window in front of No. 129, Queen's-road, Bayswater (Mr. F. M. Elgood for Mr. H. Lyne).—Consent.

Paddington, South.—A portico at the entrance to No. 6, Westbourne-terrace, Hyde Park (Mr. G. A. Hall for Mr. C. Hunter).—Consent.

Lewisham.—Bay-windows to sixteen houses on the west side and twenty-six houses on the east side of Northwood-road, Forest Hill (Mr. S. Frampton).—Refused.

Paddington, South.—Bay windows on the first, second, third, and fourth floor levels in front of Nos. 111 to 121A (odd numbers only), Queen's-road, Bayswater (Mr. W. J. Gibbon for Mr. H. Gibbon).—Refused.

St. George, Hanover-square.—A projecting iron sign in front of No. 25, Princes-street, Hanover-square (Messrs. E. J. Saunders & Co. for Mr. F. D. Byrne).—Refused.

Width of Way.

Whitechapel.—A one-story addition to the girls' school, All Saints' Schools, Buxton-street (Mr. A. Cox for the managers of All Saints' Schools).—Consent.

Space at Rear.

Kennington.—A modification of the provisions of Part V. of the Act with regard to open spaces about buildings, so far as relates to the erection of a block of residential flats on the site of Rose Cottage, Langley-lane, South Lambeth-road, Lambeth, with an irregular space at the rear (Messrs. Green & Simes for Messrs. F. W. Serff & Co.).—Consent.

Deviation from Certified Plans.

St. George, Hanover-square.—Certain deviations from the plans certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed erection of club chambers, with shops on the ground floor, on the site of No. 5, White Horse-street, Piccadilly, and stabling at the rear (Mr. E. H. Sim for Mr. G. H. Tod-Heatly).—Consent.

Finsbury, Central.—Certain deviations from the plan certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed rebuilding of No. 178, St. John-street, and of the George public-house, No. 180, St. John-street, Clerkenwell, at the corner of Compton-street (Mr. W. A. Aickman for Mr. H. H. Finch).—Consent.

Lines of Frontage and Width of Way.

St. George, Hanover-square.—A one-story addition to the coach-house at No. 31, Belgrave-mews South, Belgrave-place, St. George, Hanover-square (Messrs. G. Trollope & Sons for Mr. J. W. Todd).—Consent.

Bethnal Green, South-West.—Buildings on the site of Nos. 138 to 148 (even numbers only), Cambridge-road, Bethnal Green, at less than the prescribed distance from the centre of Pelican-passage (Mr. A. Hood for Mr. R. Voss).—Consent.

Islington, West.—An addition in front of No. 10, Windermere-road, Holloway-road, Islington (Mr. F. S. Hammond for Messrs. Knowlman Brothers).—Refused.

St. George, Hanover-square.—A porch at the entrance to St. Mark's Institute, Balderton-street, Oxford-street (Mr. W. B. Pinhey for the Polytechnic Institute).—Refused.

Width of Way and Projections.

Westminster.—An oriel window at the first and second floor levels in front of Nos. 6 and 7, Cowley-street, Westminster (Mr. F. A. Smith).—Consent.

Strand.—An iron and glass shelter at the restaurant entrance to the Garrick Hotel, Charing Cross-road, at the corner of Green-street (Messrs. Saville & Martin for Mr. R. Baker).—Refused.

Width of Way and Space at Rear.

Whitechapel.—A van shelter, with stables over, on the west side of Queen Anne-street, Whitechapel, with an irregular open space at the rear; and of a dwelling-house with an irregular open space at the rear, and forecourt fence within the prescribed distance from the centre of the roadway, on the eastern side of Thomas-street, adjoining such van shelter and stables (Mr. H. McLachlan for Mr. W. Donaldson).—Consent.

Formation of Streets.

Brixton.—That an order be issued to Messrs. Shoebridge & Rising refusing to sanction the formation or laying-out for carriage traffic of a new street, 40 ft. wide, to lead from Coldharbour-lane to Vaughan-road, Brixton (for Mr. J. Pearman).—Agreed.

Wandsworth.—That an order be issued to Messrs. Beadel, Wood, & Co. refusing to sanction the formation or laying-out of new streets for carriage traffic on the south-west side of Streatham High-road, Streatham, adjoining the London, Brighton, and South Coast Railway (for Mr. C. H. C. Du Cane).—Agreed.

Wandsworth.—That an order be issued to Messrs. Marler & Co. refusing to sanction the formation or laying-out of three new streets for carriage traffic on the Furzedown Park Estate, Mitcham-lane, Streatham (for Col. R. J. Aspinall).—Agreed.

Buildings for the Supply of Electricity.

Whitechapel.—The use for one year, as a temporary electricity generating station and works, of buildings at the depôt on the west side of Osborn-street, Whitechapel (Mr. M. W. Jameson for the Board of Works for the Whitechapel District).—Agreed.

Means of Escape from the Top of High Buildings.

Strand.—Means of escape in case of fire proposed to be provided in pursuance of Section 63 of the London Building Act, 1894, on the sixth and seventh stories of a building on the site of Nos. 173 to 179, Strand, and No. 2, Norfolk-street (the upper surfaces of the floors of which stories are about 60 ft. from the street level) for the persons dwelling or employed therein (Messrs. White & Co.).—Consent.

Cubical Extent and Construction of Buildings.

Islington, West.—The rebuilding of the Caledonian Saw Mills, No. 18, New Wharf-road, Caledonian-road, Islington, to exceed in extent 250,000, but not 450,000, cubic feet, and to be used only for the purposes of sawing, planing, and moulding timber (for Messrs. Haggis & Sons).—Consent.

The recommendations marked † are contrary to the views of the Local Authorities.

Correspondence.

To the Editor of THE BUILDER.

THE ARCHITECTURAL MUSEUM.

SIR,—I was recently at the Museum hunting for information as to casts of Gothic work which I could with confidence urge my Committee to purchase for use in the Architectural Classes at the Leeds School of Art.

I was grievously disappointed. The casts are too dirty to tell their value and effect, too much mixed up for comparison; and in most cases they have no information as to locality on them. The numbers—where they exist—do not always agree with the catalogue; and a more neglected and uncared-for museum I have never seen.

If the casts are ever to be of their full value to the profession, it seems to me they should be cleaned up, arranged in proper order of "development," labelled clearly in each case with date and locality, and, above all, put where they could be seen and studied.

As the present management seem unable to do this, perhaps the new Committee—if they find the duty too heavy for them—would hand them over to the Architectural Association, or to the Institute

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if the latter can find room. This is their natural place, and by being at headquarters, and being in more frequent use, they would surely never again reach that deplorable condition of muddle that they are in to-day.

There would then be some inducement to add to them a better collection of Classic work, and make it a real museum of architectural casts.

FREDK. MUSTO, A.R.I.B.A.

HARRINGTON HOUSE.

SIR,—With reference to the letter and note which appeared in your issue of the 21st respecting Harrington House, may I say that the original house of this name stood on what is now the garden of Clarence House, adjoining the road from the park to the stable-yard, St. James's Palace.

That house was held by the Harrington family for about 100 years up to 1831, when on the expiry of a lease possession was resumed on behalf of the Crown.

The house was, I think, last used for the accommodation of some of the servants of William IV. on the occasion of his coronation.

On giving up the house in the stable-yard Lord Harrington took Pembroke House (7, Whitehall-gardens) from Lord Pembroke and Montgomery, who held a lease of it from the Crown, and he resided there for about twenty years, during which time it was, I believe, known as "Harrington House." Certainly it was so known in 1843, and I have seen letters from Lord Harrington of that date written from "Harrington House, Whitehall," and I find it referred to by that name in other papers.

It was known again as "Pembroke House" after the Government became tenants of it in 1851.

F. H.

*** In connexion with the subject we may add that owing to an accidental omission in our note to Mr. Rovedino's letter last week, it was made to read as if Carrington House were No. 8, Whitehall-gardens, which is incorrect. The last sentence of our note should have stood "Carrington House was No. 8, Whitehall-yard."—ED.

SPRAYING PLASTER.

SIR,—Can you or any of your readers say if the plastering of walls is done at all by spraying on liquid plaster by means of compressed air through a nozzle or jet in the same way that painting of large surfaces is done. If so, the names of parties doing such work would oblige. E. R.

BOOKS RECEIVED.

DURER. By H. Knackfuss. Translated by Campbell Dodgson. (H. Grevel & Co.)

OBITUARY.

MR. WILLIAM MARTIN.—We regret to announce the death on the 18th instant, at Birmingham, of Mr. William Martin, architect, aged seventy-one years. Mr. Martin, who was born at Shepton Mallet, was articled to Mr. Plevins, of Birmingham, and having served his apprenticeship became a partner of D. R. Hall. After the dissolution of that firm he took as partner John Henry Chamberlain. The firm of Martin & Chamberlain carried out during a long period a great deal of the extensive architectural work undertaken by the Corporation of Birmingham, and as architects to the School Board took a prominent share in the practical response to the requirements, as regards the provision of school accommodation, of the Elementary Education Acts. Of buildings in and near Birmingham, planned and designed by them, we may cite the New Telephone Exchange at the corners of Newhall and Edmund streets; the Church of St. John the Evangelist, at Sparkhill (1888), and the City of Birmingham Lunatic Asylum at Hollymoor, for which they were selected as the successful competitors in April, 1898, upon the award of Mr. George Hine, the assessor for the competition (which was limited to eight), on behalf of the City Council's Asylums Committee: see our columns of May 7, 1898. After the death of his partner Mr. Martin continued in active practice, and recently took his son into partnership with himself. Under the new style of "Martin & Martin," Mr. William Martin and his son went on with the work for the asylum at Hollymoor, in respect whereof a revised tender for 207,250*l.* was submitted to the City Council four weeks ago. The firm are the architects of the Board Schools in Station-road, Harborne, for which contracts have just been ratified, and of the new Board School in Conway-road, Sparkbrook, which was completed just six months ago by Messrs. W. Whitehead & Sons, contractors, at a calculated cost of 15,000*l.* The latter school buildings have a capacity for 680 boys and girls and 360 infants; their arrangements are similar to those of the new school in Yardley-road. All the rooms are upon the ground floor level, and there are besides two large drill halls, one being for the infants. We may add that Mr. Martin was appointed to act as assessor on behalf of some important competitions, amongst them being the new public offices, with depôt, fire station, mortuary, &c., at Stratford-road, Sparkhill (December, 1898), for which Mr. A. Harrison, of Birmingham, was the successful competitor; and the Sandpits School Board Schools, Gloucester (July, 1898), the first premium being awarded by him to Mr. A. G. Dunn, of Gloucester, whose designs were estimated to cost 20,000*l.*

GENERAL BUILDING NEWS.

FRANCISCAN CHURCH, BISHOPSTON, SOMERSET.—The Bishop of Clifton laid, on the 14th inst., the foundation-stone of the new Franciscan Church of St. Bonaventure, Egerton-road, Bishopston. The site of the new church adjoins the present Friary, and the building will cost about 4,000*l.* It is designed in the Early English style, and will consist of a nave, chancel, side chapels, aisles, baptistery, confessionals, a choir at the west end, and another choir for the friars over the chapel on the Gospel side, pierced with arched openings into the chancel. The nave consists of five bays. The bays at the west end will be flanked by the tower on the Apostle side, and by the baptistery on the Gospel side. The nave is divided from the aisles by an arcading supporting the main principals of the roof, which will have a 48 ft. span, and will cover both nave and aisles. The arches of the nave will be over 30 ft. high, and will be a special feature of the church. The chancel will be divided from the nave by an arch 37 ft. in height, with three lancet windows in the east wall, and two lancets at the side. The nave will have three windows in the bay of the aisles. The confessionals are to be placed on the Gospel side of the church, with openings formed through the aisle wall. The west end of the nave will be pierced with three lancet windows. The entrance door will be in the centre of the nave wall, and there will be a smaller door in the tower opening into the porch. The organ-chamber will be approached by circular stairs built at an angle of the tower. The baptistry is apsidal in form, and will be lighted by a lancet window in each bay. The tower, baptistery, and west-end bay are not included in the present contract of 3,800*l.* The total length of the church when completed will be 90 ft., the width of nave 22 ft., width across the church 48 ft., and height from the floor to roof 50 ft. The church is being built of rubble-stone with Bath stone dressings, and facings of blue stone. It will accommodate about 350. The whole has been designed by Messrs. Pugin & Pugin, including the friary, one wing of which has already been built. The contractors are Messrs. R. W. Wilkins & Sons, of Bristol, and Brother Patrick will act as clerk of the works.

CHURCH OF ST. COLUMB MAJOR, CORNWALL.—The old parish church of St. Columb Major, Cornwall, is about to undergo fresh restoration under the supervision of Mr. G. H. Fellowes Prynne.

SWIMMING-BATHS, ENDELL-STREET, W.C.—At the Vestry Hall of the combined parishes of St. Giles-in-the-Fields and St. George, Bloomsbury, Mr. W. O. E. Meade King, M.Inst.C.E., held a public inquiry on the 10th inst., at the instance of the Local Government Board, concerning the application of these parishes to borrow the sum of 13,000*l.* for the purpose of adding a new swimming-bath, which is to measure 90 ft. by 28 ft., to the present public baths in Endell-street, W.C. The plans, prepared by Messrs. Clarkson, of Great Ormond-street, also provide for the conversion of the two present swimming-baths into one large one.

HOTEL, HUNTLY, ABERDEEN.—A new hotel at the corner of the Square and Castle-street, Huntly, was opened recently. The building is of granite, with freestone facings, and is three stories high, the main frontage being in the Square. The architect was Mr. Robert Duncan, but the building was erected under the superintendence of Mr. John Cameron, architect, of Aberdeen. The contractors were as follows:—Masonry, Mr. Robert Mitchell; carpentry, Mr. P. G. Archibald; painting, Mr. George Mitchell; plumbing, Mr. John Wilson; slating, Mr. Steele; and plastering, Mr. John Logie.

MINING COLLEGE, WIGAN.—The formal inauguration of the erection of a mining and technical college at Wigan took place on the 11th inst. Messrs. Briggs & Wolstenholme, of Liverpool and Blackburn, were the architects, and their design was selected in competition. In January of the present year the building contract was let to Messrs. Joshua Henshaw & Sons, of Liverpool. The new college comprises four floors. The basement is set apart for manual work in wood and metal, for machinery, and for practical metallurgy. The ground floor will have rooms for administration. The first floor will be occupied in part by the upper portion of the Assembly Hall, and the remaining portion will be available as classrooms and lecture theatres in mining, cotton, and other technical subjects. The second or upper floor will be set apart for art in its various branches, to accommodate 150 students at one time, a chemical laboratory for thirty-six students, an electrical laboratory, available also for engineering, for thirty-six students, and a lecture theatre common to both.

THE DUCHESS OF TECK MEMORIAL HOME OF REST FOR WORKING WOMEN AND THE VICTORIAN CONVALESCENT HOME FOR SURREY WOMEN.—These homes, erected on the seafront of Bognor, and which were opened by the Duchess of York on the 9th inst., comprise the National Memorial to the Duchess of Teck and the County of Surrey Commemoration of her Majesty's Jubilee. The former home has accommodation for six women and the latter for twenty-one convalescents. The buildings are fireproof throughout, the external walls being erected in two thicknesses with a cavity between. The floors are of Messrs. Fawcett's fireproof construction, and the casements to the window openings are of wrought iron of the manufacture of Messrs. Wenham & Waters. The ornamental wrought-iron work was supplied by Messrs. Hardman & Powell. The ground floor is laid with Duffy's pitch-pine wood-block flooring, and the first floor with yellow deal flooring. The dining and sitting rooms and corridor on the ground floor are heated by hot-water pipes and radiators as well as open fires. These rooms as well as the dormitories on the first floor are ventilated by Boyle's inlet and outlet ventilators, and the doors of the dormitories are also provided with hinged fanlights over for the free circulation of air. The majority of the dormitories are for four beds each, with ample air-space per bed. Both buildings are erected in two floors. The dining-rooms, sitting-rooms, matron's room, kitchen and offices, cloak-rooms, lavatories, &c., being on the ground floor, and the dormitories, servants' and nurses' bedrooms, bathrooms, &c., being on the first floor. All the sitting and dining rooms and dormitories face the south and sea, while the lavatories, bathrooms, servants' bedrooms, &c., look north. In each home there is a wide central corridor running the whole length of the buildings on each floor, with windows at either end. The walls are faced externally with red bricks and terra-cotta, the latter being supplied by the Burmantoft Company. The roof is covered with red Broseley tiles, the style of architecture being a free treatment of Renaissance. The walls are covered internally with "Sirapite" plastering, and the decoration carried out chiefly in Duresco. The buildings have been erected from the designs of Messrs. Lainson & Son, of Brighton, the contractor being Mr. Tate, of Bognor. Quantities were supplied by Mr. A. Boxall, Adelphi.

NEW BATH FOR WOMEN, HORNSEY.—A new bath for women has just been opened in connexion with the Public Baths and Washhouses in Hornsey-road. The extension of the baths, now almost completed, includes the following:—New first-class swimming-bath for women, thirty-seven additional private baths, new establishment laundry, stores, &c., extension of engine-room, additional boilers, engines, &c., two artesian wells, each 450 ft. deep, with pumping machinery, capable of raising 25,000 gallons of water per hour. The new swimming-bath for women has been arranged upon new principles. The generally adopted form of spectators' gallery has been abandoned, and a new one of amphitheatre form adopted; the dressing-boxes being removed from the bath and placed in an adjoining apartment. The architect is Mr. A. Hessell Tiltman, Russell-square, W.C.

SANITARY AND ENGINEERING NEWS

BRIGHOUSE SEWAGE WORKS.—New sewage works have just been opened at Cooper Bridge, Brighouse. The charter of incorporation was granted in August, 1893; Mr. A. M. Fowler, of Manchester, who had been engaged to survey the district, presented his report in February, 1894, and a site for sewage outfall works having been obtained at Cooper Bridge, the contracts were let in 1896. Mr. George Taylor, of Blackburn, has been the principal constructor of the works, the total amount of his contracts having been about 65,000*l.* Smaller contracts bring the expenditure up to 80,000*l.*, and when other works forming the extension of the sewer are completed the total expenditure will be about 105,000*l.* Eight large settling tanks, having a maximum capacity of about 1,100,000 gallons, have been erected, and into these the sewage will fall by natural gravitation, then to undergo treatment by means of lime, &c. As the sewage passes through the tanks the solids will be precipitated, and the effluent waste will be turned on adjacent land, and subsequently, in a purified state, find its way into the river. The filtration area contains about 46 acres, and about one-half of this is at present laid out to receive the sewage. The design of the outfall works has been made with a view to their being adaptable to any kind of chemical treatment which the latest scientific thought may suggest. Substantial buildings, including an engine-house (in which electricity for lighting the premises will be generated by means of a steam engine), two committee rooms, &c, have been erected.

THE STUDENT'S COLUMN.—Our Student's Column article ("Lessons in Electrical Engineering") is held over this week for want of space.

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STAINED GLASS AND DECORATION.

NEW WINDOWS BY MR. HOLIDAY.—Mr. Henry Holiday has had two stained glass windows on view at his studio at Hampstead this week. The windows are for a church in New York, where there are already many examples of Mr. Holiday's beautiful art. The subjects of those two are "The Crucifixion" and "The Ascension," and they are to face each other in either transept of the church. Each window is of five lights; each light is complete in itself, but is also an integral part of the general design of the window. The designs are remarkable compositions. Mr. Holiday believes the glass should be subordinate to the architecture, that, therefore, the divisions by mullions in tracery should be accepted as governing the design, which should yet have the unity of a harmonious whole. We are entirely in sympathy with this principle, which is well illustrated in these windows.

FOREIGN.

FRANCE.—The Municipality of Paris have had placed on the Madeleine a marble plaque recording the origin and date of the church (which was in the first instance a "Temple à la Gloire"), and also the names of the architects who were successively employed on it—Constant d'Ivry (1764), Couture (1778), Vignon (1807), and Huvé (1828).——The two pavilions on the Place de la Nation, which form part of the enclosure wall of the Fermiers Généraux, erected in the eighteenth century from the designs of Ledoux, are to be demolished.— According to custom the annual envois of the students at the Villa Medici have been on view at the Ecole des Beaux-Arts. In architecture M. Patouillard exhibits a restoration of the Island of the Tiber, with the monuments of ancient Rome. M. Duquesne has sent a study of the construction of the cupola of the Florence Cathedral, and drawings of various palaces. M. Chipiez sends drawings of the capitals of the temple of Mars Ultor. The collection includes also the drawings and sketches of the late M. Pille.——At the instigation of the "Vieux Paris" Committee the monument to Desaix, which was removed in 1800, has been set up on its old site in the Place Dauphine.——The façade of the larger Art Palais at Paris, towards the Avenue d'Antin, has just been completed by the addition of the two sculpture groups in bronze, after models by M. Peter and the late M. Falguière.

UNITED STATES.—The board of underwriters and the building and fire department of New York have recently been experimenting on wood rendered fireproof by an electric process. It was ascertained that, after being subjected to a temperature of 1200 deg. Fahr., the wood was but slightly charred.

CANADA.—The Canada Club proposes to put a distinguishing mark, chiefly consisting of a short inscription, upon buildings of historical interest in the Dominion, and have already commenced the work.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Welch, Fry, & Skelton, electrical engineers, have removed from 90, London Wall, to "Salisbury House," in the same street.——Messrs. John Senning & Son, timber merchants, of 11, Cannon-lane, have converted their business into a private company.——Messrs. C. C. Dunkerley & Co., Limited, iron and steel merchants, have removed from 66, Port-street, to new offices and warehouses in Store-street, Great Ancoats-street, Manchester.—— Messrs. Lockerbie & Wilkinson, Limited, of Birmingham and Tipton, announce an issue of 5% shares at par, being balance of unissued capital. Their prospectus will be found in our advertisement pages.

WORKSOP ELECTRIC LIGHTING.—On the 17th inst. Colonel W. Langton Coke, M.Inst., C.E., held an inquiry under the Public Health Act, 1875, and the Electric Lighting Act, 1882, at the Town Hall, Worksop, with respect to the application of the Worksop Urban District Council to borrow 15,570*l.* for purposes of electric lighting. Among those present were Mr. A. B. Mountain, M.I.E.E., of Huddersfield, consulting engineer, and Mr. F. S. Wynne, surveyor.

OUR COAL STORE.—At the annual meeting of the Victoria Institute last week, at the Society of Arts House (Sir G. G. Stokes, Bart., F.R.S., in the chair), an address on "Our Coal Reserves at the Close of the Nineteenth Century" was given by Professor Edward Hull. The author said he had selected this subject for the annual address because public attention had recently been directed to the question of our coal reserves, owing chiefly to the increased price of coal and to the unprecedented output of this mineral from British mines, amounting in 1899 to 220,085,000 tons, being about 16,000,000 tons over that of the previous year. According to the Royal Coal Commission of 1866, presided over by the late Duke of Argyll, the author stated that the production had doubled since the report of that Commission was issued in 1870—a result scarcely anticipated by the Commissioners, and the public were inquiring "for how long a period our coal reserves would be able to bear the increasing drain." The author advocated the imposition of an export duty on coal shipped to Continental States, which were taking from us about 40,000,000 tons annually, so as to form a fund towards the relief of our increasing taxation, and he concluded by the proposal for a new Commission on our coal resources, showing the subjects which would require investigation.

THE STRAND IMPROVEMENT.—On the 20th inst., at the Guildhall, Westminster, the case of Guscotte and Mrs. Fanny A. R. Sandwith *v.* the London County Council was decided before Mr. John Troutbeck, sitting as High Bailiff, and a special jury. It was a claim under the Land Clauses Act by the freeholders of the shop and premises, 342, Strand, and Nos. 2, 4, and 6, Catherine-street adjoining, for compensation for the compulsory acquisition of their property for the purposes of the Strand improvement. In opening the claimants' case, Mr. Freeman, Q.C., said the property was owned by several families, and it formed one of the finest business sites to be found in London. It was let on lease to Mr. White, a jeweller, who had occupied the shop at the corner of Catherine-street for thirty-five years. In 1891 Mr. White renewed his lease for twenty-one years, at a rental of 500*l.* per annum for the first seven years, 600*l.* for the second, and 700*l.* for the third seven years. That by no means represented the value of the premises, but he was an old tenant. Then he sublet to other tenants, who paid 550*l.* a year, Mr. White paying the rates and taxes. The learned counsel concluded by saying that his clients claimed for their freehold interest as trustees under marriage settlements, &c., the sum of 24,319*l.* Mr. F. T. Galsworthy, surveyor, of Waterloo-place, Pall Mall, Mr. Edward Bousfield, of Gresham-street, and Mr. Daniel Watney, of The Poultry, having given evidence in support of these figures, Mr. Boyle, in addressing the jury, said that the London County Council recognised that this was an excellent site and a first-class position, but he contended that the outside value was 16,000*l.* Mr. Samuel Walker, surveyor, of Moorgate-street, and Mr. G. H. Glaisher, of St. James's-street, S.W., said they were of opinion that the property was worth 16,508*l.*; and Mr. James Green (Weatherall & Green) put the amount at 16,582*l.* The jury awarded the claimants 21,578*l.*, including 10 per cent. for compulsory sale.

ARCHITECTURAL CLASSES, KING'S COLLEGE.—The following is the list of prize-winners in the Architectural Classes at King's College, conducted by Professor Elsey Smith:—DAY CLASSES.—*Architectural History.*—Gold medal and books, Mr. Harry Prince; silver medal and books, Mr. Gilbert H. Lovegrove. *Architectural Studio.*—Gold medal and books, Mr. H. Austin Leech; silver medal and books, Mr. Harry Prince; bronze medal, Mr. Gilbert H. Lovegrove, and Mr. John Parlett. *Building Construction* (Second year).—Silver medal and books, Mr. J. R. P. Rowley; bronze medal and books, Mr. R. W. Edwards. (First year) silver medal and books, Mr. W. J. Marlow; bronze medal and books, Mr. O. C. Thompson. (Third year) silver medal and book, Mr. H. A. Leech; silver medal and book, Mr. G. H. Lovegrove. *Quantities.*—Silver medal and books, Mr. G. H. Lovegrove. EVENING CLASSES.—*Architectural History.*—Silver medal and books, Mr. Harry Prince; bronze medal and books, Mr. Ralph C. Wills; books, Mr. G. H. Lovegrove. *Architectural Studio.*—Bronze medal and books, Mr. F. A. Sprules. *Building Construction.*—Silver medal and books, Mr. F. Hartnoll; bronze medal and books, Mr. F. J. Jones; books, Mr. C. A. Colyer. *Sanitary Science.*—Alderman Sir Faudell Phillips' medal, Mr. G. H. Spears. *Constructional Drawing-book Prizes.*—(1) Mr. F. J. Jones; (2) Mr. C. H. Wheeler; (3) Mr. A. Bradburn. *Quantities.*—Book prizes: (1) Mr. A. Bradburn; (2) Mr. J. D. Robertson; (3) Mr. A. Miles.

GLOUCESTER AND THE ELECTRIC LIGHT.—The Gloucester electricity supply works and dust destructor were opened recently by the Mayor of Gloucester. The works have been erected by the Corporation at a cost of over 60,000*l.*, and applications for electric light have already been received up to the full capacity of the works. Twenty-three and three-quarter miles of cable have been laid. The system of supply adopted is the continuous current. In the evening the chairman of the Electricity Supply Committee (Councillor Clutterbuck), the consulting engineer (Mr. Robert Hammond), the architect (Mr. H. A. Dancey), and the contractors (Messrs. John Gurney & Son) gave a banquet in honour of the occasion.

EAST LONDON WATERWORKS.—A Select Committee of the House of Lords, presided over by the Earl of Camperdown, sat on the 18th inst. to consider the Bill of the East London Waterworks Company for the construction of additional storage reservoirs and other works, and to authorise the taking of further water from the River Thames in cases of exceptional drought and other emergency. Mr. William B. Bryan, Chief Engineer to the East London Water Company, gave evidence in support of the Bill. He said the company supplied a total population of 1,350,000, which in the Essex portion of the company's area of supply was rapidly increasing. The total storage capacity of the company's reservoirs, constructed or in course of construction, amounted to 2,400,000,000 gallons, and under the Bill power was taken to increase that figure by 5,100,000,000 gallons, making the total 7,500,000,000 gallons. This storage would enable the company to go on till 1919, assuming that the district increased at the rate of 18·2 per cent. Some conversation then took place, as a result of which Mr. Baggallay said he had agreed with Mr. Earle, representing the Middlesex County Council, that the company should be empowered and required to supply water in bulk in case of emergency anywhere in Middlesex, subject first to the requirements of the East London Company's district; secondly, to the consent of any local authority or company authorised by Parliament to supply the part of Middlesex in question; and, thirdly, to there being a physical connection by which the supply could be given. Following on this further opposition by Middlesex was withdrawn, and the preamble of the Bill was passed.

TOURIST GUIDE TO THE CONTINENT.—The Great Eastern Railway Company's sixpenny tourists' guide for holiday-makers may be recommended to travellers. It contains a great deal of information in a small space, accompanied by maps and a number of pretty sketches.

RESTORATION OF VILLAGE CROSS, NORTH LEW, DARTMOOR.—On the 20th inst. at North Lew, a village situated upon the northern fringe of Dartmoor, the Bishop of Bristol, preceded by the choir, and a number of the local clergy in their robes, marched with banners from the parish church to the old preaching cross in the market-place, which has just been restored by Messrs. Harry Hems & Sons, of Exeter, under the superintendence of Mr. G. H. Fellowes Prynne, architect. The cross was originally erected by the missionary Benedictine monks of the Abbey of Saints Mary and Runon at Tavistock, and is in the main of thirteenth-century work. The shaft is new, and is formed of a monolith of grey Dartmoor granite.

BAPTIST CHURCH, EAST HAM.—The foundation-stones were laid recently of the new Baptist church now in process of erection at Plashet-grove, East Ham. The building will seat, when completed, a congregation of 1,000, and the cost, including the purchase of the ground, is estimated at about 9,000*l.* Mr. E. Stone is the architect.

CAPITAL AND LABOUR.

STRIKE OF QUARRYMEN, MATLOCK.—One thousand quarrymen, masons, and labourers in the Matlock district have come out on strike for an advance of a halfpenny per hour.

THE PAINTERS' STRIKE AT BLACKPOOL.—Under the Conciliation Act the dispute in the painting and decorating trade at Blackpool has been referred to the Board of Trade. Mr. Wilson Fox, who has just been instrumental in settling a similar dispute at Ulverston, met the interested parties at the Albion Hotel recently, but it is stated that his efforts were unsuccessful, the terms proposed by the masters not finding favour with the men.

LEGAL.

BUILDING DISPUTE AT THE WEST-END.

THE case of Bailey *v.* Lewis came before Mr. Justice Cozens Hardy on the 21st. inst. on a motion on behalf of the trustees of the Portland Estate for an injunction to restrain the defendant from erecting on the site of Hollis-passage any building or erection in breach of covenant.

Mr. Vernon Smith, Q.C., for the plaintiffs, said the passage ran at the back of the house No. 27, Cavendish-square, and the trustees thought it was desirable for the estate that the passage should be kept open. The defendant had got a lease of certain premises in Hollis-street from the trustees, and the lease contained a covenant in the terms that he would not, without the consent of the trustees, erect any buildings or make any alterations on the premises abutting on the passage, and that he would not suffer any trade or business to be carried on on the premises. What the defendant had done was to build a wall across the passage, and had blocked it up in altering his premises. The defendant had got a contract with the trustees for a reversionary lease which provided that the defendant should have the soil of the passage, but that he must not build on it. The defendant was a very large tenant of the trustees, but they felt compelled to ask for an injunction to restrain him from dealing with the passage in a way which was inconsistent with the provisions of his building agreement.

Mr. Eve, Q.C., for the defendant, said that in the course of building it was proposed to connect the two houses, Nos. 18 and 19, Hollis-street, and no one contemplated that the defendant would have to go over the passage by means of a bridge. Every one contemplated having a passage on the ground level, and, having regard to the nature of defendant's business, it was inconceivable that he would have ever accepted a lease of those large premises unless he could go across the passage. Mr. Lewis, in his affidavit, said he had invested upwards of 100,000*l.* in the property, and had paid a few thousands a year in the nature of ground rents to the Portland trustees. He swore that it was intended that the Hollis-street and Cavendish-square buildings should be on the same level, and be practically the same building.

His lordship said that Mr. Lewis's affidavit was a

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straightforward one, but he did not allege that there was any agreement in writing to the effect that he should build across the passage. But the defendant would take a good undertaking in damages. His lordship quite admitted that the defendant might have a good case at the trial, but he was wrong on the construction point, and he must grant an injunction until the trial, the plaintiffs undertaking in damages. The costs of the motion to be costs in the action.

IMPORTANT APPLICATION AGAINST THE NATIONAL TELEPHONE COMPANY.

THE case of the Attorney-General *v.* the National Telephone Company came before a Divisional Court of Queen's Bench, composed of Justices Kennedy and Darling, on the 24th inst. It raised the question whether the defendant company had the right to open or break up, within the administrative County of London, any street or public road for the purpose of laying their telegraph wires, &c., without the authority of the Postmaster-General and the consent of the London County Council. The plaintiffs, who sued at the relation of the Attorney-General, asked (1) that it might be declared that the defendants were not entitled to place or maintain any telegraph wires or other apparatus for the purpose of telegraphic or telephonic communication, or to execute any other work within the meaning of the Telegraph Act, 1863, under any part of any street or road within the County of London, or to break open any such street or public road, or to exercise any other of the powers of executing works which are conferred on the Postmaster-General by the Telegraph Acts, 1863 and 1878, without the authority of the Postmaster-General and the consent of the London County Council; (2) That the defendant company might be restrained by injunction from placing or maintaining or proceeding or continuing to place or maintain any telegraph wires, &c., for the purpose of telegraphic or telephonic communication, and from executing or proceeding or continuing to execute any other work within the meaning of the Telegraph Act, 1863, under any street or public road within the County of London, and from opening or breaking up any such street or public road, and from exercising any other powers of executing works conferred on the Postmaster-General by the Telegraph Acts without his authority and the consent of the London County Council for such purpose prescribed by the Telegraph Act, 1892, being duly had and obtained.

The Attorney-General, the Solicitor-General, and Mr. Cassedy appeared in support of the information, and Mr. Joseph Walton, Q.C., and Mr. Roskill for the defendant company.

The Court, by consent, made a declaration in the terms of the first paragraph of the petition, and made an order that defendants should not extend their present system of underground pipes without the consent of the Postmaster-General and the London County Council.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

6,266.—CRANES FOR DREDGERS OR EXCAVATORS: *H. W. F. Cheffins.*—The crane, to be operated from the top instead of the bottom, of a cliff or cutting has an arm pivotted on to its jib and set with guy ropes. From that arm hangs another arm, which carries the excavating bucket, which is pulled by a chain that passes over at the pivot of the former arm. In another form the arm is secured rigidly to the jib, whilst the hanging bucket arm is provided with a rack that gears with a pinion which is driven with an endless chain.

6,311.—ARTIFICIAL STONE: *F. Gehre.*—With pulverised carbonate of lime, in either a compact or a crystalline condition, are mixed boracite, borate of magnesia, or stassfurtite, or their residues respectively, and the admixture is brought into an aqueous solution of chlorides—for instance, the chlorides of zinc, aluminium, magnesium, ammonium, &c.—the filling material consisting of paper fibre treated with boracite, a chloride, and carbonate of lime.

6,330.—WINDOW SASHES: *C. D. Tabor and A. Schrafft.*—A pivot, formed of a headed bolt with a spring that draws it towards the sash, secures the sash to bars that slide between stops; the bolt enters into a horizontal slot cut in a side-plate and when it has been forced down a vertical slot, an inclined portion draws out the bolt's head and the spring is thereupon placed under tension. There are hooks which will drop when the sash is raised, so as to engage with a thimble's inclined lip, and will hold the bars in place when the sashes are lifted for their removal.

6,528.—SIPHONS: *F. M. Sims and F. T. Harrop.*—The siphon's longer leg is trapped at its outlet, and the siphon is provided with a bell-shaped container, which is hung upon the arm of a pivotted lever, whose outer end supports an oscillating weight. After the water rises up to a certain height the bell begins to rise too, and so causes the weight to oscillate. The consequent flush continues until the water has sunk to a level which liberates the bell to overbalance the weight, and the mechanism thereby assumes its normal position.

6,648.—A PIPE-JOINT: *J. Morgan.*—A guide for the spigot-end is supplied by forming an annular projection upon the socket end, a collar fitting upon the spigot; for making the joint a fillet of clay is laid on the spigot and another fillet is turned around the pipe, then grouting is filled in the ring-like shaped space.

6,686.—A CONTRIVANCE FOR WALLS, &C.: *T. Curran.*—Wire lathing has studs and supports which are made of corrugated strips having tongues at their edges which are bent around the edges of other bars and strips, or the corrugated strips may be rivetted to the latter strips and bars; slotted clips secure the studs to the horizontal members, which in the first place are affixed with bent clips or other means to the I-beams or girders; if the corrugations of the strips are fashioned in a sinuous or similar form, nails and other fasteners which are hammered into them can be the more readily bent and locked into place.

6,766.—SINK-TRAPS AND GRATINGS: *J. Duckett & Son, J. Duckett, and A. Duckett.*—The sink-trap, grating, and the sink are made in one piece; an iron band is employed for strengthening the lead waste-pipe's lower end, and in an under-cut recess is secured the nipple on to which a set-screw fastens the waste-pipe: a portion of the channel to the gully is covered over and deepened in order to minimise splashing, whilst the gully itself presents some improvements of that specified in No. 663 of 1893.

6,779.—APPARATUS FOR HEATING WATER: *A. Staege and C. Tornow.*—For the heating of water by means of a kitchen-range or cooking-stove for general domestic purposes, the inventors join both the water-feed and flow-pipes to a coil whose upper erect ends are joined together with a handle; the coil is disposed so that it shall slide through muffs, which are set in the top of the hood above the range or stove, whilst the coil's bottom turn is laid upon the burning fuel; for use with deep fire-boxes the guiding-muffs are affixed in a metal plate, and the hood is discarded.

6,782.—CHECKS FOR DOORS: *S. Coombs.*—A lever is pivotted within a recess of the jamb of the door; the recess is covered with a plate in which is a slot through which projects a tongue upon the lever; a wedge between the roller and the lever's back presses the tongue outwards, and the wedge is lifted up by means of pressure backwards exerted upon the tongue by the hanging stile as the door is closed, whilst the closing of the door is retarded and slamming is obviated by means of the wedge's friction and weight.

6,832.—CHECK-VALVES: *T. F. Codd.*—The contrivance, which is described as being applicable to water, gas, steam, and other fittings, consists of a flap-valve which is mounted upon an inclined seating made in the pipe and carried upon a pivotted arm. The valve is also provided with either springs or a counter-balancing weight. It can also be made to serve as a stop-valve by attaching a locking lever or some such contrivance to the pivotted arm.

6,858.—SIPHONS: *F. Merrill.*—An exhaustion of the air out of the space between the two lower traps of the siphon causes the siphon's action to be started. In one application of the invention the water is made to overflow into a tipper which is placed within a closed container or chamber from above which a pipe passes to the space between the two traps. In another variation the pipe is bent over into the crown of an auxiliary overflow siphon; and in yet another shape the starting of the principal siphon is effected automatically by means of the discharge of a subsidiary tank wherein is a bell whose crown is joined, with a pipe, to the space already described.

6,874.—ROOF-GLAZING: *T. Evans.*—After they have been laid upon rabbetted rafters so that they shall overlap one another, the panes of glass are made fast, at their lower edges, with spring clips. Split pins that are put through holes made in the central webs and through loops fashioned upon the clips secure the spring clips to the central webs and ribs.

6,894.—A MULTICELLULAR VOLTMETER: *J. G. Townsend, H. A. Wilson, and J. A. McClelland.*—The cells or movable vanes are divided, by insulation, into groups. The springs of a rotating disc switch are connected to the groups in such a manner that either all the parts shall be joined together for co-operation, or some shall be cross-connected and shall exert no action upon the movable axle of the vanes. Cells and vanes of different sizes can be used in one voltmeter. The former consist of half-rounded plates mounted upon insulating bolts and kept apart with short sleeves of metal and ebonite The vanes, which in different cells are set in symmetry upon the axle, are connected electrically with the plates.

6,905.—TRAPS FOR DRAINS: *T. Hughes.*—A vertical inlet is made in one entire piece with the trap, which has also a branch carried out from its side, through which obstructions may be cleared away or removed, and an eye through which a rod or brush can be inserted. The trap's bore is uniform throughout.

6,916.—GEARING FOR CRANES: *J. C. Howell, T. Humpage, and H. I. Jacques.*—The inventors provide a speed-reducing and clutch reversing gearing mechanism for overhead travelling cranes, which are driven with electricity. A reducing train—after the kind specified in No. 20,542 of 1892—gears the motor to the shaft; two bevel wheels are carried on the inclined arms of the train's loose spindle, one of the bevel wheels gearing with a wheel upon the driven shaft, and the other bevel wheel gearing with a pinion upon the motor shaft as well as with a wheel upon the casing that is fitted with a brake band. Of the three pairs of clutch pinions upon the driven shaft, one pair operates the jenny's endless chain, another pair serves to drive the winding-drum in either direction, and the other pair enables the carriage to be moved backwards and forwards.

6,924.—CONSTRUCTION OF WALLS, PARTITIONS, &C.: *J. Chapman.*—Corrugated sheets or pieces of wire, interlaced between the cores during the process of moulding, are devised for strengthening the building-slabs, which are pierced vertically with holes and have half-rounded grooves in their sides for the nails around whose heads liquid plaster is filled in; for flat arches over floors and doorways are used oblique wedge-shaped slabs, to be joined together and maintained in their places with metal rods extending from one wall to another, and the inventor claims that the arches would prove self-sustaining did the floors give way in a fire. The slabs are made of a compound of plaster-of-Paris, a weak solution of glue, cement, &c., and are roughened that they may furnish a holdfast for plaster.

6,934.—TRAPS FOR DRAINS: *E. Haendeler.*—Inside a cone-shaped receiver is hung a similarly shaped silt-box by means of a peripheral flange which is water-trapped. From around the receiver's upper edge is suspended by means of its own flange another cone-shaped trap so as to provide a double seal which shall prevent the escape of gas.

6,944.—A NON-INFLAMMABLE AND NON-CONDUCTING MATERIAL: *H. R. Romney, J. Thame, and Fibrous Materials Syndicate.*—The material is composed of the refuse of cocoa-nut husk mixed in water with certain fibrous substances, such as rag, paper, or wood pulp, asbestos fibre, and mica, magnesium, silicate or carbonate, and, it may be, sodium silicate. For making a porous and hard compound should be added a small quantity of lime, and for a plastic fireproof material cocoa-nut husk refuse should be saturated with sodium silicate in solution, and be then treated with acid salts or acids.

MEETINGS.

FRIDAY, JULY 27.

Institution of Junior Engineers.—Visit to the Generating Station and Depot of the Central London Railway, Shepherd's Bush. 6.30 p.m.

SATURDAY, JULY 28.

Architectural Association.—Fourth Summer Visit to Stowe House, near Buckingham.

London and Provincial Builders' Foremen's Association.—1. Visit to Messrs. Holloway Brothers' works, Victoria Wharf, Belvedere-road, Westminster Bridge. 4 p.m. 2. Meeting at the Memorial Hall to transact the usual quarterly business. 7 p.m.

MONDAY, JULY 30.

Sanitary Institute.—Conference at 20, Hanover-square, on the "Housing of the Working Classes." 10 to 1 p.m. (Exhibition of plans, &c., at the Parkes Museum. 2 p.m.) Visits in the afternoon.

TUESDAY, JULY 31.

Sanitary Institute.—Conference on the "Housing of the Working Classes" (concluded).

WEDNESDAY, AUGUST 1.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 5.—By G. SWORDER & SONS (at Bishop's Stortford).

Oakley, &c., Essex.—Bollington Hall Farm, 451 a. 3r. 33 p., f.	£5,900

July 9.—By WILLSON & PHILLIPS (on the estate).

Leigh-on-Sea, Essex.—Cliff-rd. West, 116 plots of building land, f.	3,192

July 11.—By BUCKLAND & SONS (at Hungerford).

Kintbury, Berks.—An enclosure of meadow, 2 a. 1 r. 23 p., f.	120
Two freehold cottages	100
Inkpen, Berks.—Enclosures of land, 9 a. 2 r. 34 p., f.	270
A freehold cottage and 1 a.	160
A freehold meadow, 3 a. 0 r. 27 p.	105

July 12. By RAWLINS & CO. (at Barking).

Barking, Essex.—St. Awdry's-rd., &c., 69 plots of building land, f. (in lots)	2,751

By J. A. EGGAR (at Farnham).

Isington, Hants.—A freehold house, r. 20*l.*	370
King's Close meadow, 6 a. 0 r. 21 p., f.	240
King's Close copse, 4 a. 1 r. 36 p., f.	135
Blacknest, Hants.—Two freehold cottages	100
Binstead, Hants.—Two freehold cottages	200

By BAXTER, PAYNE, & LEPPER (at Bromley).

Bromley, Kent.—81, Bromley Common, f., e.r. 55*l.*	525
Plough-rd., a plot of building land, f.	200
3, 4, and 5, Palace-rd., f., r. 55*l.*	665
45 and 47, Tylney-rd., u.t. 62 yrs., g.r. 8*l.*	300

By G. FITT & CO. (at North Walsham).

Trunch, Norfolk.—Enclosures of land, 62 a. 0 r. 35 p., f.	1,750
Seven cottages and garden ground, f.	488
Enclosures of land, 14 a., f.	1,400
White House Farm, 146 a. 2 r. 15 p., f. and c.	3,500

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July 13.—By E. G. RIGHTON (at Stratford-on-Avon).
Bidford, &c., Warwick.—Little Dorsington and Barton Farms, 382 a. 1 r. 14 p., f. £8,000

By J. HIBBARD & SONS.
Shepherd's Bush.—347, and 349, Goldhawk-road, u.t. 27 yrs., g.r. 10*l.* 10s., r. 91*l.* 900
Clapham.—41, 42, and 44, Richmond-terrace, u.t. 37 yrs., g.r. 22*l.* 10s., r. 132*l.* 945

By JONES, LANG & CO.
Finsbury.—Finsbury-av., f.g.r. 30*l.*, reversion in 79 yrs. 870
City of London.—4, Moorfields, u.t. 16 yrs., g.r. 130*l.*, e.r. 369*l.* 885

By MARK LIELL & SON.
Sidcup, Kent.—Hatherley-rd., Woodside, f., e.r. 60*l.* 1,025
West Ham.—1, 3, 5, and 7, Marcus-st., u.t. 73½ yrs., g.r. 12*l.* 380
Leytonstone.—Montague-rd., &c., four plots of building land, f. 405
Bow.—19, Armagh-rd., f. 405
Regent's Park.—40, Redhill-st., u.t. 25 yrs., g.r. 30*l.*, r. 45*l.* 300

July 14.—By T. W. GAZE (at Norwich).
Tunstall, Norfolk.—The Marsh Farm, 242 a. 3 r. 15 p., f. and c. 5,350
Banham, &c., Norfolk — Occupation Farm, 102 a. 3 r. 14 p., f. and c. 800
Heath Farm, 96 a. 1 r. 33 p., f. 950

By C. R. MORRIS, SONS, & PEARD (at Taunton).
Bishops Hull, Somerset. — Long Run Estate, 96 a. 3 r. 36 p., f. 6,700
Denham House Estate, 132 a. 1. 25 p., f. and c. 8,700
The New Inn and 0 a. 3 r. 0 p., f. 1,700
The Cottage and 6 a. 2 r. 26 p., f. 1,010

By SEWELL & BARNES (at Framlingham).
Sanford, Suffolk.—A freehold and copyhold farm, 92 a. 3 r. 14 p. 755
Larkfield, Suffolk.—A freehold farm, 16 a. 3 r. 12 p. 430

By BENTLEY & SONS (at Doncaster).
Park-lane, Yorks. — A freehold farm, 146 a. 2 r. 29 p. 3 550
Moss, Yorks.—A freehold farm, 106 a. 2 r. 26 p... 3,760
Two closes, 17 a. 0 r. 3 p., f. 880
Braithwaite, Yorks.—Two closes, 13 a. 0 r. 15 p., f. 601

By H. J. WAY & SON (at Newport).
Chale, Isle of Wight.—The Clarendon Hotel and 12 a., r. 55*l.* 1,450

By WILLSON & PHILLIPS (on the estate).
Southend-on-Sea, Essex.—North-rd., &c., 120 plots of building land, f. 7,408

By FENN & Co. (at Colchester).
Essex.—The Manors or Lordships of Thorpe, Kirkby and Walton within the Soken, with all lands, rights, rents, &c. 2,500

July 16.—By DANN & LUCAS.
Dartford, Kent.—12 and 14, Lowfield-st., f., r. 110*l.* 2,750
Lowfield-st., enclosure of land, 4 a. 3 r. 27 p., f. 1,100

By F. DOD & Co.
Hackney.—221 to 259 (odd), Cassland-rd., f., r. 765*l.* 18s. 4,900
Stoke Newington.—96, Rectory-rd., u.t. 70 yrs., g.r. 7*l.*, r. 40*l.* 435
Tottenham.—59, Cornwall-rd., u.t. 50 yrs., g.r. 5*l.* 5s., r. 27*l.* 10s. 250

By HARMAN BROS.
Highbury.—33, Grosvenor-rd., u.t. 49½ yrs., g.r. 4*l.* 5s., r. 60*l.* 550
Hackney.—63 and 65, Downs Park-rd., u.t. 61 yrs., g.r. 10*l.*, r. 90*l.* 790

By G. B. HILLIARD & SON.
Southchurch, Essex.—Mayland Court Estate (part of), 73 a. 3 r. 4 p., f. 970
Bradwell, Essex.—Blue House Farm, 48 a. 1 r. 39 p., f. 850

By W. R. NICHOLAS & Co.
Barham, Kent.—Out Elmstone and 8 a. 1 r. 0 p., f. 1,700
The Shrubbery and 4 a. 2 r. 0 p., f. 3,500

By T. W. OFFIN.
Bradwell, Essex.—Sandbeach Farm, 220 a. 3 r. 32 p., f. 2,000

By RICHARD AUSTIN & JAMES HARRIS & Sons (at Fareham).
Soberton, Hants.—Various enclosures, 66 a. 2 r. 15 p., f. 1,423
A freehold holding, 36 a. 1 r. 22 p. 550
Rose Cottage and 1 a. 1 r. 9 p., f. 240
East Hoe Farm, 379 a. 1 r. 13 p. f. 5,550
Various enclosures, 39 a. 0 r. 37 p., f. 1,585
The Manor Farm, 228 a. 0 r. 33 p., f. 4,500
Droxford, Hants. — Enclosures of land, 29 a. 1 r. 31 p., f. 850

July 17.—By DEBENHAM, TEWSON, & Co.
New Malden, Surrey.—Malden-rd., the Coombe Neville estate (part of), 73 a. 0 r. 35 p., f. 15,000
Totteridge, Herts.—High-rd., Holme Lodge, and 22 a. 1 r. 15 p., f., r. 105*l.* 2,220
High-st. Rose Hill and 2 a. 2 r. 22 p., f., r. 160*l.* 3,600

By DAVID BURNETT & Co.
Tooting.—12, St. Cyprian-rd., u.t. 96 yrs., g.r. 6*l.* 260
Stoke Newington.—100, Lordship-rd., u.t. 44 yrs., g.r. 5*l.* 360

By DAVID J. CHATTELL.
Chislehurst, Kent.—Lubbock-rd., Kincraig and 1 a., f. 4,000

By HAMPTON & SONS.
Maidstone, Kent.—Knightrider-st., the College of All Saints, 2 a., f. 3,850

By RUTLEY, SON, & VINE.
Kentish Town.—218 and 236, Kentish Town-rd, u.t. 48 yrs., g.r. 24*l.*, r. 176*l.* 4s. 6d. 2,330
and Carlton-st., u.t. 59½ yrs., g.r. 6*l.*, r. 55*l.* 730

By S. CLIFFORD TEE.
Stamford Hill.—No. 97, u.t. 84 yrs., g.r. 15*l.*, r. 190*l.* 1,600
Clapton.—5 and 7, Powerscroft-rd., u.t. 78 yrs., g.r. 14*l.*, r. 70*l.* 775

By G. TROLLOPE & SONS.
Wandsworth.—3, Rydal-rd., u.t. 80 yrs. g.r. 15*l.*, r. 15*l.* 650

By T. G. WHARTON.
Kentish Town.—48 to 54 (even), Islip-st., u.t. 49 yrs., g.r. 32*l.* 1,390
74 to 80 (even), Peckwater-st., u.t. 49 yrs., g.r. 25*l.* 770

By GARROD, SON, & TURNER (at Ipswich).
Saxmundham, Suffolk.—The Sutton Hall Estate, 1,163 a. 3 r. 37 p., f. (including tithe rent-charge of 233*l.* 19s. 6d.) 18,000
The Manor of Sutton Hall, with its rents, rights, royalties, &c. £360
Tithe rent-charge of 55*l.* 15s. 660
Ablitt's and 3 a. 2 r. 27 p., f. 265
Hollesley, Suffolk.—The Oxley Marshes, 36 a. 3 r. 0 p., f. 800

By ALFRED RICHARDS (at Tottenham).
Tottenham.—72 to 80 (even), Chestnut-rd., f. 1,220
Shelbourne-rd., Frederick Villa, u.t. 88½ yrs., g.r. 6*l.* 300
225, Park-lane, f., r. 32*l.* 470
Edmonton.—46 and 48, Claremont-st., f. 290
Wood Green.—95 and 97, Lordship-lane, u.t. 63 yrs., g.r. 13*l.* 370
Enfield.—1 and 2, Birkbeck Villas, f. 635

By Messrs. COBB (at Rochester).
Hoo, Kent.—Red Barn and 13 a. 2 r. 30 p., f. 2,400
A fruit plantation, 5 a. 3 r. 34 p., f. 800
Spring Meadow, 9 a. 2 r. 9 p., f. 375
Four cottages and 1 r. 25 p., f. 430
Cliffe, Kent.—Enclosure of land, 15 a., f. 1,050
Rainham, Kent.—Street Field, 19 a. 3 r. 16 p., f. 3,800
Two freehold cottages and 1 r. 300
Kiln Field and Breaches, 43 a. 1 r. 36 p., f. 3,000
Road Field, 17 a. 1 r. 37 p., f. 2,400
Allen's Enclosure and copse, 14 a. 1 r. 19 p., f. 2,500
Enclosures of land, 109 a. 2 r. 19 p., f. 9,750
A fruit plantation, 2 a. 3 r. 26 p., f. 600
Queen Court holding, 35 a. 0 r. 35 p., f. 3,150
Enclosures of land, 22 a., f. 2,025
A wharf and plantation, 0 a. 3 r. 27 p., f. 300
Motney Mills Estate, 273 a. 3 r. 10 p., f. 5,000
Enclosures of woodland, 14 a. 3 r. 3 p., f. 300

By BOURNE & SON (at Totnes).
Cornworthy, Devon. — The Broadridge Estate, 220 a. 0 r. 14 p., f. 3,450
Harberton, Devon.—The Ashridge Estate, 107 a. 1 r. 6 p., f. 3,450

By BARKER, CATHIE, & Co. (at Masons' Hall Tavern).
Kingston, Surrey.—Richmond-rd., The Queen's Head p.h., u.t. 26½ yrs., r. 100*l.*, with goodwill 7,300

By J. & S. MOTION (at Masons' Hall Tavern).
Victoria Park.—Bishop's-rd., The Park Hotel, u.t. 53 yrs., g.r. 25*l.*, r. 125*l.* 2,200

July 18.—By ABERCROMBIE & EDMUNDS.
Chiswick.—77, Barrowgate-rd., u.t. 82 yrs., g.r. 14*l.* 17s., r. 65*l.* 850

By FOSTER & CRANFIELD.
Croydon.—4, Moreton-rd., f., r. 65*l.* 800
Old Kent-rd.—140, Peckham Park-rd., u.t. 21 yrs., g.r. 6*l.* 5s., r. 34*l.* 200

By GRAVES & SON.
Westbourne Park.—3 and 8, Durham-ter., u.t. 49 yrs., g.r. 20*l.*, r. 155*l.* 1,055
3, Sunderland-ter., u.t. 49 yrs., g.r. 11*l.*, r. 75*l.* 640
14, Leamington-rd. Villas, u.t. 56 yrs., g.r. 10*l.* 10s. 510

By HAROLD GRIFFIN.
Battersea.—13 and 15, Orbell-st., u.t. 77 yrs., g.r. 12*l.* 12s. 590
142, New-rd.; also Ceylon Cottage, u.t. 25 yrs., g.r. 5*l.*, r. 52*l.* 230
9, 11, and 13, Kersley-st., u.t. 77 yrs., g.r. 21*l.*, r. 125*l.* 965
116, Latchmere Grove, u.t. 81 yrs., g.r. 3*l.* 210
Putney.—14, Galveston-rd., u.t. 83 yrs., g.r. 7*l.*, r. 35*l.* 355

By HUMBERT & FLINT.
Walkern, &c., Herts.—Finches and Walkern Bury Estate, 716 a. 2 r. 12 p., f. 9,000
The School House and 0 a. 2 r. 23 p., f. 215
Thornborough, Bucks.—Lower End Farm, 112 a. 1 r. 17 p., f. 1,700
Camden Town.—9 to 19 (odd), 54, 56 and 58, Marquis-rd., u.t. 60¾ yrs., g.r. 27*l.*, r. 324*l.* 3,580

By MULLETT, BOOKER & Co.
Hyde Park.—20, Albion-st., u.t. 25 yrs., g.r. 10*l.*, r. 115*l.* 370
14, Albion-st., u.t. 25 yrs., g.r. 10*l.*, r. 95*l.* 250

By F. C. SQUIRE & Co.
St. John's Wood.—18, Springfield-rd., u.t. 37 yrs., g.r. 7*l.*, e.r. 55*l.* 930

By TRAFFORD & CARTER.
Sutton, Surrey.—Carshalton-rd., Rosebank, u.t. 52 yrs., g.r. nil, e.r. 60*l.* 280
Stepney.—67 to 101 (odd), White Horse-lane, and 8, Eastbury-ter., u.t. 6 yrs., g.r. 37*l.* 440
526, Commercial-rd., c., r. 40*l.* 135
66, Shandy-st., f., r. 26*l.* 1,500
Bow.—236, Bow Common-lane, u.t. 35 yrs., g.r. 3*l.* 592
Mile End.—212, 214, and 216, Jubilee-st., f., r. 105*l.* 1,010
Plaistow.—Howard's-rd., f.g.r. 12*l.*, reversion in 64 yrs. 530
Mile End.—52 and 54, Leatherdale-st., u.t. 23¾ yrs., g.r. 6*l.* 370
Stepney.—22, East Arbour-st., u.t. 11 yrs., g.r. 1*l.* 10s. 265

By SEWELL & BARNES (at Yarmouth).
Ormesby St. Margaret, Norfolk.—A freehold occupation, 43 a. 0 r. 28 p. 660
Two enclosures, 14 a. 2 r. 25 p., f. 475

July 19.—By ALDER & Co.
Walworth.—31 to 37 (odd), Boundary-lane, u.t. 50 yrs., g.r. 20*l.* 345
Camberwell.—2 and 4, Hardess-st., u.t. 67 yrs., g.r. 9*l.* 240

By H. J. BLISS & SONS.
Notting Hill.—243, Cornwall-rd., u.t. 62 yrs., g.r. 8*l.*, r. 38*l.* 350
Clapton.—Clifden-rd., f.g.r. 10*l.*, reversion in 67 yrs. 350
Bethnal Green.—38 and 40, Sewardstone-rd., u.t. 58 yrs., g.r. 8*l.* 10s., r. 60*l.* 1,022
Old Ford.—23, Kenilworth-rd., f. 1,370
Bethnal Green.—16 and 18, Mape-st., u.t. 26 yrs., g.r. 6*l.* 355
57 and 59, Viaduct-st., u.t. 18 yrs., g.r. 6*l.* 15s. 235
Harringay.—46, Duckett-rd., u.t. 90 yrs., g.r. 6*l.* 6s., r. 36*l.* 225
Stoke Newington.—16, Wiesbaden-rd., u.t. 92 yrs., g.r. 6*l.* 10s., r. 32*l.*
53, 55, and 57, Wiesbaden-rd., u.t. 92 yrs., g.r. 19*l.* 10s., r. 102*l.*
73, 79, 81, and 85, Wiesbaden-rd., u.t. 92 yrs., g.r. 26*l.*, r. 132*l.*

By CLIMPSON & JOHNSON.
New Cross.—79, Edward-st., f.
47, Shere-rd., u.t. 47 yrs., g.r. 2*l.* 15s.
34, Mornington-rd., u.t. 33 yrs., g.r. 2*l.*
63, Amersham-vale, u.t. 42 yrs., g.r. 3*l.* 10s. £310
68, Amersham-vale, u.t. 62 yrs., g.r. 3*l.* 335

By DEBENHAM, TEWSON, & Co.
Southwark.—4, 5, 6, and 7, Vine-yard, f., r. 121*l.* 10s. 1,030
Vine-yard, freehold stables and workshop, r. 71*l.* 16s. 650
Crouch Hill.—Dickenson-rd., Womersley House and 1 a. 2 r. 26 p., f. 4,500
Ealing.—5, 7, 19, and 21, Warwick-rd., u.t. 68½ yrs., g.r. 62*l.* 4s., r. 280*l.* 10s. 3,025
16 and 54, Grange-pk., u.t. 68½ yrs., g.r. 33*l.*, r. 180*l.* 1,850

By FAREBROTHER, ELLIS, & Co.
Epping, Essex.—Hemnall-st., a block of building land, 6 a. 3 r. 21 p., also two residences, r. 50*l.*, f. 1,875
Thornwood Common, Pickard's House and 10 a. 1 r. 37 p., f. and c. 1,340
Romsey, Hants.—Little Woodley Farm, 34 a. 0 r. 32 p., f. 1,800
City of London.—Finsbury Circus, &c., area 18,230 ft., let on building lease for 80 yrs., at per annum ,500

By W. HALLETT & Co.
Paddington.—3, Bristol-gardens, u.t. 50 yrs., g.r. 8*l.* 10s., e.r. 55*l.* 450
Maida Vale.—22, Warrington-cres., u.t. 58 yrs., g.r. 25*l.*, e.r. 130*l.* 800

By LINNETT & LANE.
Kilburn.—13, 13a, 13b, 13c, 15, 15a, 15b, and 15c, Canterbury-rd., u.t. 58 yrs., g.r. 8*l.* 1,635
13 and 13a, Alpha-pl., u.t. 58 yrs., g.r. 6*l.* 495
3, Willesden-lane, u.t. 37 yrs., g.r. 12*l.* 10s., r. 45*l.* 310
13, 19 to 25 (odd), Cambridge-av., u.t. 58 yrs., g.r. 55*l.*, r. 273*l.* 10s. 2,310
76, 81, 85, 86, and 99, Cambridge-rd., u.t. 62 yrs., g.r. 40*l.*, r. 253*l.* 2,365
24, 28, and 30, Granville-rd., u.t. 62 yrs., g.r. 21*l.* 790
5, Percy-rd., u.t. 62 yrs, g.r. 6*l.*, r. 43*l.* 4s. 275
4, Cambridge-mews West, u.t. 62 yrs., g.r. 6*l.*, r. 36*l.* 220
1, 2, and 3, Pembroke-mews, u.t. 62 yrs., g.r. 5*l.* 5s. 370
Paddington.—21, Howell-st., u.t. 38 yrs., g.r. 7*l.* 7s., r. 30*l.* 235

By C. C. & T. MOORE.
Whitechapel.—4 and 29, Greenfield-st., f. 1,675

By NEWBON, EDWARDS, & SHEPHERD.
Belgravia.—Wilton-cres., i.g.r. 50*l.*, u.t. 23¾ yrs., g.r. 11*l.* 440
Holloway.—1, Russell-rd., u.t. 51 yrs., g.r. 4*l.* 10s., r. 30*l.* 325
Caledonian-rd.—Nos. 88 and 90., u.t. 34 yrs., g.r. 21*l.*, r. 132*l.* 715

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

WOOD.*

Per Petersburg standard hundred.

	£	s.	d.	£	s.	d.
White Sea: first yellow deals	18	0	0	23	0	0
Second do.	16	0	0	18	10	0
Third do.	13	0	0	15	0	0
Battens, 40s., 30s., and 15s. less respectively.						
Petersburg: first yellow deals	15	10	0	19	0	0
Second do.	13	0	0	14	0	0
Battens, 30s. and 20s. less respectively.						
Petersburg, white deals	12	0	0	15	0	0
Do. white battens	11	0	0	12	0	0
Riga, white deals	10	0	0	11	10	0
Swedish mixed yellow deals	16	10	0	21	0	0
" Third do.	14	10	0	17	0	0
" Fourth do.	13	0	0	14	10	0
" Fifth do.	12	0	0	13	10	0
Battens, 30s., 20s., and 10s. less respectively.						
Whitewood, 10 to 20 per cent. less.						
Finnish unsorted yellow deals	11	10	0	12	10	0
Battens, 10s. and 5s. less respectively.						
Whitewood, 5 to 10 per cent. less.						
Norwegian second yellow battens	8	10	0	9	0	0
Third do.	8	0	0	9	0	0
Fourth do.	8	0	0	8	10	0
Whitewood, 10s. less.						
Danzig, Crown Deck deals, per 40 ft. 3 in.	0	15	0	1	5	0
Brack	0	12	0	1	0	0
St. Lawrence Pine deals, &c., per P.S.H.:—						
1st, Bright and Dry, regular sizes	22	0	0	29	0	0
" " oddments	15	10	0	23	0	0
2nd " regular sizes	17	10	0	20	0	0
" " oddments	12	0	0	16	10	0
3rd, " regular sizes	11	0	0	12	0	0
" " oddments	9	10	0	10	10	0
4th " regular sizes	10	0	0	11	0	0
" oddments	9	0	0	10	0	0
St. Lawrence Spruce deals, &c.						
First, regular sizes	13	0	0	15	0	0
Second "	10	10	0	11	0	0
Third "	10	5	0	10	10	0
Fourth "	9	15	0	10	5	0
Oddments and battens at 20s., 10s., 7s. 6d., and 5s. less respectively.						
New Brunswick Spruce deals, &c.	10	0	0	12	0	0
Oddments, battens, and fourths	9	10	0	10	0	0
United States pitch pine planks and boards	11	10	0	15	0	0

* The prices named are for the wood as imported and landed in the docks. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

[*See also next page*

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PRICES CURRENT *(Continued)*.

	£ s. d.	£ s. d.
Prepared Boards, per square		
1¼ by 6½ and 7 in. 1st yellow	11 6	16 6
,, ,, ,, 2nd ,,	11 0	23 6
1 by 6½ and 7 in. 1st ,,	10 6	12 6
,, ,, ,, white	9 6	10 6
,, ,, 2nd yellow	9 6	11 6
,, ,, ,, white	8 6	9 6
¾ by 6½ & 7 in. 1st & 2nd yellow	8 6	9 6
,, ,, white	8 0	9 0
¾ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)	9 0	10 0
¾ by 6½ and 7 in. 2nd yellow and white (ditto)	8 0	9 0
¾ by 6½ and 7 in. 1st yellow and white (ditto)	7 0	8 0
¾ by 6½ and 7 in. 2nd yellow and white (ditto)	6 6	7 6
Narrower widths at 10 per cent. less.		
3rd quality at 15 per cent. less than 2nd.		
Danzig and Memel Fir Timber— per load		
Best middling	3 12 0	3 15 0
Good middling and Second	3 0 0	3 5 0
Common middling	2 15 0	3 0 0
Undersized	2 15 0	3 0 0
Swedish and Norwegian Balks	2 5 0	2 10 0
Baltic Oak Timber—		
Danzig and Stettin—Large	3 17 6	4 10 0
Small	3 2 6	3 15 0
Quebec Timber per load		
Yellow Pine	4 15 0	6 5 0
Oak	4 0 0	6 0 0
Elm	5 5 0	6 5 0
Ash	3 5 0	4 0 0
Birch	3 17 6	6 5 0
New Brunswick, &c., Birch	3 12 6	4 10 0
American Pitch Pine Timber	2 17 6	4 5 0
Wainscot, per log, 18 cubic ft.—		
Crown (Eng. & Dutch) nominal	3 0 0	4 0 0
Brack nominal	2 7 6	3 0 0
Lathwood, per cubic fathom—		
Petersburg	4 0 0	6 10 0
Riga and Danzig	4 10 0	5 10 0
Norway Poles, per ft. run	0 0 1	0 0 1½
Oak Staves, per mille full size pipe		
Memel, Crown	220 0 0	230 0 0
Brack	190 0 0	200 0 0
Danzig	165 0 0	175 0 0
Bosnia, single Barrel (nominal)	28 0 0	30 0 0
United States, Pipe	37 10 0	45 0 0
Hogshead, extra heavy and double extra	30 0 0	35 0 0
Indian Teake per load	10 10 0	16 0 0
British Guiana Greenheart	0 0 0	8 0 0
Mahogany, per foot superficial—		
Honduras, cargo average	0 0 4½	0 0 5½
Nicaragua, do.	0 0 4½	0 0 5½
Tabasco, do.	0 0 4½	0 0 6
Mexican, do.	0 0 4	0 0 4½
Panama, do.	0 0 3½	0 0 4
African, do.	0 0 3½	0 0 5
Cuba, do	0 0 6	0 0 8
St. Domingo, do.	0 0 5	0 0 7½
Do. Curls (good to prime)	0 0 9	0 1 3
Walnut, American (logs)	0 2 9	0 4 9
Do. do. (planks and boards)	0 2 0	0 7 6
Italian, per foot superficial	0 0 3	0 0 7½
Black Sea, per ton	6 0 0	28 0 0
Satin Walnut (logs) per foot cube	0 1 0	0 1 6
(planks and boards)	0 1 9	0 3 0
Sequoia (Californian redwood), per foot cube	0 1 9	0 2 0
Whitewood, American (logs)	0 1 4	0 1 9
,, ,, (planks and boards)	0 1 9	0 2 9
Quartered oak ,, ,,	0 2 3	0 4 0
Kauri pine (logs)	0 1 9	0 2 0
,, ,, (planks)	0 2 3	0 2 0
Jarrah (planks)	0 2 0	0 2 6
Lancewood spars each, fresh and large	0 5 0	0 7 0
Lancewood spars, ordinary to fair	0 3 0	0 4 0
Degame spars	0 8 0	0 10 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders ,, ,,	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	12 0 0	0 0 0

METALS.

IRON—Pig, in Scotland ton	3 10 8	- - -
Bar, Welsh, in London	11 0 0	- - -
Do. do. at works in Wales	10 0 0	- - -
Do. Staffordshire, in London	11 5 0	- - -
COPPER—Sheets, strong	83 0 0	- - -
LEAD—Sheet, English, 6 lbs. per sq. ft. and upwards	19 17 6	- - -
Pipe in coils	20 7 6	- - -
ZINC—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
TIN—English Ingots per lb.	0 1 6	- - -
SOLDER—Plumbers' ,,	0 0 7½	- - -
Ticmen's ,,	0 0 10	- - -
Blowpipe ,,	0 0 11½	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, ,, fourths	3d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths	5d. ,, ,,
Fluted sheet, 15 oz.	3¼d. ,, ,,
,, 21 ,,	4¼d. ,, ,,
⅛ Hartley's Rolled Plate	3d. ,, ,,
⅛ ,, ,, ,,	3¼d. ,, ,,
¼ ,, ,, ,,	4d. ,, ,,

PRICES CURRENT *(Continued)*.

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
,, ,, ,, in barrels ,,	0 3 2
,, ,, ,, in drums ,,	0 3 4
Boiled ,, ,, in pipes ,,	0 3 4
,, ,, ,, in barrels ,,	0 3 5
,, ,, ,, in drums ,,	0 3 7
Turpentine, in barrels ,,	0 2 11
,, in drums ,,	0 3 2
Genuine Ground English White Lead per ton	27 0 0
Red Lead, Dry ,,	24 0 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 6
Knotting	0 10 0
Best French and Brush Polish	0 10 0

BRICKS, &c.

	s. d.	
Hard Stocks	34 0	per thousand alongside, in river.
Rough Stocks and Grizzles	30 0	,, ,, ,, ,,
Smooth Bright Facing Stocks	58 0	,, ,, ,, ,,
Shippers	42 0	,, ,, ,, ,,
Flettons	29 6	,, ,, at railway depôt.
Red Wire Cuts	34 0	,, ,, ,, ,,
Best Fareham Red	71 6	,, ,, ,, ,,
Best Blue Pressed Staffordshire	87 0	,, ,, ,,
Best Stourbridge Fire Bricks	84 6	,, ,, ,, ,,
Best White Glazed Stretchers	260 0	,, ,, ,, ,,
Headers	240 0	,, ,, ,, ,,
Quoins and Bull-nose	340 0	,, ,, ,, ,,
Double Headers	320 0	,, ,, ,, ,,
Best Dipped Salt Glazed Stretchers and Headers	240 0	,, ,, ,, ,,
Quoins and Bull-nose	280 0	,, ,, ,, ,,
Double Headers	280 0	per thousand at railway depôt.
Seconds Quality White and Dipped Salt Glazed	40 0	per thousand less than best.

	s. d.	
Thames and Pit Sand	7 9	per yard, delivered.
Thames Ballast	6 6	,, ,,
Best Portland Cement	34 0	per ton ,,
Best Ground Blue Lias Lime	23 6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt
Bath ,,	1 7	,, ,,
Beer ,,	1 6½	,, ,,
Grinshill ,,	1 10	,, ,,
Brown Portland in blocks	2 2	,, ,,
Darley Dale ,,	2 1½	,, ,,
Red Corsebill ,,	2 5	,, ,,
Red Mansfield ,,	2 4½	,, ,,
Hard York ,,	2 10	,, ,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super at rly. depôt.
,, ,, 6 in. Rubbed Ditto	2 10½	,, ,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,, ,,
,, ,, 3 in. self-faced Ditto	0 9	,, ,,

SLATES.

in. in.	£ s. d.	
20×10 best blue Bangor	11 5 0	per 1000 of 1200 at ry. dep.
,, best seconds ,,	10 15 0	,, ,,
16×8 best ,,	6 2 6	,, ,,
20×10 best blue Portmadoc	10 18 0	,, ,,
16×8 ,, ,,	6 0 0	,, ,,
20×10 best Eureka unfading green	11 2 6	,, ,,
16×8 ,, ,,	6 15 0	,, ,,
20×10 Permanent green and Sedan green	10 0 0	,, ,,
16×8 ,, ,,	5 12 6	,, ,,

TILES.

	s. d.	
Best plain red roofing tiles	41 6	per 1,000 at rly. depôt.
Hip and valley tiles	3 7	per doz. ,, ,,
Best Broseley tiles	48 6	per 1,000 ,, ,,
Hip and valley tiles	4 0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 ,, ,,
Do. ornamental Do.	60 0	,, ,, ,,
Hip tiles	4 0	per doz. ,, ,,
Valley tiles	3 9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000 ,, ,,
Hip tiles	4 1	per doz. ,, ,,
Valley tiles	3 8	,, ,, ,,

TO CORRESPONDENTS.

H. C., M. & F. (amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BENHAM PARK (near Newbury, Berks).—For model dairy, for the trustees of Sir Richard Sutton Bart. Mr. James H. Money, architect, Newbury, Berks:—
George Elms & Sons (exclusive of dairy appliances)* ..... £2,200.

BROADSTONE (Dorset).—For the erection of a villa, for Dr. C. W. Curtis. Mr. W. Andrew, architect, Alton Office, Parkstone:—

Chinchen & Co.	£1,600	Baker & Pearcey	£1,180
J. W. Cross	1,287	A. & F. Wilson, Parkstone*	1,085
E. S. Griffen	1,265		
E. H. Crabb	1,182		

CAMBORNE.—For additions to villa, Camborne, for Messrs. Holman Bros. Mr. S. Hill, architect, Redruth:—
Turner & Nettell, Camborne* £566

CLOWN (Derbyshire).—For the erection of six cottages, for Mr. J. Radford. Mr. John Allsopp, architect, Worksop:—

G. Norman	£1,529 6 9	John Jackson, Whitwell, Chesterfield*	£1,140 0 0
G. Wright	1,400 0 0		
W. Hall	1,233 0 0		
W. Thomason	1,137 9 0		

DARLINGTON.—For the erection of warehouse, &c., Crown-street, for Messrs. H. Foster & Son:—

Stairmand & Son	£415 0 0
Boyd & Sons	389 15 0
J. W. & M. McKenzie, W. Jameson, J. & G. Wharton, T. Easby, T. Lishman	387 0 0*

[All of Darlington.]

GRAYS (Essex).—For supplying and fixing hot-water heating to three schools for the Grays Thurrock School Board. Mr. Christopher M. Shiner, architect, 3, Bond-court, Walbrook, E.C., and Grays:—

Shrivell	£815 10 0	Palowkar & Son	£639 0 0
Benham & Son	724 18 9	Russell & Co.	625 0 0
Burroughes & Co.	674 0 0	Worns & Co.*	600 0 0
Bechett Bros.	659 10 0		

GRAYS (Essex).—For supplying and fixing lighting system fittings to the Co-operative Stores for the Grays Co-operative Society, Ltd. Mr. Christopher M. Shiner, architect, 3, Bond-court, Walbrook, E.C., and Grays:—

H. E. Wright*	£229 0	W. Shrivell	£227 10

GRAYS (Essex).—For supplying and fixing new partitions to schools, for the Grays Thurrock School Board. Mr. Christopher M. Shiner, architect, 3, Bond-court, Walbrook, E.C., and Grays:—

J. Brown	£480	H. R. Rons*	£445
H. J. Carter	470		

HARPENDEN.—Villa, Tennyson-road. Mr. Percival C. Blow, architect, St. Albans and Harpenden:—

Philips & Blake	£593 10	Hall	£482 0
Bushell	520 0		

HELSTON. — Additions, Nausloe Mansion House, Helston, for Mr. H. M. Rogers. Mr. Sampson Hill, architect, Redruth:—
W. Roberts, Helston* £770

HENDON.—For the erection of public offices, for the Hendon Urban District Council. Mr. Thomas Henry Watson, architect, 9, Nottingham-place, W. Quantities by Messrs. Leaning & Sons, 28, John-street, W.C.:—

Knight & Son	£12,975	W. Tout	£11,700
Wall & Co.	12,849	Gough & Co.	11,454
Gould & Brand	12,266	Kingerlee & Son, Oxford*	11,309
Collins & Godfrey	11,748		

ILLOGAN.—For the erection of villa, Illogan, for Mr W. Meager. Mr. S. Hill, architect, Redruth:—
Masonry.—S. J. Nicholls, Redruth* £246
Carpentry.—T. Martin, Redruth* 123

[*See also next page.*

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ILLOGAN.—For erecting the Bain Memorial, Illogan Mr. S. Hill, architect, Redruth :—
John Odgers, Redruth* £425

IPPLEPEN (Devon).—For the erection of farmhouse, &c., for Mr. R. Meddicott. Mr. S. Segar, architect, Union-street, Newton Abbot :—

H. J. Almond	£1,600 0 0	F. A. A. Stacey	£1,195 0 0
Parker Bros.	1,318 0 0	S. Blatchford	1,090 0 0
W. A. Goss	1,290 0 0	Jos. Edwards, Newton Abbot*	1,038 7 6
P. Horswell	1,247 0 0		
Mitchell & Son	1,236 15 0		

KETTERING.—For the erection of children's home Burton Latimer, for the Guardians. Messrs. Gotch & Saunders, architects, Bank Chambers, Kettering :—

F. Henson	£1,846 0	A. Bamford	£1,575 0
G. Henson	1,772 9	Lewin & Son	1,568 0
Bell	1,758 0	A. Lewis, Isham, Kettering*	1,539 0
Freeman & Son	1,650 0		

LEEDS.—For raising and extending car sheds at Hunslet, for the Corporation. Mr. Thos. Hewson, City Engineer, Municipal Buildings, Leeds. Quantities by Mr. E. J. Silcock, Park-row, Leeds :—

Brickwork.

Isaac Gould, Limited £3,929 14 0

Ironwork.

Clayton, Sons, & Co., Limited 1,130 16 6

LEVERTON (Wilts.).—For building two pairs of labourer's cottages and out offices at Leverton, on the Charlton Lodge Estate, for Sir William Pearce, Bart. Mr. James H. Money, architect, Newbury, Berks :—
George Elms & Sons £909 0 0
Woodridge & Son, Hungerford 887 11 1

LONDON.—For redecorations to dining rooms, saloon, &c., at Hampden House, St. Pancras, for Hampden House, Limited. Messrs. Salter, Issott, & Salter, architects, St. Pancras :—

Lapie & Sons	£218 0	Marchant & Hirst	£137 0
Vears & Co.	149 0	Gavin Bros.*	119 15

LONDON.—For two artesian wells, pumps, &c., at the New Public Baths, Prince of Wales-road, Kentish Town, for the Parish of St. Pancras. Messrs. T. W. Aldwinckle & Sons, architects :—

Tilley & Sons	£8,307	Le Grand & Sutcliff*	£4,735 !
Isler & Co.	5,277		

LONDON.—For the erection of eleven shops and dwellings in High-road, Kilburn, for Mr. J. Druce. Mr. C. Weber, architect, Wellesley-road, Leytonstone :—

Lyell	£12,050	Babbs*	£11,000
Gregary	11,095	Cook	10,087
Amos	11,030		

LOWESTOFT.—For the erection of the Gunton Cliff House (basement only). Mr. Herbert J. Green, architect and surveyor, 32, Castle Meadow, Norwich :—

Shillito & Sons	£3,178	Youngs & Son	£2,518
Cornish & Gaymer	2,890	J. S. Smith, Norwich*	2,455
Johnson & Co., Ltd.	2,794		

NELSON (LANCS.).—For the conversion of a house into Council offices; erection of a fire station, &c., for the Brierfield Urban District Council. Mr. J. T. Landless, C.E. Station-buildings, Nelson :—

Masonry.—Benjamin Taylor, Brierfield £1,526 11 6
Joinery.—Thos. Boothman, Brierfield 478 1 9
Plastering.—John Hargreaves, Nelson 225 0 0
Plumbering.—Richard Guest, Brierfield 130 0 0
Concreting.—Richard Guest, Brierfield 80 0 0
Slating.—Wm. Stanworth, Burnley 113 11 0

NOTTINGHAM.—For the erection of a house, Sherwood for Mr. S. Clarke. Messrs. Collyer & Slater, architects, 3, Bridleswith-gate, Nottingham. Quantities by architects :—

Cooper & Son, Ltd.	£685 0 0	G. Hoyes	£592 5 0
Gates & Belling	680 0 0	A. G. Bell	585 0 0
J. W. Boyfield	667 0 0	T. Cuthbert	585 0 0
A. Fitt	657 0 6	T. Long	585 0 0
Hutchins & Co.	649 10 0	W. Maule	575 10 0
F. Hawkes	649 10 0	J. Whittaker, Pindars House-road*	570 0 0
Scott & Son	610 0 0	J. Musson	559 0 0
J. Kerruish	597 7 6		

[All of Nottingham.]

Plumber's Work.

W. Levers	£72 10 5	C. E. Pindar, Hartley-road*	£63 0 0
J. Mansfield	65 0 0		
J. W. Bull	64 0 0		

RAUNDS (Northants).—For the erection of shops and stores, for the Co-operative Society. Messrs. Sharman & Archer, architects, Wellingborough. Quantities by the architects :—

E. Marriott	£2,100 0 0	Kettering Co-operative Builders, Kettering*	£1,957 0 0
Smith & Son	2,090 0 0		
Brown & Son	2,052 12 6		
C. Henson	2,050 0 0		
W. Goodman	1,998 0 0		

REDRUTH (Cornwall).—For additions, &c., to Lanyon House, Gwinnear. Mr. Sampson Hill, architect, Greenlane, Redruth :—
W. Jenkin, Leedstown* £320

RUSHDEN.—For additions to shoe factory, Station-road, Rushden, for Messrs. Jaques & Clark. Messrs. Mosley & Scrivener, architects, Northampton :—

T. Swindall	£1,999 0 0	T. Willmott, junr.	£1,897 0 0
F. Allwright	1,998 9 0	Hacksley Bros.	1,869 0 0
H. Sparrow	1,980 0 0	Whittington & Tomlin	1,847 0 0
J. M. Panting	1,980 0 0	E. Mitchell	1,823 14 0
G. Henson	1,978 12 6	R. Marriott, Rushden*	1,810 0 0
Walker & Everard	1,975 0 0		
Beardsmore	1,925 0 0		

RYDE.—For villa at Beachland, Ryde, for Mr. Edmund Ward. Mr. John J. Barton, architect, Ryde :—

Wheeler Bros.	£1,159 0	J. Whitewood, Ryde*	£998 10
Barton	1,070 0		

ST. ALBANS.—Four residences, London-road, St. Albans. Mr. Percival C. Blow, architect, St. Albans and Harpenden :—

Miskin & Son	£3,976	E. Dunham	£3,810

ST. ALBANS.—Two pairs of villas, Clarence-road. Mr. Percival C. Blow, architect, St. Albans and Harpenden :—

Whibley & Jervis	£3,730	Dunham	£3,590
Bushell	3,644		

WENDRON.—For erecting a Bible Christian chapel, Carnkie, Wendron. Mr. S. Hill, architect, Redruth :—
W. H. Moyle, Chacewater, Scorrier* £709
[Trustees are providing all stone, including dressed granite.]

WEYHILL (Hampshire).—For additions to Weyhill House, for Captain Smith. Mr. James H. Money, architect, Newbury, Berks :—
Sydney Bell, Andover* £727 6 4

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect :—

BATH-STREET SCHOOL, CITY-ROAD.—Overhauling heating apparatus, &c. :—

J. Grundy	£393
G. & E. Bradley	350
Brightside Foundry and Engineering Co., Ltd.	325
J. Esson	279
Defries & Sons, Ltd.†	215

BLOOMFIELD-ROAD HIGHER GRADE SCHOOL (Plumstead). — Re-arranging heating apparatus :—

Seward & Co.	£96 0	Wenham & Waters, Ltd.	£52 0
Paragon Heating Co.	80 0	Morris & Co.	47 10
Wontner-Smith, Gray, & Co.	80 0	J. Grundy	44 0
Cannon & Sons	75 0	L. Hill†	35 0

BYRON AND BRIGHT-STREET SCHOOL (Bromley).—Works to heating apparatus :—

Defries & Sons, Ltd.	£648 10	Dargue, Griffiths, & Co., Ltd.	£487 0
Cannon & Sons	599 0	Wenham & Waters, Ltd.	486 0
J. Esson	556 0	Duffield & Sons†	460 0
J. & F. May	513 0		
J. Grundy	497 0		

CAMDEN-STREET SCHOOL (Camden Town).—For heating apparatus :—

Kite & Co.	£85 0	Wontner Smith, Gray, & Co.	£39 0
G. Davis	62 0	Palowkar & Sons	38 10
Morris & Co.	44 0	Knight & Sons†	28 0
G. & E. Bradley	39 10		

CASSLAND-ROAD SITE, WELL-STREET, HACKNEY.—New higher grade school. This higher grade school of four stories will contain two halls—one on the ground floor and one on the first floor—each having an area of about 1,700 super ft., and also the following accommodation :—Ground floor—Three classrooms of 48 and three classrooms of 40. First floor—Three classrooms of 48 and three classrooms of 40. Second floor—Two classrooms of 56 and three of 48; Gymnasium, area 1,744 super ft., with dressing-rooms and store for gymnastic apparatus. Third floor—Chemical laboratory, area 803 super ft.; physical laboratory, area 723 super ft.; lecture-room, area 745 super ft.; drawing classroom, area 1,336 super ft.; clay modelling-room, area 551 super ft.; needlework-room, area 547 super ft., with stockrooms for chemicals and teachers' rooms. Also a manual training centre for 40 boys, containing an area of about 1,507 sq. ft. A propulsion system of heating and ventilation will be provided, and also covered playgrounds for boys and girls, the area of the playgrounds being :—Girls, 10,290 super ft. = 26 ft. per scholar; boys, 9,610 super ft. = 24 ft. per scholar. Area of site, 35,755 sq. ft. :—

		If Walls of Classrooms and Halls be Plastered add ‡
Chessum & Sons	£33,821 17	....
Leslie & Co., Ltd.	33,629 0	£324 0
Miskin & Sons	31,674 0	344 0
Perry & Co.	31,420 0	410 0
Munday & Sons	31,289 0	—
Clarke & Bracey	31,250 0	—
Kirk & Randall	31,250 0	374 0
F. & F. J. Wood	31,198 0	—
Williams & Son	31,120 0	354 0
J. & M. Patrick	31,109 0	—
Grover & Son	30,835 0	387 0
Lawrance & Sons	30,594 0	362 0
Treasure & Son	30,441 0	352 9
C. Cox†	30,379 0	348 0

‡ Amount included in tender of contractors.

CHARING CROSS-ROAD SCHOOL. — Electric Lighting :—

		A
Comyn Ching & Co.	£339 0 0	£2 5 0
Drake & Gorham	254 2 6	1 8 0
Hodgson & Co.	247 8 0	1 7 0
Peto & Radford, Ltd.	216 0 0	1 5 6
Weston & Co.	208 1 0	1 8 6
Palmer & Watson†	165 0 0	1 2 0

A—Rate per lamp at which any additions or deductions made during the progress of the work are to be calculated including switch and plain pendant.

COBOURG-ROAD SCHOOL (Old Kent-road).—For new boiler, &c. :—

Cannon & Sons	£219 0	Knight & Sons	£117 0
Wenham & Waters, Ltd.	156 0	Lewis Hill†	106 10

COOK'S-GROUND AND GIPSY-ROAD SCHOOLS. Repairs to furniture :—

(a) Chelsea—Cook's-ground School.

T. Cruwys	£175 0 0	London School Furniture Co.†	£156 18 8
H. Bouneau	170 0 0		
Hammer & Co., Ltd.	160 0 0		

(b) West Lambeth—Gipsy-road School.

H. Bouneau	£120 10 0	London School Furniture Co.	£106 6 3
T. Cruwys	115 0 0	Hammer & Co., Ltd.†	96 0 0

"CUBITT TOWN" SCHOOL (Poplar).—Stone staircase, partitions, &c.—Continuing the girls' stone staircase from the first floor to second floor, including alterations to framing, lavatory basins, &c. Altering position of an existing partition, and providing a new partition in order to re-divide classrooms A and B of the infants' department into three rooms :—

Gibb & Co.	£780	T. H. Jackson	£430
E. Proctor	500	Barrett & Power	420
G. Barker	450	J. Kybett*	406

CURTAIN-ROAD (Shoreditch). — Additional heating :—

C. Kite & Co.	£135 0	Stevens & Sons	£84 0
W. G. Cannon & Sons	93 0	W. Simmons	73 6
Comyn, Ching, & Co.	89 15	Palowkar & Sons	73 0
		A. A. Morris & Co.†	65 10

DREADNOUGHT-STREET SCHOOL, GREENWICH MARSH.—Additional heating surface :—

Bates & Sons	£190	Paragon Heating Co.	£106 0
J. & F. May	175	Knight & Sons	96 0
Stevens & Sons	173	Wenham & Waters, Ltd.†	88 16
Strode & Co.	149		
Duffield & Sons	117		

EARL-STREET SCHOOL, PLUMSTEAD.—Additional heating surface :—

J. Esson	£355 10	Defries & Sons, Ltd.	£253 0
J. Grundy	303 0	Paragon Heating Co.†	230 0
Cannon & Sons	299 0		

ENFIELD-ROAD SCHOOL (De Beauvoir Town).—Additional heating :—

Comyn, Ching & Co.	£127 10	Russell & Co.	£94 0
G. Davis	125 0	W. Simmons	76 0
Palowkar & Sons	104 0	Wenham & Waters, Limited†	66 0
Knight & Sons	96 0		

"FOX" SCHOOL, SILVER-STREET, KENSINGTON.—For partition, &c., in infants' department :—

Lathey Bros.	£235 0	R. S. Buckeridge	£176 10
W. R. & A. Hide	195 10	S. Polden†	164 0

FULHAM PALACE-ROAD SITE.—New School.—The school is a three-story building, and contains the following accommodation :—Halls—Boys', girls', and infants' departments, each 54 ft. by 32 ft. Classrooms—Boys', girls', and infants' departments, each 60, 60, 56, 56, 48, 40, 40. Drawing classroom, 1,400 ft. area. Heating by low-pressure hot-water apparatus. Area of site, 50,810 square feet. Playgrounds, area per child—Boys', 45 square feet; girls' and infants', 34 square feet; a schoolkeeper's house is also included in the plans :—

Leslie & Co., Ltd.	£31,302	Stimpson & Co.	£28,820
Simpson & Son	30,388	Johnson & Co., Ltd.	28,663
Miskin & Sons	30,073	C. Cox	28,500
Lawrance & Sons	29,794	Martin, Wells, & Co.	28,053
Treasure & Son	29,496	Wallis & Sons†	27,844
C. Wall	29,100		
J. Carmichael	29,048		

HACKNEY U.—New School in Wood-close.—Heating apparatus :—

Cannon & Sons	£849 0	Brightside Foundry & Engineering Co., Limited	£645 0
J. & F. May	682 0	Duffield & Sons	500 0
Dargue, Griffiths & Co., Limited	681 11	Turner & Co.	555 0
Wippell Bros. & Row	675 0	The Paragon Heating Co.†	499 0
J. Esson	668 0		
J. Grundy	660 0		

HASELTINE-ROAD SCHOOL, LOWER SYDENHAM.—For new boiler :—

Brightside Foundry and Engineering Co., Ltd.	£315	Kite & Co.	£175
G. & E. Bradley	185	J. & F. May	165
		J. Grundy	95
		Morris & Co.†	92

HOLLYDALE-ROAD SCHOOL (Nunhead).—For science room, &c. :—

E. B. Tucker	£340	London School Furniture Co.	£249
Rice & Son	325	G. Kemp*	190
General Builders, Ltd.	279		

[See also next page.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
School Buildings	Machynlleth School Board	30*l.*	Aug. 18

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Repairs at Infirmary, Mayday-road, Thornton Heath	Croydon Guardians	F. West, Surveyor, 23, Coombe-road, Croydon	July 30
*Kerbing, Tarpaving, &c., Chalsey-road, Brockley	Lewisham Board of Works	Surveyor's Department, Town Hall, Catford, S.E.	July 31
*Kerbing, Tarpaving, &c., Eastern-road, Brockley	do.	do.	do.
*Kerbing, Tarpaving, &c., Pattenden-road, Catford	do.	do.	do.
*Kerbing, Tarpaving, &c., Pascoe-road, Lewisham	do.	do.	do.
Warehouse, Hammerton-street	Bradford Corporation	J. H. Cox, Surveyor, Town Hall, Bradford	do.
Additions, &c., The Cottage, Exmouth	Mr. A. J. Darke	P. Kerley, Architect, Exmouth	do.
Additions, &c., to Roath Abattoirs	Cardiff Corporation	W. Harpur, Civil Engineer, Town Hall, Cardiff	do.
School, Gowerton, Glam.	.....	J. B. Morgan, Architect, Llanelly	do.
Alterations to House, Clark-street, Morecambe	Mr. E. Gardner	A. L. Lang, Architect, 12A, Pedder-street, Morecambe	do.
*St. Anne's Depôt in Horse and Dolphin Yard, Soho	Strand Board of Works	Surveyor, 5, Tavistock-street, Covent Garden, W.C.	Aug. 1
Service Reservoir, &c.	Shipston-on-Stour R.D.C.	J. E. Willcox, Civil Engineer, 63, Temple-row, Birmingham	do.
Making-up Marian-road, &c., Mitcham	Croydon R.D.C.	J. Wilson, Town Hall, Croydon	do.
Granite Road Metal	New Winchester R.D.C.	W. D. Statham, Surveyor, 2, St. James-street, Winchester	do.
Waterworks	Cowdenbeath (N.B.) Police Comrs.	Buchanan & Bennett, Civil Engineers, 12, Hill-street, Edinburgh	do.
Alterations to Schools, Miskin and Beddau	Llantrissant School Board	J. C. Jones, 8t. Catherine-street, Pontypridd	do.
Additions to Fire Station	Belfast Town Council	W. J. Moore, Architect, Ann-street, Belfast	do.
Building Work, St. Mary's Church, Ipswich	.....	E. F. Bishopp, Architect, 32, Museum-street, Ipswich	do.
Building at Sewage Farm	Rushden (Northants) U.D.C.	W. B. Madin, Civil Engineer, Vestry Hall, Rushden	do.
School, Northwood	Hanley School Board	E. E. Scrivener, Architect, Howard-place, Hanley	Aug. 2
Hospital and Other Buildings	Barry (Glam.) U.D.C.	J. C. Pardoe, Civil Engineer, Council Offices, Barry	do.
Extension of Electricity Works, Valley-road	Bradford Corporation	Mawson & Hudson, Architects, Exchange, Bradford	do.
Earthenware Pipe Sewers	Leamington Corporation	W. de Normanville, Borough Engineer, Town Hall, Leamington	do.
Timber Wharfing, Beeleigh Abbey, Essex	.....	F. Whitmore, Architect, Chelmsford	do.
Laundry Buildings and Chapel	Cowley (Oxon) Guardians	W. H. Castle, Surveyor, Town Hall, Oxford	do.
Six Houses, Craigiau, Wales	Mr. O. Hawkins	R. L. Evans, Architect, Windsor-place, Cardiff	do.
*Hot Water Supply and Heating	Croydon R.D.C.	R. M. Chart, Surveyor, Union Bank Chambers, Croydon	do.
Mill, Bingley	Sharp's Trustees	W. R. Nunns, Architect, Market-street, Bingley	Aug. 3
Congregational Church, Barry Dock, Glam.	.....	G. Thomas, Architect, Queen's Chambers, Cardiff	do.
Additions to Schools, Findochty, &c., Buckie, N.B.	Rathven School Board	J. Macdonald, 4, East Church-street, Buckie	do.
*New Vicarage House at Coalbrookdale, Shropshire	.....	Vicarage, Coalbrookdale	Aug. 4
Two Cottages, near Electricity Station	Bury St. Edmunds Town Council	J. C. Smith, Borough Surveyor, Town Hall	do.
High Chimney, Road-making, &c.	Radcliffe (Lancs.) U.D.C.	J. Sharples, Council Offices, Radcliffe	do.
Stoneware Pipe Sewers, St. Budeaux, Devonport	.....	J. F. Burns, Borough Surveyor, Devonport	do.
*Girls' School	Ashby-de-la-Zouch Grammar Sch.	Barrowcliff & Alloock, Architects, Loughborough	do.
*Sewers	Romford U.D.C.	See Advertisement	do.
*Sewerage Works	Blaby R.D.C.	J. B. Everard, Engineer, 6, Millstone-lane, Leicester	Aug. 6
Cottage	Armagh U.D.C.	J. C. Boyle, Armagh	do.
Sewerage Works, &c.	Tiverton R.D.C.	Cameron & Co., Civil Engineers, Bedford-circus, Exeter	do.
Cast-iron Mains and Laying, near Canterbury	Blean R.D.C.	H. T. Sidwell, Civil Engineer, Herne Street, near Canterbury	Aug. 7
Reservoir Embankment, West Baldwin Valley	Douglas Corporation	G. H. Hill & Sons, Engineers, 5, Victoria-street, S.W.	do.
*Making-up Boar's Head Yard	Brentford U.D.C.	N. Carr, Surveyor, Clifden House, Boston-road, Brentford	do.
*Water Supply	Isle of Wight R.D.C.	F. Newman & Cocks, Civil Engineers, Ryde	Aug. 8
100 Houses, Streets, &c., Blaydon-on-Tyne	N. E. Ry. Co.	W. Bell, Architect, Central Station, Newcastle-on-Tyne	do.
*Drainage Work	Islington Guardians	W. Smith, Architect, 65, Chancery-lane, W.C.	Aug. 9
Refuse Destructor	Royal Leamington Spa Corp.	W. de Normanville, Engineer, Town Hall, Leamington Spa	Aug. 11
House, &c., Aughebrach, Donemana, Ireland	Rev. J. M'Glinchey	E. J. Toye, Architect, Strand, Londonderry	do.
Telegraph Cable (8,272 miles) & laying in PacificOcean	H.M. Government, &c.	Clark, Forde, & Taylor, 4, Great Winchester-street, E.C.	Aug. 14
*Works at Cottage Homes and Schools	Isle of Thanet Guardians	See Advertisement	Aug. 15
Main Sewerage Works	Newport Pagnell R.D.C.	D. Balfour & Son, Civil Engineers, 1, Victoria-street, S.W.	Aug. 21
*Schools	Croydon School Board	See Advertisement	No date
School Buildings and Offices, Gislingham, near Eye	.....	H. B. Ellis, Gislingham	do.
Additions to the Cairn Hydro., Harrogate	.....	Bland & Bown, Architects, Harrogate	do.
Factory, York-place, Leeds	Messrs. D. Little & Co.	A. Neill, Architect, Leeds	do.
Shop and Storerooms, Bridge-street, Leeds	.....	H. B. Buckley, Architect, 85, Commercial-street, Batley	do.
Villa, Newtownbreda, Belfast	.....	J. J. M'Donnell, Architect, 27, Chichester-street, Belfast	do.
Hotel (The Fountains Abbey) and Stabling, Ripon	.....	A. A. Gibson, Architect, Yorkshire Bank Chambers, Harrogate	do.
Residence, Westcliffe-on-Sea	Mr. R. Chadwick	Greenhalgh & Brockbank, Architects, Southend-on-Sea	do.
Additions to Warehouse, Saville-street, Leeds	Messrs. R. S. Brownhill & Sons, Ltd.	G. F. Danby, Architect, 10, Park-row, Leeds	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Hendon U.D.C.	4*l.* 4s. per week	July 30
*Clerk of Works	Taunton Corporation	3*l.* 3s. per week	Aug. 4
*Architectural and Engineering Assistant	York Corporation	150*l.* per annum	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* —. *Contracts, pp.* iv. vi. viii. x. & xx. *Public Appointments, pp.* xviii. & xx.

MARLBOROUGH-STREET SCHOOL (Blackfriars). Repairing furniture :—

London School Furniture Co.	£148 10	H. Bouneau	£132 10
Hammer & Co., Ltd.	134 0	T. Cruwys	129 0

MONSON-ROAD SCHOOL (Hatcham) and HOLDEN-STREET SCHOOL (Battersea).—Repairs to furniture :—

(i.) *Greenwich—Monson-road* (altering desks, &c.) :—

T. Cruwys	£24 6	London School Furniture Co.†	£20 5
H. Bouneau	22 19		
Hammer & Co., Ltd.	22 0		

(ii.) *West Lambeth—Holden-street* :—

London School Furniture Co.	£17 2	H. Bouneau	£16 16
		T. Cruwys†	16 10

MIDWAY-PLACE SCHOOL (Rotherhithe).—Additional heating surface :—

Harlow & Sons	£247 17	Wippell Bros. & Row†	£185 0
Cannon & Sons	243 0		

MONTEITH-ROAD SCHOOL (Old Ford-road).—For new boiler, &c. :—

Williams & Sons, Ltd.	£375	J. & F. May	£310
Paragon Heating Co.	359	J. Grundy	297
Wippell Bros. & Row	355	Duffield & Sons	260
Oldroyd & Co., Ltd.	332	G. & E. Bradley†	259

PRIORY-GROVE SCHOOL (South Lambeth).—Reconstructing boiler flue :—

H. & G. Mallett	£143 0	Rockhill Bros.	£128 10
Maxwell Bros., Ltd.	130 0	Rice & Son	126 0
B. E. Nightingale	130 0	J. Garrett & Son*	124 0

NEW-ROAD SCHOOL (Wandsworth).—Partitions, &c. :—

H. & G. Mallett	£459	Lathey Bros.	£398
Rice & Son	440	R. S. Ronald	383
W. Hammond	439	E. B. Tucker*	354
Maxwell Bros., Ltd.	439		

NORTHEY-STREET SCHOOL (Limehouse).—Boiler and additional heating works :—

Stevens & Sons	£115 0	Wenham & Waters, Ltd.	£94 0
Knight & Sons	106 0	Palowkar & Sons	91 10
Wontner-Smith, Gray, & Co.	102 0	G. Davis	75 0
		Morris & Co.†	74 10

[*See also next page.*

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RUNNING CONTRACT FOR THE SUPPLY OF TIMBER FOR MANUAL TRAINING CENTRES.

Description and Sizes.		Farquharson, Bros., & Co.	W. & J. R. Hunter.	J. Latham, Limited.†	London School Furniture Company.	W. Mallinson & Co.
Silver birch (from 3 in. to 4 in. wide)—		s. d.	s. d.	s. d.	s. d.	s. d.
2 in.	per ft. super.	..	..	0 10	1 0	0 10
1½ in.	,,	..	..	0 7½	0 9	0 7½
1 in.	,,	..	..	0 5	0 6	0 5½
¾ in.	,,	..	..	0 4½	0 5½	0 4½
½ in.	,,	..	..	0 3	0 5	0 3½
¼ in.	,,	..	..	0 2½	0 4½	0 3½
Mahogany, Honduras (not less than 8 in. wide)—						
¾ in.	per ft. super.	0 3½	0 3½	0 3	0 4½	0 6
¼ in.	,,	0 2½	0 2¼	0 2¼	0 3¼	0 4

PROSPECT-TERRACE SCHOOL (Gray's Inn-road).—Overhauling heating apparatus, &c. :—

Kite & Co.	£450	G. & E. Bradley	£225
Morris & Co.	382	J. Esson	205
J. Grundy	379	Cannon & Sons	189
Brightside Foundry and Engineering Co., Ltd.	290	Duffield & Sons†	130

ROMAN-ROAD SCHOOL (Bow).—Alterations to heating apparatus :—

Cannon & Sons	£72 0 0	Wenham & Waters, Limited	£49 0 0
Morris & Co.	65 0 0	Palowkar & Sons	42 16 6
G. Davis	65 0 0	W. Simmons†	37 11 0

RUNNING CONTRACT FOR CLOTHES HORSES :—

W. Summerscales & Sons, Ltd.	each £1 0 0		
Bradford & Co.	,, 0 13 0		
H. Duvall †	,, 0 10 6		
Thomas & Taylor, Ltd.†	,, 0 10 6		

RUNNING CONTRACT FOR NEW PATTERN DRAWING DESKS :—

	Each.		Each.
J. H. Martin	£3 12 0	Hammer & Co. Ltd.	£1 18 6
Spencer & Co.	3 3 0	H. Bouneaut	1 15 0
Bennet Furnishing Co.	2 14 0	London School Furniture Co.†	1 15 0
T. Cruwys	1 19 0		

RUNNING CONTRACT FOR LARGE COAL HAMMERS :—

R. H. & J. Pearson, Ltd., per doz.	£1 16 6
Lockerbie & Wilkinson, Ltd., per doz.†	1 10 6

RUNNING CONTRACT FOR TIMBER FOR REPAIRS TO FURNITURE :—

	London School Furniture Co.	S. Putney.†
3 in. by 2 in. yellow deal, at per 100 ft. run	£0 18 9	£0 16 8
3 in. by 2½ in. yellow deal, at per 100 ft. run	0 16 6	0 10 5
1 in. by 1 in. yellow deal, per square of 100 ft. super	1 0 0	0 15 9
9 in. by 2½ in. plain yellow deal, at 100 ft. run	1 10 0	1 1 0
11 in. by 1¼ in. plain pitch pine, at per 100 ft. run	1 5 0	0 16 8

PLASSY-ROAD SCHOOL, CATFORD.—Enlargement. The Board of Education have sanctioned the enlargement of the Plassy-road School, Catford, by 400 places. The plans of an enlargement by 340 places (viz., boys', 116; girls', 116; and infants', 88), which were passed by the Committee on May 14 last, include also the following other works proposed to be carried out at the same time:—Providing two new classrooms, sixty and fifty-six, and new cloakrooms for all departments; additional lavatory basins for girls' and infants' departments; also girls' and infants' teachers' water-closets inside building; additional water-closets for boys' and girls', and new infants' entrance and exit. (The accommodation of classroom C in infants' department will be reduced from seventy-eight to fifty-eight places in consequence of forming a new exit for infants'.) Also removing portion of existing boundary-wall towards Plassy-road, providing iron railing, and altering and repairing outside steps to girls' northern entrance :—

White & Co.	£5,095	Lorden & Son	£4,666
Kirk & Randall	4,995	Garrett & Son	4,618
Wallis & Sons	4,983	J. Appleby	4,590
Johnson & Co., Ltd.	4,939	J. & C. Bowyer	4,396
Edwards & Medway	4,886	Bulled & Co.	4,066
J. Marsland	4,789	Mitchell & Son†	3,870
Smith & Sons, Ltd.	4,675		

PORTOBELLO-ROAD SCHOOL, NORTH KENSINGTON.—Halls and other improvements :—*Boys' and Girls' Department.*—(i.) Providing new hall to each department. (ii.) Providing new entrances and new lavatory. (iii.) Extending one classroom in the boys' department. *Infants' Department.*—(i.) Adapting the existing classrooms to form hall, and building two new classrooms for sixty each. (ii.) Rebuilding cloakrooms and lavatories. (iii.) Providing new entrance and corridor. The revised accommodation, on the completion of the improvements, will be for boys', 366 (unaltered); girls', 371 (gain of 12); infants', 384 (loss of 14); total, 1,121, being a loss of two places in the total accommodation of the school. The accommodation of the old rooms, the planning of which will be altered, will now be calculated on the seat basis :—

Perrett & Son	£5,010	Martin, Wells, & Co.	£4,192
Leslie & Co., Ltd.	4,653	Miskin & Sons	4,056
Lawrance & Sons	4,350	Stimpson & Co.	4,040
Treasure & Son*	4,192	McCormick & Sons†	3,697

SANTLEY-STREET SITE (Ferndale-road, Brixton.—New School.—The school is a three-story building, and contains the following accommodation :—Boys, 55 ft. 1½ in. by 32 ft.; girls', 54 ft. 4½ in. by 31 ft. 7½ in.; infants', 54 ft. 4½ in. by 31 ft. 3 in. Classrooms—Boys' and girls' departments, each 56, 56, 56, 48, 48, 40; infants', 56, 56, 56, 50, 48, 40; special school for 40 children. Drawing class-room, 1,090 ft. area. Heating by low-pressure hot-water apparatus. Area of site, 52,590 sq. ft. Playgrounds (area per child)—Boys', 66 sq. ft.; girls' and infants', 33 sq. ft. An existing house to be retained on the site for the use of the schoolkeeper :—

		If walls of class-rooms and halls be plastered add
T. L. Green	£24,918 0 0	+ £384 0 0
F. & F. H. Higgs	23,436 0 0	+ 253 0 0
W. Downs	23,063 0 0	+ 250 0 0
W. Johnson & Co., Ltd.	22,640 0 0	+ 255 0 0
E. Lawrance & Sons	22,515 0 0	+ 235 0 0
J. Garrett & Son	22,508 18 6	+ 244 17 3
C. Cox	22,050 0 0	+ 266 0 0
G. E. Wallis & Sons	21,990 0 0	+ 218 5 0
Holliday & Greenwood†	21,866 0 0	+ 275 0 0

"SHAFTESBURY" TRAINING SHIP.—Heating apparatus in drying-rooms :—

Wontner-Smith, Gray, & Co.	£195	G. & E. Bradley	£145
J. Esson	176	Strode & Co.	113
Defries & Sons, Ltd.	150	Duffield & Sons†	83

SOUTHAMPTON-STREET SCHOOL (Camberwell).—Heating works :—

Kite & Co.	£80 0 0	Morris & Co.	£31 10 0
G. & E. Bradley	43 10 0	Wenham & Waters, Limited†	31 0 0
W. Simmons	43 8 6		
Knight & Sons	37 0 0		

STAR-LANE SCHOOL (West Kensington).—New pattern gallery and partition :—

General Builders, Limited	£247 0	London School Furniture Co.	£199 4
Lathey Bros.	213 0	W. Hammond*	198 0

SUPPLY OF BENTWOOD STOOLS FOR USE WITH DRAWING DESKS :—

	Each. s. d.		Each. s. d.
Shoolbred & Co.	2 11½	Phillips & Co. (B pattern)†	2 11
Thonet Bros.	2 11	Phillips & Co. (A pattern)	2 7

SURREY-LANE HIGHER GRADE SCHOOL, BATTERSEA.—Sanitary and drainage works :—

Wells & Co.	£1,809 0 7	H. & G. Mallett	£1,440 0 0
Falkner & Son	1,699 0 0	G. Kemp	1,400 0 0
W. Hammond	1,691 0 0	J. & C. Bowyer	1,396 0 0
G. Parker	1,655 0 0	Edwards & Medway	1,367 0 0
J. Carmichael	1,527 0 0	Rice & Son	1,362 0 0
Johnson & Co., Ltd.	1,486 0 0	Maxwell Bros., Ltd.†	1,346 0 0
Akers & Co.	1,481 0 0		
Lathey Bros.	1,449 0 0		

TIDEY-STREET TRANSFERRED SCHOOL, BROMLEY-BY-BOW.—Alterations and repairs :—

A. E. Symes	£1,195 0	G. Barker	£973 15
Gibb & Co.	1,100 0	T. H. Jackson	927 0
J. T. Robey	995 0	Elkington & Sons†	662 14

TRUNDLEY'S-ROAD SCHOOL (Deptford Lower-road).—Additional heating surface :—

Cannon & Sons	£239	Strode & Co.	£147
Kite & Co.	230	Lewis Hill†	139
Seward & Co.	184		

VICTORIA SCHOOL, STARCH GREEN.—Additional heating works :—

J. Gray	£109 0 0	Morris & Co.	£71 0 0
Wontner-Smith, Gray, & Co.	85 15 0	G. Davis	65 0 0
W. Simmons	72 13 1	Duffield & Sons†	62 18 0

WALTON-STREET TEMPORARY TRANSFERRED SCHOOL (Chelsea).—Cloak-rooms, Sanitary Works, &c.—Providing new outside cloak-rooms for all departments, lavatory basins for boys' and girls', stone staircase for boys', kindergarten gallery, partitions, &c., and also providing new outside water-closets, together with sundry other works in connexion therewith :—

J. Neal	£2,175	John Garrett & Son	£2,043
Rice & Son	2,123	F. G. Minter	1,999
Maxwell Bros., Ltd.	2,095	T. Hooper & Son*	1,736

WEST-SQUARE HIGHER GRADE SCHOOL (Southwark).—Additional heating surface :—

Jones & Attwood	£370	Duffield & Son	£290
Dargue, Griffiths, & Co., Ltd.	369	Defries & Sons, Ltd.	269
Cannon & Sons	299	Wenham & Waters, Ltd.†	210

WILLIAM-STREET SCHOOL, HAMMERSMITH.—Adapting school-keepers' old house for housewifery, providing partitions, &c. :—

W. R. & A. Hide	£850 0 0	W. Hammond	£692 0 0
Rice & Sons	782 0 0	S. Polden	458 0 0
Williams & Sons	770 0 0	Bristow & Eatwell*	303 7 6

WOOLMORE-STREET SCHOOL, POPLAR.—For adapting house for schoolkeeper; enclosing, &c., additional land and other works :—

Johnson & Co., 25 per cent. on schedule.		G. Barker	£1,065
Gibb & Co.	£1,175	Stevens Bros.	1,038
T. H. Jackson	1,139	Barrett & Power	998
Elkington & Sons	1,069	J. T. Robey†	988

WORNINGTON-ROAD SCHOOL, PORTOBELLO-ROAD.—Reconstructing boiler flue :—

E. B. Tucker	£497	Marchant & Hirst	£165 0
W. Hammond	185	Rockhill Bros.†	89 10
W. R. & A. Hide	175		

CLEANING AND PAINTING.

The work at the following schools will be done during the summer holidays—July 26 to August 25, 1900. Where exterior as well as interior work has to be done, an additional week will be allowed for the former.

BAILEY'S-LANE.—Painting interior and exterior (all buildings on site, including the iron buildings) :—

F. Bull	£577 0 0	Collis Wilmott	£369 5 6
G. Barker	398 10 0	Grover & Son	354 0 0
Silk & Son	377 0 0	J. Kybett*	324 0 0

BATH-STREET.—Painting interior (boys', girls', and infants'), and interior and exterior (special school) :—

T. Cruwys	£670	Johnson & Co.*	£485
G. Barker	485		

BARRETT-STREET.—Painting exterior :—

T. Cruwys	£217 0 0	F. T. Chinchen	£129 13 9
F. Chidley	170 0 0	W. Brown*	127 0 0
R. S. Buckeridge	169 0 0	W. Chappell	113 10 0

BATTERSEA PUPIL TEACHERS' CENTRE.—Cleaning interior :—

E. Flood	£177 10	Maxwell Bros., Ltd*	£119 0
J. & C. Bowyer	121 0	C. Gurling	95 0

BERGER-ROAD.—Painting interior and exterior :—

Silk & Son	£650 0	J. Kybett	£463 0
Marchant & Hirst	517 0	Elkington & Sons*	311 5
G. Wales	492 0		

"BOW CREEK."—Painting interior and exterior :—

Gibb & Co.	£273 0	J. Kybett	£169 0
T. H. Jackson	203 10	S. H. Corfield*	148 0
J. T. Robey	190 0	J. Haydon	131 18

BUCK'S-ROW.—Painting exterior :—

Johnson & Co.	145 0	S. H. Corfield	£125 0
A. W. Derby	136 0	J. Kybett	108 0
J. F. Holliday	130 0	Stevens Bros.*	98 10

CAPLAND-STREET.—Painting interior :—

F. T. Chinchen	£143 10	W. Chappell	£349 0
Marchant & Hirst	414 0	Densham & Sons	337 0
T. Cruwys	399 0	W. Brown*	309 8
W. Hornett	384 0	Bristow & Eatwell	305 0

COBOURG-ROAD.—Painting interior (old portion and interior and exterior (new portion) :—

Rice & Son	£792	H. J. Williams	£561
E. B. Tucker	700	B. E. Nightingale	557
H. Line	643	G. Brittain*	464
Martin, Wells, & Co.	573		

COTTENHAM-ROAD.—Painting interior (old and new portions) :—

C. & W. Hunnings	£810 4 2	Stevens Bros.	£418 0 0
T. Cruwys	456 0 0	Marchant & Hirst	389 0 0
G. L. Kirby	445 0 0	J. W. Dixon*	325 0 0

DEAL-STREET.—Painting interior and exterior :—

J. Haydon	£518 10	Stevens Bros.*	£448 0
S. H. Corfield	504 0	G. Barker	380 0
T. Cruwys	496 0	Johnson & Co.	340 0
J. Kybett	456 0		

ECCLESBOURNE-ROAD.—Painting interior and exterior (all buildings) :—

E. Lawrance & Sons	£783	Stevens Bros.	£576
J. Kybett	682	G. Barker*	520
Marchant & Hirst	669		

[See also next page.

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ESSEX-STREET.—Cleaning interior (boys' and girls') and painting interior (infants' and pupil teachers' schools):—

A. E. Symes	£553 0	G. Barker	£345 0
A. W. Derby	385 0	J. Kybett	319 0
Heard & Co.	378 0	J. Haydon	314 12
J. F. Holliday	347 10	Elkington & Sons*	293 15

"HIGHWAY." — Painting interior (old and new portions):—

J. Kybett	£479	A. W. Derby	£420
S. H. Corfield	460	J. F. Holliday*	415
J. T. Robey	447	G. Barker	379

HORSEFERRY-ROAD.—Painting exterior:—

Martin, Wells, & Co.	£200 0 0	Holliday & Greenwood	£140 0 0
J. F. Ford	172 0 0	E. B. Tucker	129 13 6
B. E. Nightingale	160 0 0	Lathey Bros.*	107 0 0

HUGH MYDDELTON (Junior school).—Painting:—

G. Barker	£125	Johnson & Co.	113
J. Kybett	125	Stevens Bros.*	107

"HUGH MYDDELTON."—Cleaning interior of school and painting interior of deaf centre:—

J. Kybett	£564	Johnson & Co.	£435
Stevens Bros.	535	G. Barker*	388

HUNGERFORD-ROAD.—Painting interior and exterior:—

T. Cruwys	£607	Marchant & Hirst	£519
Stevens Bros.	566	J. W. Dixon*	505

KILBURN-LANE.—Painting interior:—

G. Neal	£710 0	W. Hammond	£490 0
Lathey Bros.	649 0	F. T. Chinchen	448 0
T. Cruwys	623 0	F. Chidley*	324 18

LEWISHAM BRIDGE.—Painting exterior:—

W. Hayter & Son	£295 0	W. Banks	£198 10
W. J. Howie	226 0	S. Musgrove*	158 0
A. Black & Son	200 0		

MAWBEY-ROAD.—Painting interior (enlargement):—

Johnson & Co.	£285 0 0	H. Line	£198 0 0
W. Banks	203 12 6	H. J. Williams*	178 0 0

MERTON-ROAD.—Painting exterior and cleaning interior:—

R. S. Ronald	£380 0	E. Triggs	£259 0
Lorden & Son	311 15	Maxwell Bros., Ltd.*	247 0
Johnson & Co., Ltd.	265 0		

MONTEM-STREET.—Painting interior (old and new portions):—

C. & W. Hummings	£1,040 15 6	W. H. Stephens	£568 0 0
Marchant & Hirst	590 0 0	G. L. Kirby	552 0 0
		Stevens Bros.	508 0 0
		J. W. Dixon*	380 0 0

RENDLESHAM-ROAD.—Painting exterior (all departments), cleaning interior (boys', girls', and infants'), and painting interior (junior mixed):—

F. Bull	£596	G. Barker	£422
J. T. Robey	501	Stevens Bros.	418
J. Kybett	449	Barrett & Power*	365
Silk & Son	424		

ROTHERHITHE NEW-ROAD. — Cleaning interior:—

A. White & Co.	£261 0 0	H. Line	£210 0 0
W. Banks	254 10 0	J. Garrett & Son*	183 0 0
E. B. Tucker	238 0 0		
Johnson & Co.	227 0 0		

SANDFORD-ROW.—Painting exterior and cleaning interior:—

H. J. Williams	£485	Rice & Son	£411
G. Brittain	476	Garrett & Son	397
E. Triggs	422	H. Line	375
W. V. Goad	416	B. E. Nightingale*	348

ST. ANDREWS STREET.—Painting interior:—

W. V. Goad	£640	E. Triggs	£464
Rice & Son	628	Holloway Bros.*	425
Lathey Bros.	473		

ST. JOHN'S-ROAD.—Painting interior (old school):—

Grover & Son	£632	Lawrance & Sons	£533
McCormick & Sons	545	G. Barker*	368

THOMAS-STREET.—Painting interior (boys', girls', and infants'):—

Gibb & Co.	£654	A. W. Derby	£610
T. H. Jackson	637	J. T. Robey	590
S. H. Corfield	629	J. F. Holliday	550
G. Barker	621	J. Kybett*	482

TOTTENHAM-ROAD.—Painting:—

A. W. Derby	£880 0 0	S. H. Corfield	£576 0 0
Unsigned	650 0 0	Gibb & Co.	566 0 0
Grover & Son	628 0 0	C. Willmott	556 0 0
G. Kirby	582 0 0	W. Hornett*	435 19 0

WESTMINSTER BRIDGE-ROAD. — Painting interior and exterior (all buildings):—

R. S. Ronald	£845 2	G. Kemp	£497 0
B. E. Nightingale	590 0	Johnson & Co.*	424 0
H. J. Williams	548 0		

WESTVILLE-ROAD.—Painting interior:—

Marchant & Hirst	£579 0	W. Hammond	£420 0
S. Polden	530 0	F. T. Chinchen	415 0
E. Flood	496 0	W. R. & A. Hide*	397 10

UPPER KENNINGTON-LANE. — Painting interior:—

Bulled & Co.	+ 25 on schedule	J. F. Ford	£433
W. Smith	£484	Rice & Son	397
Holloway Bros.	452	G. Brittain	396
		H. & G. Mallett*	336

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VOL. LXXIX., No. 3000. AUGUST 4, 1900.

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Dwellings for the Poor.

THE housing of the poorer classes, though a most important subject, is not a very picturesque or attractive one, on which account the Sanitary Institute are the more to be credited with their success in arranging a two days' Conference on the subject, and getting together two such large and lively meetings as those which occupied the large Lecture Room of the Royal Medical Society on Monday and Tuesday mornings. There was the usual proportion, no doubt, of speakers who insist on introducing alien topics and totally fail to understand why they are out of order, and of those who (unlike Falstaff) while not witty themselves are the cause of wit in others, such as the "labour member" who brought down the house by the surprising statement, delivered in the best tragic tones, that there were in London "sixty thousand families living in one room." But in the main the meetings were serious in interest and logical in method, the more so owing to the excellent chairmanship of Mr. Beachcroft on the first day and Dr. Wynter Blyth on the second day. And though a conference of this kind never produces any definite and immediate practical result, it serves to clear people's minds on the subject under consideration, and to suggest new methods of dealing with it.

The two days were nominally devoted to two distinct questions: "Insanitary Areas and Displacement of Town Populations" on the first day, "Improved Homes for Town Dwellers" on the second day; in other words, how to get rid of the slum houses first, and what to put in their place afterwards. The division was not entirely adhered to, for Mr. Douglass Mathews's excellent and practical paper read on the first day (to which we will refer again) ought logically to have come into the second day's subject. The latter is of the more direct interest to us, as concerning the actual practical means of building healthy dwellings at a cheap rate, and the best way of planning and arranging them; the subject of dealing with unhealthy areas is much more vague and much more mixed up with political and moral considerations.

Mr. Beachcroft summed up the subject very well in his opening address on Monday, showing that the two great difficulties in connexion with unhealthy areas were, who is to pay for the clearing of them, and what is to be donewith the dishoused. As to the first question, there can be no doubt that the clearance of insanitary areas and the dedication of the land to working-class dwellings is essentially an act of philanthropy at the cost of the ratepayers, whose position practically is that they find the funds without having the credit which attaches to spontaneous charity. Against this there is, of course, to be set the fact that insanitary areas are a danger to the community, and their clearance is a general gain; but we should certainly like to see a little more of the burden fall on the landlords who have allowed them to become insanitary. Mr. Beachcroft hinted that some little progress had been made in this direction. The late Board of Works displaced tenants at a cost of 59*l.* per head; the County Council under the Housing Act carried out the same operation at £50 a head, the difference being attributable to the special compensation provisions of the Housing Act of 1890, under which Mr. Beachcroft maintains that it is now anything but profitable to own slum property required under the Housing Act. Deductions from compensation are made, we know, in respect of enhanced value obtained by overcrowding, in respect of bad state of repair, and in respect of the property not being reasonably capable of being made fit for habitation; but we doubt whether, in the wholesome English opposition to anything like confiscation, these deductions are pressed as they might be, and whether the legalised spoliation of these Egyptians, with a righteous object, might not be carried further than it is. Some persons deserve to be confiscated. Mr. Blashill, in his short speech after the conclusion of the Chairman's address, proposed a more drastic remedy—that the Freeholders of the insanitary areas should be compelled to form themselves into a syndicate for the improvement of the property. Mr. Blashill's scheme is described more at length in the report of his paper at the Southampton Sanitary Institute Congress last year, to the account of which we had better refer the reader; it will be found in our issue of September 9, 1899 (page 238). He contemplates apparently a re-entry of the Freeholders, who are to be "directed to form a Trust for the improvement of the property," and acquire all leasehold interests at their fair value under the circumstances. The inhabitants would enjoy fixity of tenure until the local authority could get them settled elsewhere, and when they had eventually all been removed, the Trust "would demolish the houses, widen the streets, and make the property marketable *without any restriction as to its purpose*." It is a pity that Mr. Blashill did not repeat his scheme more in detail on the present occasion, as it might then have been taken up and considered by other speakers, who in fact seemed to evade further reference to it, probably because, in the brief way it was put, it was not altogether intelligible. The words which we have italicised in the above quotation from our report of the Southampton Congress suggest a very large economic question, which was referred to, in passing, by another speaker at the second day's meeting—whether the clearing of an insanitary area is necessarily involved with the erection of working-class dwellings on its site, and whether part of the financial difficulty in connexion with the subject does not arise from this very superstition, as it may be called. Mr. Beachcroft drew attention, in his paper, to the fact that while the sites on which the dwellings of the London County Council had been built stood in their books at a total value of 90,000*l.*, their real commercial value was estimated at 230,000*l.* The difference is the price the ratepayers have to pay for the applica-

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tion of the land to that special purpose of working-class dwellings. Of course the idea originates with the provision that the body who clear the site are bound to find housing for the same class and (approximately) for the same number of that class whom they dis-house. But the testimony is unanimous among those who have been concerned in the erection of working-class dwellings on cleared sites, that only a very small proportion of the people who once lived on the area come back to it; and in fact it is very rarely that even the same class of people come to reside in the new buildings. The effort to improve the occasion and to put better dwellings on the site leads to the production of buildings which cannot be let at the rents which the dis-housed tenants of the "insanitary area" used to pay. Consequently, a new race of a higher class come into the area, and the old tenants drop into other slums at the rents they can afford. The number of dis-housed may be provided for in the new buildings, but the same people are not there, nor even the same class of people. Why not, then, let the cleared area at its market value, without restriction as to class of building, and provide for the dis-housed in a cheaper manner, and at once, elsewhere? Mr. Blashill's theory seems to point towards this conclusion.

Before quitting this portion of the subject, we may advert to one important point which was suggested, *en passant*, at the second day's meeting by Mr. C. J. Hair, who observed how often we saw an area cleared, and then, after it had lain waste for a year or two while the authorities were considering what to do with it, eventually after another year or two plans would be completed and building commenced. In the meantime, the original inhabitants, supposed to be provided with homes by the rebuilding, had drifted out of sight and memory. Why not, he said, make the plans *before* the clearance of the site, instead of after?

We presume that the duplicate arrangement of subjects for discussion at the second day's meeting—"Improved Houses for Town Dwellers" and "Improved Means of Communication," may be taken as indicating that the promoters of the meeting considered the question of communication with suburban sites as intimately bound up with that of cheap housing. Sir Sydney Waterlow, who was the appointed chairman for the day (though he had to leave early), in his opening address expressed great doubt whether working-class houses at a considerable distance from the centre of London would prove any real solution of the problem. He maintained that they would cost as much as in a central position (which we very much question); that living expenses would be higher in a suburban district, which may be true; and that the daily journey in railway or tram-car was a most serious waste of the working-man's time and strength, which is certainly true. A balance has to be struck, however, and we are not convinced that suburban dwellings must be a failure. Sir Sydney Waterlow's address, to say truth, was a little too much taken up with showing that his Company's dwellings were the most financially successful that had been erected; and his moral was that private enterprise could better grapple with the problem than official effort. We are ready to accept this conclusion without necessarily accepting the premiss. It is quite certain that the London County Council, so far, have not met the problem. They have erected at Bethnal Green, they are erecting at Millbank, a very fine series of blocks of dwellings; those at Millbank especially are in an architectural sense most satisfactory in point of taste and style and in the laying out of the site; but neither of these really provide homes for the very poor; they have been costly to erect, and the rentals are only suited to a higher grade of working-class than those whose needs constitute the real difficulty. The Boundary-street estate at Bethnal Green is a very fine improvement scheme, which has given dignity to a formerly squalid quarter, and we cannot but look with pleasure on such a transformation as it has effected; but it has not provided dwellings for the inhabitants of the squalid quarter; it has merely created a new neighbourhood and drawn a new population there. Sir Sydney Waterlow states that his Company's buildings have been a financial success, that his shareholders have always had a dividend of 5 per cent., and that they have always aimed at providing for the class who earn from 25s. to 2*l.* per week (this however is hardly the poorest class). Mr. Bond, the chairman of the East-end Industrial Dwellings Company, stated that their company had aimed at providing for the class who earned from 15s. to 22s. per week, which is much nearer the real problem, and that they had been able to do this at a profit. The general conclusion is that private enterprise has met the matter much better than the London County Council has met it, because the Council, though they are carrying out some fine building schemes, are doing so in an expensive manner (we hear of 8d., 9d., and even 10d. per cubic foot as the average cost of their buildings), and are not really providing homes for the poorest class, but for a class above these. And as to the cost of their buildings, it really seems as if the very fact that a scheme is to be carried out by an official authority at once sends everything up—price of land, price of materials, cost of labour; besides what is shrewdly hinted, that the best effort of the labourer is not secured by the official builder nearly so efficiently as by an independent contractor.

In connexion with this side of the question attention should be given to the statements furnished by Alderman Thompson, of Richmond (who made an admirable speech at the second day's meeting), in regard to the cost of the cottage houses at Richmond. These cottages have been built at 42*l.* per room, whereas the block dwellings in London now average between 75*l.* and 80*l.* per room; and the plans of these cottages, exhibited at the Parkes Museum, seem very satisfactory. That is a point in favour of the suburban system, though we must add that we do not in the least wish to minimise the serious drawback of distance from the centre of work. It may be added that Alderman Thompson stated that they could let these Richmond cottages profitably at a rate of from 1s. 3d. to 1s. 9d. per room, while the East End Industrial Dwellings Company, Mr. Bond admitted, cannot let at less than 3s. 6d. a room. On the other hand, in considering cottage *versus* block building, we must not omit to notice that the L. C. C. Brook-street cottages cost 87*l.* per room, as against 42*l.* per room of the Richmond cottages. We have not seen the Brook-street cottages; it would be instructive to know where this vast difference in cost is produced.

The possible disadvantages, in a sanitary sense, of large blocks of many-storied dwellings, about which some medical authorities have spoken strongly of late, should not be overlooked; but at the same time it must be recognised that the death-rates in some of these buildings seem to furnish a most satisfactory answer to the criticisms which have recently been made on them in this respect. They are of course less homelike and less private than smaller houses, but for town dwellings it may be admitted that their advantages overbalance their disadvantages.

In connexion with Mr. Douglass Mathews's paper at the first day's meeting, we examined with care his plan for dwellings for the very poor, among those exhibited at the Sanitary Institute. It looks as if it would work out very well in practice. He takes what is practically one square room between the walls; takes off it by a partition a parents, sleeping-room, and divides off by low partitions one or two children's cubicles, as may be required in consideration of the age and sex of the children. A water-closet is provided in a small annex, apparently one for each dwelling being contemplated. It is most important that a separate closet should be provided for each tenement, even for the poorest; both comfort and morality are concerned in this question; and where there is joint use of a closet it is impossible to fix the responsibility for keeping it clean. We regard all the schemes which involve the use of a closet jointly between two tenements as so far defective.

In visiting some examples of working-class dwellings on Monday afternoon—two on the Grosvenor estate, and the Millbank and Bethnal Green L.C.C. buildings, all the visitors must have been struck with the amount of the rents stated, considering that they were nominally dwellings for the poor. None of them really come under that heading. Some points in connexion with them may be noted here. At the first of the Grosvenor Estate buildings visited the tenements consisted of from three to five rooms at an average rent of 2s. 8½d. per room, and giving a return of 4 per cent.; so that this building may be considered a financial success, although it does not provide certainly for the really poor. A comparison between this and the block called Ebury-buildings (a rather older structure) suggests the question whether we have been altogether right in discarding the external balcony system in block dwellings. It is at variance with privacy no doubt, but on the other hand it gives a much more cheerful appearance to the buildings, especially when, as in some places, plants were trained over the railings. We must say that we were astonished to find, in these blocks, and in some of the Boundary-street houses, the water-closet approached through the scullery, with a door opening between one and the other. Such an arrangement is anything but a "model dwelling" one. At the Millbank estate the houses have been admirably treated architecturally; variety and character are cleverly obtained by mere treatment of the wall planes — a portion of the end wall of a block built at an obtuse angle for instance, with the centre

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angle corbelled out, and other such inexpensive but effective means of varying the buildings are employed. The Luton bricks, employed as facing-bricks for the ground story, look very well, and their dull brownish tint contrasts effectively with the red facing-bricks of the upper portion. The interior passages and stairs are lined with glazed bricks, and the whole internal finish is excellent. But these are expensive buildings, and have cost 90*l.* per room. In regard to the Boundary-street estate, we have before criticised the laying out of the streets in radiating lines, though we admit that the view given everywhere up to the central open space and its greenery is an advantage. The buildings here are effectively treated, in a different manner from those at Millbank, and perhaps look in some places a little too pretentious and un-domestic, but they are not commonplace. Some trees in the paved courts would be a desirable addition, which can perhaps be supplied in time. The most unsatisfactory feature is the baths, which are grouped, and for the use of which a small charge is made—not a method calculated to promote cleanliness; and the baths themselves, with their unpolished wood tops, are not sanitary for this kind of promiscuous use.

Among the plans exhibited at the Parkes Museum there are some good and some curious things to be seen. There are Mr. Towers's artisans' dwellings at Leeds, on the back-to-back system, which was absurdly defended at the meeting by one delegate from Leeds, on the ground that it was at night that you mostly wanted ventilation, and that at night, with windows closed and curtains drawn, an ordinary house was no more ventilated than a back-to-back house. This is absolute nonsense; a brick and plastered wall is far more impermeable than any window shutters and curtains. The Borough Engineer of Glasgow created rather a sensation at the meeting by his statement that he had built large blocks of tenements at Glasgow at 6d. and even 5d. per cubic foot; but his credit for this is rather discounted when we come to look at his plans, one of which actually shows, in every alternate house, a central unlighted and unventilated water-closet. It seems almost incredible that such a plan should be hanging up at the Parkes Museum of Hygiene. To place a large ornamental (?) dust-receptacle, too, in the centre of the courtyard, where it would be a play-place for the children, and where it probably would only be emptied at comparatively long intervals, shows a lamentable want of judgment. Among plans which are worth attention (besides those already mentioned) are those by Mr. Macartney for the Duchess Trust, with the tenements grouped in connexion with an entrance lobby to each four tenements and a water-closet to each two—this of course is, as above remarked, unsatisfactory, but the plan generally is well arranged. We may mention also Mr. Cutler's labourers' cottages, which are sanitary in planning and pleasing in style; Mr. de Courcy Meade's plain two-storied working-men's cottages (Manchester); Mr. H. H. Collins's "Canonbury" dwellings; one of Messrs. Spalding & Spalding's plans, with an arrangement of a kind of extended balcony or open area on each story, out of which the water-closet opens, and Messrs. Cranfield and Potter's plans, elevation, and bird's-eye view of a collection of structures. These are not executed, and appear to be a portion of the illustrations to a book on the subject which they have lately brought out.* This contains some good suggestions and some useful data and statistics; the plans are nearly all good; the elevations represent an attempt to give a certain picturesqueness in an economical way, which is well intended, but we do not think that any real good is done or any corresponding effect obtained by these projections and lean-to roofs; they add to cost and produce an effect of unrest and want of solidity; if a building has to be cheap it is better that it should look as simple as possible. The authors deserve credit for their arrangement of the bath with lifting cover, sunk in the scullery floor; a contrivance which might well be generally adopted in houses of this class.

In conclusion, we wish to draw special attention to the short paper by Mr. Boulnois, communicated though not read at the meeting, and which will be found in our report on another page. Mr. Boulnois hits the nail on the head when he says that "a great many people approach the problem from their own standpoint, and not from the standpoint of those they are anxious to serve," and produce buildings which please their own tastes but which are beyond the reach and the requirements of the poorest class. So long as this is done the problem will remain unsolved. The whole evidence on this occasion, from the speeches and the nature of the buildings visited, goes to confirm his view; and if this conclusion can be established and accepted it will be the best and most practical result of the Conference.

* "Houses for the Working Classes in Urban Districts." By Sydney White Cranfield and Henry Ingle Potter. London: B. T. Batsford; 1900.

NOTES.

The Law of Ancient Lights.

WE learn from the last issue of the *Journal* of the Institute of Architects that, in accordance with a resolution passed at the general meeting of the Institute on April 9, a joint committee has been appointed by the Council of the Institute and the Council of the Surveyors' Institution, to consider the steps to be taken towards obtaining an alteration in the existing law in regard to ancient lights. Four members of committee have been appointed by each body. Those appointed by the Institute of Architects are Mr. E. A. Gruning, Professor Roger Smith, and Mr. J. Douglass Mathews (Fellows), and Mr. J. Fletcher Moulton, Q.C. (Honorary Associate). Those appointed by the Surveyors' Institution are Mr. A. Rose Stenning, Mr. A. T. Steward, Mr. H. Chatfeild Clarke, and Mr. G. Mallows Freeman, Q.C. This makes a very strong Committee, in which the constructional and the legal element are well represented, and the subject will no doubt be fully and ably considered. Professor Roger Smith has been elected Chairman of the Committee, which has already held two meetings.

Railway Companies' "Extras."

WHILE the railway companies have not been at all fortunate in some of their recent endeavours to augment their receipts at the expense of the travelling public, they have been more successful in the matter of siding charges. Undeterred by a previous decision of the Railway Commissioners with respect to the Sheffield sidings, a number of coal merchants and others at Derby have been resisting the Midland Company's claim for siding rent at the latter station. A charge of sixpence per truck per day is now imposed on all wagons not released within four days, but it appears that until recently an unwritten law referred to as "the average system" has provided a loophole by which the traders have escaped this charge. The Sheffield case, which was on much the same lines, went entirely in favour of the railway company, but the traders apparently hoped that certain variations in the circumstances might tell in their favour at Derby. The President of the Commission, however, was very decided in ruling that four clear days was an ample time allowance, and that a charge of sixpence per truck per day thereafter was not unreasonable. The effect of this judgment will be that where the railway companies insist on payment of "extras" of this description, resistance will be of little avail unless the conditions differ very decidedly from those prevailing at Sheffield and Derby. Falling dividends are causing them to look sharply after various sources of revenue in respect of which they have hitherto been very indulgent.

Proposed Widening of Piccadilly.

PLANS have been prepared in the Office of Works for a widening of Piccadilly, along its southern side, between Walsingham House and Hyde Park-corner, whereby, subject to her Majesty's approval of the project, the present width of the street, which varies from 68 ft. to about 100 ft. between those limits, would be increased so as to vary from 72 ft. at Walsingham House, to 90 ft. at Park-lane, 120 ft. at Hamilton-place, and 170 ft. at Hyde Park-corner. The police authorities anticipate that the alteration will better enable them to regulate the ever-increasing traffic from east to west, and from north to south at Grosvenor-place, Hyde Park-corner, and Hamilton-place. The London County Council will be asked to defray the cost, estimated at 30,000*l.*, of widening the roadway and of constructing a new pathway, to be 24 ft. wide, along the side of the Green Park, whilst the Office of Works will pay for the alteration of the land and paths within the park itself. We may here point out that for nearly the whole of its length the present pathway outside the park railings is at a level higher than that of the park within, the difference between the two levels being greatest at the dip in Piccadilly between Half Moon and Down streets, which marks the old crossing, at the Stone bridge near the Brook Shot-fields, of the Ay brook or Tybourne. The necessary higher altitude of the new pathway will increase the cost of its construction. The Commissioners' plans will, it is stated, not involve the destruction of the trees in the park which stand at the foot of the bank that rises up to the base of the railings, though the trees which at present form so pleasant a feature of the south side of the road will be cut down. Negotiations have also been opened with the Office of Woods and Forests, who own the freehold of most of the property on the north side of Piccadilly between Sackville-street and

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Piccadilly-circus, in respect of a scheme for widening the main street in that portion when existing leases shall have expired.

The London Bridge Lift Accident.

IT appears that the recent mishap to one of the lifts at the London Bridge station of the City and South London Railway was due to a curious combination of circumstances. Although being used by the officials of the company, the lift was under the control of the contractors, and the accident was caused by the breakage of a steel shaft 6 in. in diameter. By subsequent examination it was ascertained that a small flaw existed, which extended until the shaft finally failed, with the result that the balance weight gave way and the lift descended rapidly to the bottom of the well. The safety apparatus would have prevented this accelerated descent, but, unfortunately, it had been disconnected for experimental purposes by the contractors' men. Consequently the ropes constituted the only safeguard against the fall of the cage, but the beneficial effect expected therefrom was nullified by the fact that the workmen had placed some heavy weights on the cage roof for the purpose of a second experiment, and entirely without the knowledge of the company. These weights were responsible for the injuries caused to the passengers, though they did not cause the failure of the lift itself. No doubt the conditions were somewhat exceptional, but it is difficult to understand why the public should have been permitted to act as unconscious participants in dangerous experiments of the kind we have mentioned.

Acetylene Gas Lighting.

THE Acetylene Illuminating Company, Limited, of Victoria-street, Westminster, has sent us a pamphlet relating to acetylene and calcium carbide. Hitherto the Company has confined its operations to the manufacture and sale of carbide, but it is now prepared to supply all the appliances required for an acetylene installation of any description. The Company will work in accord with the higher class generator makers. The Acetylene Illuminating Company is the pioneer company of the acetylene industry in this country, and is conspicuous for the manner in which it has endeavoured to suppress the publication of the misleading claims which are frequently made by acetylene enthusiasts, and for its efforts to clear the market of inferior acetylene appliances. The following extracts from the pamphlet will demonstrate how widely the nature of the information contained therein differs from that contained in the average acetylene catalogue:—"Beautiful as the acetylene light is, it should not be claimed for it that it will supersede, or even compete as regards cost with coal gas, because wherever coal-gas works exist the incandescent mantle can be used with the economical advantages now so well known." Again, "the acetylene burners now in general use consume over half a cubic foot of gas per hour, the best of which give a light of from eighteen to twenty candle power." We have frequently commented upon the misleading nature of the claim that acetylene gives a light fifteen times greater than that obtained from coal gas. The company undertakes (1) to tender advice or submit quotations for an installation of any size; (2) to arrange for payment for installations by instalments if desired; (3) to guarantee a regular supply of carbide which will yield an average of five cubic feet of gas per lb. of carbide; and (4) to generate acetylene from central stations for lighting large villages, hamlets, and groups of private houses, charging by meter for the gas consumed, or to arrange detached installations for single houses as may be most advantageous.

Two Hundred Volts.

THE deputation from the London electricity supply companies who called on Mr. Ritchie last week to try and get him to alter the Board of Trade Regulations with regard to the pressure at which consumers may be supplied were placed in rather an unenviable position. The regulation which they wish to have altered reads as follows:—"Provided that no change shall be made in the pressure of the supply to any premises . . . except with the consent of the consumer." They wish to substitute "except on such terms and conditions as may be agreed upon between the undertakers and the consumer, or, failing agreement, as may be settled by an arbitrator appointed by the Board of Trade." Professor Kennedy, who appeared for the Westminster Company, stated that out of 5,300 consumers there were only ten who absolutely refused to change over. These ten put the company to great expense, and prevented those who had changed over from getting the full benefit of the reduction of price to which their action entitled them. Mr. Ritchie pointed out to the deputation that all the London companies had been represented at the Conference in 1896, when the regulations were drawn up. We may mention that they were then willing to agree to anything in order to get permission to use the higher pressure. He also read extracts from letters addressed by the Westminster Company to their consumers, in which the company had clearly exceeded its rights and had tried to force their consumers to take the higher pressure. Mr. Ritchie suggested that the company should now try more conciliatory methods, and that the "resources of civilisation" had not yet been exhausted. The consumers are plainly within their rights in objecting, and several electricians who are members of the Council of the Institution of Electrical Engineers are strongly convinced that they have excellent reasons for objecting. Considering what generous treatment electrical companies receive from the Board of Trade, it ill becomes them to try and bully their consumers. If they were fined 5*l.* every time their pressure fell 4 per cent., and 50*l.* every time they shut down a circuit, as they are legally liable to be, very few, if any, companies would have survived to make complaints about the "harsh regulations" of the Board of Trade.

Dover House, Whitehall.

WE notice that a new wing has just been added to the south side of Dover House, Whitehall, which adjoins the Horse Guards. The house, formerly occupied by the Viscountess Clifden, was taken in September, 1885, for the offices of the Secretary of State for Scotland and the Scotch Education Department. The addition abuts upon the garden, on the north side of the Treasury Chambers, which has a private gate opening on to the parade ground. Inasmuch as the history of Dover, formerly Melbourne, House is not quite correctly given in the customary books of reference, we may state that it was built (1754-8) by J. Payne for Sir Matthew Featherstonehaugh, who died in 1774. Ten years afterwards the house was vacated (1784) by Sir Jeffery Amherst (Baron Amherst of Montreal, co. Kent) in favour of the Duke of York and Albany, for whom Holland added the portico, the domed entrance hall, and the grand staircase, and it was thenceforth held on lease from the Crown. In 1791, being then known as York House, it was exchanged by the Duke of York and Albany with the first Lord Melbourne for the house of the latter in Piccadilly—built by Sir William Chambers—which Lord Melbourne had purchased in 1770 from Lord Holland. The name Melbourne House appears in the Blue-book of 1831 for the last time; in the following year occurs the name Dover House, the house having been taken by Lord Dover (*obiit.* July 10, 1833), the only son of the second Viscount Clifden. Lord Dover predeceased his father in July, 1833; his widow occupied the house during many years after her husband's death.

Clarendon Park, Wiltshire.

CLARENDON PARK, near Salisbury, the seat of the late Sir Frederick Bathurst, Bart., and extending over 4,266 acres, has just been sold for about 85,000*l.* Clarendon, "wherein," says Camden, "are the footsteps of two royal palaces, King Manor and Queen Manor," gave a title to Sir Edward Hyde in 1661 and a name to the "Constitutions" that were drawn up as between the laity and clergy *temp.* Henry II. It had been a royal forest in the Conqueror's day and a favourite hunting seat of many of his successors. Henry VIII. bestowed the neighbouring Abbey of Wilton upon Sir William Herbert, K.G., whose first wife was a sister of Katharine Parr. In Edward VI.'s reign, Herbert, elevated Earl of Pembroke in 1551, obtained a grant of Clarendon for the lives of himself and his eldest son. In 1665 it was granted in fee to George Monk, Duke of Albemarle. His son Christopher left it to his relative, the Earl of Bath; the heirs of Lord Bath sold the property to Benjamin Bathurst, to whose descendants it has since belonged. The story goes that Stephen Duck, the thresher poet, worked upon the estate. A description of the ruins of the old palace and its precincts, nearly seventy acres in area, is given by Sir Richard Hoare in his "Ancient History of Wiltshire," 1812-31; he quotes from the Pipe-rolls a payment, 30 Hen. III., of 526*l.* 16s. 5d. to one Nicholas for building works, and another, of nine years later, of 6*l.* and one mark for the making in the New Forest of 30,000 shingles and transporting them to Clarendon for roofing the king's palace, with another payment of 11*l.* 10s. for a further supply of the same amount of material.

Leeds and Yorkshire Architectural Society.

THE twenty-fourth annual Report of the Leeds and Yorkshire Architectural Society shows that the Society has now a total of 111 members, as against 121 on the same date last year; a decrease which is naturally not encouraging to the managing body of the Society. We hope that there will be an alteration in this respect before long. There ought to be plenty of opportunity for an

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increase in membership, since we find it mentioned in the last Presidential address, which is appended to the Report, that while there are, as far as could be ascertained, 367 architects practising within the area covered by the Society, only 59 of that number are members; there are 48 members of the Institute of Architects in the area, but only 36 are members of the local society; and while there are 27 architects in Hull, only one of these is a member of the Society. We incline to conjecture that the fault is with the outstanding members rather than with the Society, and would urge them to consider whether they are not failing in a duty in not better supporting the Architectural Society of the district. Among other points mentioned in the Report we notice that the Society have been able to expend a considerable sum in the purchase of new books for the library, and hope to be able to make a further addition this year.

LETTER FROM PARIS.

THE International Congress of Architects held its first meeting at the Ecole des Beaux Arts on Monday, July 30. The proceedings were opened by a speech from the President of the Congress and the report of the Secretary. We shall be able to give further details in a subsequent issue.

The Committee of "Vieux Paris" decided at its last meeting, after hearing a report made by M. Selmersheim, the Chief Inspector of Historical Monuments, to instal a new Museum of Parisian Antiquities in the rooms of the old College des Bernardins, now occupied by the fire brigade, and to exhibit there the most interesting of the works of sculpture collected at Paris since the Gallo-Roman period. The old college would form an excellent place for such a museum. The refectory, built at the commencement of the fourteenth century, a lofty nave over 200 ft. long and divided up with massive columns, as well as the large cellars beneath and the roof gallery above, would be a most suitable exhibition place for the objects it is proposed to place there.

On July 12 a lecture was given at the Trocadéro by M. Perrault-Dabot on the archives and catalogues of the Commission des Monuments Historiques collected by M. de Baudot. These archives date back to 1837, the date of the foundation of the Commission. They comprise measured drawings, water-colours and perspectives, together with the various documents employed to form the classification of the monuments accepted by the Minister of Public Instruction as worthy of being classed as historical monuments. There is also a formidable manuscript composed of reports and descriptive notices concerning each monument, a most interesting record of useful information. There are also nearly 23,000 photographs of the various buildings and objects. To this collection is added about 3,000 engravings of old buildings and a library of 12,000 volumes. The collection contains, besides the above documents, all the numerous drawings made by Viollet-le-Duc, the measured drawings of the Direction des Cultes, and drawings and manuscripts concerning the royal châteaux and public buildings. The subdivision of this collection was a most complicated matter, and the explanatory lecture, illustrated by limelight projections, made by M. Perrault-Dabot was a most interesting one.

It is proposed to demolish the old prison of Saint-Lazare and form a public garden on the site. It has been proposed for some time back to pull down this old and interesting building, but the matter has each time been deferred on account of the many associations connected with the building. Saint-Lazare was, at the commencement of the twelfth century, first a leprosy hospital, and a little later the place for embalming the bodies of the Kings of France when on their way to the royal burial-place of the Abbey of Saint-Dénis. In the thirteenth century the building became a convent and a priory, and in 1632 Saint Vincent de Paul occupied it with the priests of his mission. In later times it became a prison for the aristocracy, and in more modern days one for the lowest classes.

The Académie des Beaux-Arts has awarded the Prix Nicolas Bailly, of the value of 1,500 fr., destined to recompense an architect for one of his works constructed and completed during the past six years, to M. Marcel Dourgnon for his Museum of Egyptian Antiquities at Cairo.

The new Gare d'Orleans, erected on the Quai d'Orsay, is now completed, and the architect, M. Laloux, may be sincerely congratulated at the happy result he has obtained of a practical and yet really artistic railway station. The walls under the entrance gallery have been effectively decorated with picturesque paintings reproducing the most interesting portions of the Orleans line, executed by MM. Joubert, Dameron, and Bourgeois. In the interior of the station are powerful paintings by M. Cormon representing Biarritz and Amboise. The large central hall is very fine as regards effect; the ceiling with its arches, decorated panels and glass, recalls somewhat the style of the ceilings of some of the churches of the Italian Renaissance.

The monument to Dr. Tarnier, by M. Denys Puech, to be placed on the Boulevard de l'Observatoire, has, by the decision of M. Brouardel, the oldest member of the Académie de Medécine, been somewhat modified. M. Puech had surrounded the doctor, shown standing by the bed of a young mother, with a number of figures representing some of the best known Parisian hospital doctors, arousing a certain jealousy amongst other doctors who had not been chosen to fill the group. The matter was referred to Dr. Brouardel, who decided that the heads of the persons figuring in the group should be changed from portraits to imaginary heads.

The first prize for the competition called the Achille Leclére, at the Ecole des Beaux Arts, has been awarded to M. Bernard for his design for a building representing France at a foreign exhibition. The programme was—A space of about 150 ft. square allotted, in a foreign exhibition, to a French pavilion. The building was to be supposed to contain the works of art and the products of the national manufactories, Gobelins, Beauvais, and Sévres. The exterior should be designed in a rich manner with niches and porticoes so as to allow an effective arrangement of marble and bronze statues and works of art, and a rich decoration of ceramic and mosaic work. There should be two saloons for receptions and the Press, a large glazed hall for sculpture, and galleries for works of painting, sculpture, and architecture. The plan and design of M. Bernard is very effective and would work out well; the conception, however, is as usual rather too imposing and expensive for an exhibition building.

A sum of 400,000 fr. has been granted by the town of Paris to the parish of Saint-Antoine-des-Quinze-Vingts at Paris. Up to the present time this parish has been obliged to hold its religious services in the chapel of the hospital of the above name, built under the reign of Louis XV. to house his "Mousquetaires noirs."

It appears that the State has some inclination towards retaining possession of the smaller Fine-Arts Palace on the Champs-Elysées, which under existing arrangements, as we have previously mentioned, was to revert to the Municipality of Paris after the Exhibition. It is not likely, however, that any considerations will be allowed to break the formal contract made between the Government and the Municipality on this subject, at all events unless with the consent of the Municipality, and that is by no means likely to be given, for the City authorities are very proud of their acquisition of this beautiful building, which moreover supplies a real want in providing them with a place for the exhibition of their numerous art-treasures; and next year M. Girault's palace will open to the public as the repository of the works in painting, sculpture, and the sketches and models, at present provisionally housed at Auteuil. At the same time the Galliera Museum will be rearranged, and will become the place for the exhibition of works of industrial art, such as tapestry, bindings, silver-work, ewellery, &c. In this way the Municipality will possess two art museums perfectly distinct in their aims and having each its proper programme; while the Carnavalet will still be kept up as the specially historic museum of Paris, the contents of which are regarded rather for their value as documents than as works of art. This museum, thanks to the acquirement of the Hôtel de Lauzun, can now be further developed, and the church of St. Julien le Pauvre will also be utilised for this end.

The Ecole de Médecine, commenced from the plans of the late M. Ginain, is at last complete, and his surviving collaborator, M. Dupré, has completed also the buildings bordering the Rue Hautefeuille and the Rue de l'Ecole de Médecine, where are placed the examination rooms, the state vestibule, and large meeting-hall. This latter will be decorated with the portrait busts of eminent physicians and surgeons, and also with some Gobelins Tapestries representing "The Elements" and "The Seasons," which were presented by Louis XV. to the old School of Surgery. M. Dupré has also completed a building intended as a place for holding the various examinations instituted by the City of Paris. This building occupies part of the site of the old market of Saint-Germain. Before serving its permanent purpose, however, it is to serve, through the months of August and September, for the exhibition of the Congress on Public Art, of which M. Charles Lucas is one of the principal organisers.

The new Cour des Comptes will soon be completed. This immense building, of which M. Moyaux is the architect, has no less than twelve stories (counting the two in the basement); it is a great rectangular block of architecture of a very restrained and sober type, with its principal in the Rue Mont-Thabor.

At the new Sorbonne M. Nénot, the architect, has placed in the courtyard, experimentally, various models of sculpture groups, by way of trying their effect in completing the decoration of the building. On the flight of steps leading to the chapel court are placed two seated figures, one symbolising Science, under the guise of Pasteur, the other Literature, under the likeness of Victor Hugo. The latter is by M. Marqueste, the former by M. Hugues. Further on, a statue by M. Denys Puech, upright and clad in drapery treated in a severe and monumental manner, represents a kind of Minerva of modern life. Two other statues, by M. Blanchard and M. Fagel, representing the Faculté des Sciences and the Faculté des Lettres, complete the scheme.

At the Ecole des Beaux Arts the awards in the Prix de Rome competition are being made. The Grand Prix in painting goes to M. Fernand Sabatté, pupil of Gustave Moreau, and the "second" to M. Henri Rousseau, pupil of M. Gérôme. In sculpture the Grand Prix is carried off by M. Paul Landowski, pupil of M. Barrias, and the "second" by M. Ernst Legrand, pupil of M. Thomas.

The Municipality of Paris acquires every year some works from the Salon. This year the Decennial Exhibition at the Grand Palais has also been drawn upon, and the total purchases represent a sum of 120,000 fr. Among them are M. Adrien Demont's "Plage du Nord"; Mme. Demont-Breton's "Dans l'eau bleue"; M. Henner's "L'Eglogue," which has gained him the medal of honour; and M. Tattegrain's absurd picture (to English eyes) "Sauvetage en pleine mer." In sculpture the purchases include M. Allouard's "La Source"; M. Pallez' "Nemesis"; M. Vasselot's "La Pureté au dessus des Vices," a fine work in marble and bronze; and a fine cameo in sardonyx by M. George Lemaire, intended for the Galliera Museum.

On Saturday last was inaugurated the monument to Lavoisier, the statue (in bronze) by M. Barrias and the architectural portion by M. Gerhardt. It stands behind the Madeleine, on the axis of the Rue Tronchet.

The death is announced of M. Charles Edouard Bezodis, a member of the Société Centrale des Architectes, at the age of seventy-one. He was for many years attached to the service of the administration of cemeteries under the municipality of Paris, and carried out also important works in his private practice, both residences and commercial and industrial works.

MARBLES, GRANITE, AND KAOLIN IN ELBA.—According to an official report received at the British Foreign Office, a German company, disposing of considerable capital, intends to develop the quarries of marbles, granite, and kaolin in Elba. The company in question has already bought the chief quarries, and will send the stone and clay to Hamburg by sea. The quarries at Elba are almost on the seashore, and the loading of the marble is easy. The kaolin at Elba has hitherto been used by the porcelain factories of Tuscany, whither a considerable amount was sent from the principal beds at Campo, a harbour on the south coast of the island.

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COMPETITIONS.

School of Cookery, Newcastle-on-Tyne.—The Newcastle Public Library Committee, in conjunction with representatives from the Technical Education Committees of the County Councils of Durham and Northumberland, has had under its consideration the erection of premises for the purposes of a Northern Counties School of Cookery and Household Economy in Northumberland-road Newcastle. The Committee has issued a report which states that in response to an advertisement in the local newspapers ten sets of designs were received. Mr. Joseph Smith, F.R.I.B.A., President of the Sheffield Society of Architects and Surveyors, after a careful examination of the designs, placed the design under the motto of "Jonoger" first, and bracketted for the second place the designs under the mottoes of "Thorough" and "Experience." The Committee, after examining the plans, decided to confirm the recommendation of the assessor, and on opening the envelopes containing the names of the competitors, it was ascertained that the authors of the three designs are as follows:—"Jonoger," Mr. John W. Dyson, 67, Grey-street, Newcastle; "Experience," Mr. W. H. Knowles, 37, Grainger-street, Newcastle; "Thorough," Messrs. Marshall & Tweedy, 4, Northumberland-street, Newcastle. The Committee recommend that the selected design by Mr. John W. Dyson be adopted, and forwarded to the Local Government Board, and that in the event of the Board sanctioning the loan, Mr. Dyson be appointed architect for carrying out the work; and that the premiums of 30*l.* and 15*l.* be equally divided between Mr. Knowles and Messrs. Marshall & Tweedy.

ENGINEERING SOCIETIES.

The Institution of Junior Engineers.—On Friday, July 27, a large number of the members availed themselves of the opportunity afforded by Mr. Basil Hogg for visiting the generating station of the Central London Railway, at Shepherd's Bush, under the guidance of Mr. Beaumont Pontifex. The electric locomotive shed was first seen, the construction and running of the engines being explained. Two specially designed steam locomotives, capable of working in the tunnels, were also shown. In the boiler-house are sixteen Babcock and Wilcox boilers in eight batteries of two each, fitted with Vicar's mechanical stokers. Hunt's coal-conveyer was seen in operation, taking the coal from the storage-bunkers, which are of 1,000 tons capacity. By a reverse action the ashes are removed. Four sets of Green's economisers are fitted, and four Barnard Wheeler cooling towers. Although the line was not open to the public, trains were running, and had been for some days previously, under ordinary working conditions, to accustom the employés to their duties. In the engine-house are six Reynolds Corliss compound condensing engines, supplied by the Edward P. Allis Company, through Mr. Blackwall. Each engine is of 1,300 I-h.-p., and runs at ninety-four revolutions per minute. The engines are coupled direct to three-phase generators of 850 kilometres capacity, 5,000 volts pressure, and 35 cycles. At the conclusion of the visit, a special train was provided to convey the party from Shepherd's Bush to the Bank and back, and the system of working the trains was thereby illustrated.

THE ANNUAL EXCURSION OF THE ARCHITECTURAL ASSOCIATION.

By accident a page of our correspondent's MS. was omitted in last week's issue. The following should have appeared prior to the last paragraph describing Monday's proceedings:—

[The next point of interest was Bardwell Manor House, a moderate-sized and somewhat shattered example of the domestic architecture of the end of the fifteenth or early sixteenth century; in colour charming by the time-mellowed red brick and tile, in outline picturesque by the corbie-stepped gables and cut-brick chimneys, one only of which retains its original completeness of cap, shaft, and base. Here in panels and window heads are examples of the red English terra-cotta work of the period which, by their bright tone, now light up the purple-grey of the weathered walling.

From Bardwell Drive to Stowlangtoft brought the party to another church, dedicated to St. George, a very Late and very well-proportioned Perpendicular church, consisting only of nave, chancel, south porch, and western tower, in flint and stone chequers. The chief interest, especially as the sun was hot, lay in the interior, where the roofs are plain but have old colour decoration. The rood-screen has been cut down, but still the lower part shows a good colour scheme in red and green, white and black, and gold. This has been touched up in modern times, but there is still much of the original draughtsmanship. The original stair to the rood-loft remains, though the loft has gone. The clergy stalls are in their original position, and have some excellent carving in the misereres and ends. The modern reredos contains some choice examples of old German carvings of the Passion. The font is a good example of the local type, with sculptured but mutilated figures of the Virgin, St. George, and other saints and bishops. There is a monument to Sir Simonds d'Ewes, who bought Stow in 1614, and another to his son, Sir Willoughby d'Ewes.]

Wednesday.

A long drive to Mildenhall was the first item in this day's proceedings, a short halt being made on the way at Risley for a rapid glance at the church there, chiefly remarkable for its picturesqueness and its circular tower of early date, by some said to be Saxon, but more probably Norman.

There is in the church some Early English and decorated work of good character and one perpendicular window, and also on the opposite side of the road a picturesque old house of early eighteenth century date. Risley, however, was not intended to be taken as a very serious part of the programme, fifteen minutes only being allowed for the halt there, and this merely as a break in the long two hours' drive. Nearer to Mildenhall a slight divergence from the direct road was made for a glimpse at the lodge and house at Cavenham by Mr. Prentice. On arrival at Mildenhall the first visit was made to the magnificent and well-known church where the chancel is of good Early English work with a seven-light east window that has a remarkable and unusual treatment of tracery. The remainder of the church is of Late Perpendicular work, and is chiefly remarkable for the very striking treatment of the hammer-beam roofs over the nave and aisles. The more important porch is on the north side of the church, and is a very fine example of the not uncommon East Anglian treatment, with a large parvise chamber over the groined porch. The tower, as usual, is at the west end of the church, and is lofty and a striking feature in the landscape. Under the tower is an interesting piece of fan vaulting. The excellence of the church rather dwarfs, as a matter of study, the interest of the other features of Mildenhall, but a considerable number of the members paid a visit to the manor house, now used as an Anglican Theological College. This building is mainly of the Elizabethan period of somewhat peculiar plan, which has been considerably modified by later additions and alterations. After luncheon with the Vicar of Mildenhall the return journey was commenced, the first halt being made at Icklingham, All Saints', where there is a highly interesting and completely unrestored dilapidated church. The plan is somewhat peculiar in that the western tower is at the end of the south aisle. The greater part of the building is of decorated character with a perpendicular south porch. Amongst the interesting features are some Early English benches of perpendicular period without backs, but with poppy-head carved ends. There are the remains of a rood-screen with some good carving, square pews, and Jacobean pulpit, also the mutilated remains of some very fine canopied niches which formerly flanked the altar in the south aisle, old tiles mostly of thirteenth century work, fragments of old glass and coloured decoration, which all combine to render this dilapidated building highly interesting.

The next halt was made at West Stow, where the small gatehouse of the old hall is an interesting example of the red brick and terra-cotta work characteristic of the early sixteenth century in East Anglia. In the room over the entrance there is a curious rude wall painting or fresco of Elizabethan date, symbolising the four periods of man's life. The hall itself has now not much of interest except the covered way treated with Doric columns connecting it with the gatehouse. After leaving West Stow the party drove to Hengrave, the last and chief item in the afternoon of this day. Hengrave Hall (see plate) is a fine specimen of the domestic architecture of the sixteenth century, having been built between 1525 and 1538 by Sir Thomas Kytson, and, while retaining the greater part of its original construction and decoration, has been considerably altered, chiefly by members of the Gage family, in whose possession it was until recently. The house is built round an internal quadrangle on all four sides, and is therefore illustrative of domestic planning immediately prior to the introduction of the Elizabethan type.

In the chapel of Hengrave Hall is a remarkable stained-glass window of a date between 1570 and 1580, apparently of Flemish work, which has recently been very carefully repaired with the minimum of restoration by Ward & Hughes. In close proximity to the Hall is the church of Hengrave, another example of western round tower, to which is joined a church principally Perpendicular in date. This church has been recently restored, carefully and skilfully, by Mr. Green, of Norwich, and is remarkable for the exceedingly beautiful monuments of the Elizabethan period which it contains. At Hengrave the members were hospitably entertained, and after spending a pleasant couple of hours returned to Bury.

Thursday.

On this day the assistance of the railway was again invoked, as the scene of the day's operations was at some distance from Bury. The train was taken to Long Melford station, whence the party were driven first of all to Long Melford Hall, where they were received by the present owner, Sir William Hyde Parker, by whom they were shown round the house, and who gave them some account of its ancient history. From ancient times Melford Hall was the favourite country residence of the Abbot of St. Edmund Abbey at Bury. The Manor was given to the Abbey in the times of Edward the Confessor, but when the residence was built is not exactly known, although Abbot Sampson is recorded to have often resided here from 1182 to 1211. Melford remained in the possession of the Abbey until it was surrendered to the King in 1539, John Reve, of Melford, being the last Abbot. The present hall, however, save for some purely archæological interest in the foundations, dates no further back than the time of Sir William Cordell, to whom the manor was granted by Henry VIII. in 1546, and who entertained Queen Elizabeth in his newly erected house in 1578, between which dates the erection of the present building must, therefore, be placed, although in the hall there are a pair of brass dogs bearing the date 1515, with the name of the maker "Leve Petersen," and on the garden side of the house is an old carved porch dated 1515 which is a little puzzling. It has been suggested that the brass dogs, at any rate, which are now mounted on a base, bearing the date 1559, were the property of the abbey, from the fact that the deeds of Samson as well as other scriptural scenes are thereon represented. There is no possibility of this brass-work dating back to Abbot Sampson's time, but as he was one of the greatest Abbots of Bury the pun may be an allusion rather than a coincidence. After the death of Sir William Cordell the property passed into the female line until Lady Rivers, who was ruined by the Revolution, sold it to Sir Robert Cordell, who was the representative of the younger branch of the builder's family and M.P. for Sudbury from 1671 to 1678. Under Sir Robert Cordell considerable alterations were made in the house, chiefly in detail. Further alterations were made after it had been purchased in 1786 by Sir Harry Parker, the father of the famous Admiral Sir Hyde Parker. Sir William Chambers is traditionally said to have carried out work at Long Melford Hall, and the character of the eighteenth-century alterations justifies the tradition, although there does not appear to be any clear evidence on the point. Certainly the house as it now stands, mellowed by time, is a charming example of a comparatively unpretentious Elizabethan mansion.

Leaving the hall the excursionists walked to Long Melford Church, which, as is well known, is one of the finest and one of the largest examples of Perpendicular work in Suffolk. A new tower at the west end is now being erected from the designs of Mr. Bodley, partly encasing the eighteenth-century tower, which

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forms the foundation to which Mr. Bodley's design has been added. The church is one of those memorials of the fifteenth century of which the full effect is to-day lacking from the absence of the stained glass which filled the windows and the coloured decoration that formerly covered the walls and woodwork, but remains of this ancient glass exist and are of great interest. There are also several noteworthy monuments, including the beautiful one to Sir William Cordell, and others to various members of the Clapton and Parker families. In point of picturesqueness, the chapel at the east end of the church surpasses the more magnificent architecture of the church itself. Its somewhat peculiar plan, with an ambulatory all round, and the charming effects of light and shade with the excellently carved and bleached oak in the roof, found a hearty response in the appreciation of the visitors. From Long Melford a magnificent drive through a beautiful avenue of a mile long took the party to Kent-

KENTWELL HALL.

well Hall, for many centuries the residence of the Clapton family, great benefactors of Long Melford. This, with its moat around, is in the exterior probably the most picturesque domestic building seen on the excursion—picturesque by variety of outline and tones and colour rather than intentional architectural effort. This, again, is one of the examples of the use of the E plan in the early part of the sixteenth century. Internally the house has suffered considerably in the Batty Langley period, so that its architectural interest is now almost entirely confined to the exterior. After a pleasant two and a-half hours here the excursionists drove to Lavenham, where they were received by Canon Scott, and conducted over the beautiful church, smaller than Long Melford, but admittedly superior in beauty. This church is a memorial of the palmy days of East Anglia, being built by Mr. Spring, the rich clothier of Lavenham, and the thirteenth Earl of Oxford. The tower, although 141 ft. high, has never been completed; tradition says because the architect, whose name is unknown, was killed by falling from the tower when it had reached its present height. Apart from the beauty of its architecture, which is transcendent amongst late Perpendicular work, there are various interesting features, such as the vestibulum, or vestry, built by Thomas Spring, an ancestor of the rich clothier, and the so-called Spring pew, which is more properly described by the term used in Mr. Spring's will bearing date 1523, wherein he bequeaths his "body to be buried in the church of Lavenham before the awter of Saint Kateryn where I will be made a tombe with a parclose thereabout at the discrecion of myn executors." This parclose is an exceedingly interesting piece of woodwork, for, while bearing traces of unmistakable renaissance feeling, it also illustrates the tendency of the latest phase of Gothic work, as seen particularly in Spain and Portugal, and by way of illustration in Rosslyn Chapel, Edinburgh. Undoubtedly it is the work of "foreigners," possibly, as Canon Scott suggests, of Flemish workmen, though not necessarily so. The rood screen also is interesting, and probably of about 1360, therefore earlier than the great bulk of the church. There are many more interesting features and pieces of detail in Lavenham Church, which to study fully would require more than the three hours allotted for the excursionists stay in this town, particularly as part of this time was occupied in the enjoyment of Canon Scott's hospitality, and in visiting and sketching the many picturesque examples of old work existing in the town, chief of which is the Moot Hall, a grand example of half-timber work. Lavenham, indeed, may be cited as one of those mines of architectural interest which great wealth in a past age, succeeded by comparative poverty in later times, has bequeathed to us at the present day. From Lavenham the party returned by train to Bury St. Edmunds.

Friday.

The scene of Friday's work was within comparatively easy reach of Bury, and the party therefore drove first to Hawstead, a small church which, under the care of Mr. Prioleau Warren, has become one of the most delightful interiors met with on the excursion. Numerous monuments of the families of Cullum and Milner Gibson, both ancient and modern; organ case and reredos, designed by Mr. Warren; hammer-beam roof, brasses, good modern glass and fragments of old; coloured decoration by Mr. Warren on the barrel ceiling to the chancel; an old Perpendicular lectern; a restored pulpit with Jacobean detail—all go to make up a *tout ensemble* for which the one and a half hours allotted was by no means more than enough. Leaving Hawstead, the excursionists drove to Coldham Hall, an Elizabethan Manor House of E plan, picturesque in grouping, particularly on the garden front, but whose detail, especially that of the entrance porch, was a thing to be avoided rather than admired. This house, like many others in Suffolk, is an example of the imitation of stone treatment in plaster over brick. The situation and gardens are admirable, and a very pleasant couple of hours were spent here. In the afternoon, on the way back, Rushbrooke Hall was visited (see plates); another E-plan house to which considerable modifications, particularly in the interior, had been made in the eighteenth century by Lord Jermyn. This house, which retains the moat round it, is not only of great interest, with our present tastes, from its internal architecture, but from the fine collection of pictures and other heirlooms that it contains, including a suit of clothes of King Charles I. which were shown with great gusto by the young son of the house. Here the visitors were most kindly received and hospitably entertained by the present owners, Mr. and Mrs. Rushbrooke; and the last item of the excursion outside Bury left pleasant memories, slightly damped by a heavy thunderstorm, which, after the heat and sunshine of the earlier part of the week, found unprepared many of the party, who were therefore obliged to drive back the three miles to Bury insufficiently protected, and which kept up the almost unbroken tradition that an Architectural Association excursion is invariably accompanied by rain.

Saturday.

Some few of the party left Bury early on Saturday morning, but the majority carried out the programme which had been arranged, and under the guidance of Mr. Spanton, the local photographer, visited the more important buildings. Commencing with a walk through the grounds of the ancient Abbey for an inspection of the few remains of the old monastery, the party then paid a visit to the Church of St. James, the largest church in the town and of late Perpendicular work. Next, they went to the eighteenth-century house built by the first Earl of Bristol, the interior of which, by the permission of Miss Thomas, the present owner, the members were enabled to see. Hence the party proceeded to the Church of St. Mary (see plate), built shortly after 1442 at the cost of the people of Bury St. Edmunds, independent of the Abbey.

Here there is much that is of interest, both architectural and historical, on the latter side being in particular a monument of white marble to the memory of Mary Tudor, third daughter of Henry VII., wife of Louis XII. of France, and afterwards of Charles Brandon, Duke of Suffolk. Passing through the town, the exterior of the Unitarian Chapel—a charming red brick eighteenth-century building—was noted, and then the Guildhall, with its beautiful ancient porch of flint, brick, and stone, its eighteenth-century interior in the council chamber, and some good portraits of members of the corporation and benefactors of the town. After this, as time was passing rapidly, the exterior of the County Hall, a building by the Brothers Adam, and the cupola house were noted in passing, and then a visit paid to the very interesting old building known as Moyseys Hall, which has now been converted into a museum, and which was probably erected early in the thirteenth century as a dwelling-house. After this one of the eighteenth-century houses near the Abbey gate was visited, and finally the Athenæum, with its ball-room by Adam. This concluded the excursionists' programme, which thus ended at mid-day, and during the afternoon the remainder of the party left the ancient town, in and around which one of the most pleasant and satisfactory weeks recorded in the annals of Architectural Association excursionists had been spent.

Silver-gilt Chalice at Clare Church. *(See "Builder" of July 28, page 77.)*

THE BUILDING TRADES' GIFT TO THE NATION.—At a meeting of the Committee on the 27th ult., the chairman, Mr. E. O. Sachs, announced that some large contributions had been received during the past month from the provinces. The collections in Birmingham from workmen already exceed 200*l*., whilst in Walsall over 150*l*. have been collected; in Leicester the amount has reached 170*l*., and in Nottingham 100*l*., &c. Messrs. Trollope & Son are now engaged in carrying out the work, and the brickwork of two of the homes is nearly completed. As far as contributions are concerned, it is now particularly requested that they may be in money rather than in kind. All communications should be addressed to the Executive at 1, Waterloo-place, Pall Mall, S.W.

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THE SANITARY INSTITUTE:

CONFERENCE ON THE HOUSING OF THE WORKING CLASSES.

WITH the view to advancing the consideration of the problem of the housing of the working class population in London and large towns, the Council of the Sanitary Institute convened a Conference on the subject, and this was opened in the lecture hall of the Royal Medical and Chirurgical Society, 20, Hanover-square, on Monday. Many local authorities in London and the provinces responded to the invitation to send delegates, and as the date preceded a visit to Paris by only a few days, there was a large and representative attendance of professional gentlemen who are on the roll of the Institute.

Monday's conference, which was presided over by Mr. R. M. Beachcroft, L.C.C., was devoted to the consideration of "Unhealthy areas and displacement of town populations."

The Chairman, in his opening address, remarked that on the flyleaf of the programme reference was made to an opinion expressed by Mr. T. W. Russell to the effect that when the General Election comes on this question of how to house the people would be one of the great issues upon which that election would be fought. He (the Chairman) expressed the hope that this would not be so, but that the question would be recognised as a non-party one. No one, as Mr. Robert Reid said the other day, could surely desire to make party capital out of the miseries of other people. Agreeing, then, as they probably all did, with the Prince of Wales, that there was no question at the present time of greater social importance than this, and lamenting with him that greater progress had not been made in the solution of the difficulties which surrounded the question, they might well devote two days to the discussion and consideration both of these difficulties and the way in which they might be surmounted. The completion by the London County Council of their great Boundary-street improvement, which involved the displacement of 5,400 of the labouring class, the clearance of fifteen acres of slum property and the substitution of a model colony of municipal dwellings for fifteen acres of dirty hovels, is in itself an event which not only invites, but demands criticism. For a time it was believed that the results achieved were not such as to justify a repetition of clearances on a similar scale, but a year or two ago two other large areas, viz., one in Somers Town and another in Clare Market, were initiated and are now in course of being dealt with, whilst quite lately three new schemes have been adopted, involving further large displacements, so that additional heavy calls upon the ratepayer in the same direction may be immediately looked for. It was, therefore, most desirable every opportunity should be given and taken for analytical discussion of the operation of the existing law in the matter of treatment of unhealthy areas. Whatever conclusion might ultimately be arrived at, it might perhaps be taken as satisfactory that the net cost of the clearances effected so far by the London County Council compared favourably per head with that incurred by the Metropolitan Board of Works. The Board of Works carried out twenty clearance schemes, displacing 25,217 persons at a net cost of 59*l.* per head, while the cost per head of clearances effected by the Council under the Housing Act works out at about 50*l.* a head—the difference might fairly, he thought, be attributed to the special compensation provisions of the Housing Act of 1890—in fact, the Council's valuer had more than once stated that the effect of those provisions was to make it anything but a profitable transaction to own slum property required under the Housing Act; on the other hand, every large clearance by the London County Council must involve the buying out not only of the slum owners, but of trade interests, and it was this which caused the loss to the ratepayer. The commercial value of land in the central districts when cleared was always largely in excess of its value as site restricted to the erection of dwellings. For example, the sites on which the existing dwellings of the Council had been erected by them stood in their books at a total value of 95,000*l.*, while the commercial value is estimated by their valuer at 230,000*l.* The difference between these two figures represented the cost which had to be borne by the rates.

Various remedies have been suggested and doubtless would be referred to that day. Mr. Blashill would, he hoped, explain his scheme for compelling owners of areas pronounced insanitary to form themselves into a syndicate, and for casting the onus and cost of clearance upon them. Other methods might possibly be suggested for giving freeholders whose lessees stand in the way the right of re-entry, and so overcome a difficulty which London freeholders, such as the Prince of Wales, experienced, owing to intervening interests created by leases.

Whilst no doubt there would be found followers of Mr. Asquith and Mr. Stuart, who looked to an adjustment of local taxation in the direction of charging all rates on to land apart from buildings as a means both for relieving the present incidence of the cost of improvements and for cheapening suburban land; and lastly there might be those who agree with Lord Rosebery that the only real way to settle this and other social questions is to appoint a dictator "who can see what is to be done, and do it." The question whether the present method of dealing with unhealthy areas was the best one was not, however, purely a financial one, but largely depended on the effect it had on the overcrowding difficulty. It must be a disappointment to every one, whether philanthropist or sanitary reformer, that so few of those displaced ever found their way back into the new dwellings erected for them, and he confessed personally to an inability to accept as even partially satisfactory the assurance of the political economist, that the provision of a high standard of house accommodation produced a general shift, and served to raise the standard all round. The fact remained that a mere fraction of those living on the Boundary-street area at the date of the scheme in 1890 were to be found in the new dwellings, and that none, so far as he could ascertain, of the Clare Market tenants, who were to be considered as provided for by the buildings the Council had erected at Millbank, had been willing to migrate to them and pay the rents demanded. The question put by Lord Rosebery, "What is to be done with the residuum which you displace?" had still to be answered. It was easy to pass a resolution, as the County Council did a few months ago, that in future they would find accommodation for a number equal to those they displace, but not so easy to avoid displacement until new accommodation was provided. The crux lies in providing accommodation for those displaced who ought to be accommodated on the spot before the actual displacement, and, in his opinion, no clearance scheme should be allowed to pass which fails to make this provision. These persons belong naturally to the poorest class, and in the new buildings hitherto provided the rents were too high for them and the restrictions too great. As overcrowding was the cause of an area becoming insanitary, it followed that a strict application of the law against overcrowding ought, in at all events the great majority of cases, to effect the required cure. If an area was found actually unfit for human habitation, instead of buying it up, the local authority should be able to insist that the houses on it should cease to be occupied until the area had been reconstructed. The owners would then be driven to find the means of reconstruction themselves, and the only duty, condemnation once made effectual, that would then devolve upon the local authority would be to see that accommodation was found for those displaced whose business necessitated residence on the spot. Experience showed that a very small proportion of those living on an insanitary area actually needed to live on the spot (out of 6,000 disturbed in connexion with the new street from Holborn to the Strand only 774 belonged to the class whose work rendered residence on the spot a necessity), and the Borough Councils, who would now have the same power that the London County Council had of providing dwellings under Part III. of the Housing Act, ought to be able, with the knowledge at their disposal, to meet the wants of these.

He did not, of course, suggest that cases may not arise where a clearance scheme by the central authority under Part I. of the Housing Act on the same extravagant lines as heretofore was rendered necessary by special circumstances, but he did say that such cases in London should now be very exceptional, and that it was not so much unhealthy areas that required treatment as unhealthy houses. He noticed with pleasure the recent circular of the Local Government Board reminding local authorities generally of the very large powers they possessed for securing the proper sanitary condition of all premises within the area under their control, and although recent decisions might go to prove that amendment of some kind of Part II., as well as of Part III., of the Housing Act was required, the fact remained that if the existing law against overcrowding was but rigorously enforced, not only would there be no unhealthy areas to deal with, but a stop would be put to the influx of population and rents would go down. Recent returns showed how few houses in London, comparatively speaking, occupied by members of more than one family, were registered and under proper inspection, they could not wonder then that overcrowding continues. What was wanted was a gradual but certain enforcement of existing powers, so that ultimately every house of the kind referred to may be under proper inspection. So far as the metropolis was concerned, the danger ahead of them was not so much how to deal with unhealthy areas within their border, but how to prevent them from being created just outside that border. It was high time that both the London Building Act and the Public Health (London) Act, 1891, were made applicable to districts within, say, twenty miles of London and other populous towns.

Mr. T. Blashill, F.R.I.B.A., said it was quite true, as the Chairman had said, that the County Council had spent 50*l.* per head of each person rehoused. That, in his view, was the cardinal point of the problem, and a defect which needed to be remedied. At the Sanitary Congress at Southampton he ventured to offer some suggestions on the same point, and all he could do that day was to repeat and emphasise them. What he said was that, instead of purchasing property in future, public authorities should keep their hands out of the public purse altogether. What should be done was to schedule each family to be displaced, investigate its position, and compel the owners of the areas to form themselves into a syndicate, and take upon themselves the onus and cost of clearance. To those tenants who have to go further away to live the public authority might make up an equivalent to their travelling expenses. He contended that his scheme, which, as he said, threw the onus upon the landlords, would cost less than one quarter of the amount spent by the County Council on its present method.

Dr. Sydney Marsland (Birkenhead) insisted that what public authorities required was greater freedom of action; Dr. Sykes (St. Pancras) pleaded for the extension of flats by the conversion of existing houses; Mr. Cooper (Aberdeen) complained of the anomalous conditions under which loans were granted to local authorities for housing purposes; Mr. Godbold (West Ham) urged the restriction upon the erection of further factories in conjested districts, and the Lord Provost of Glasgow pointed out the features of the local Acts under which the housing schemes had been carried out in Glasgow, and Mr. Harpur (Cardiff) animadverted upon the way in which the Local Government Board carried out their powers in regard to local by-laws.

Mr. H. H. Collins (Paddington) agreed that the London County Council had done splendid work by their various housing schemes, but he could not help regretting that the effect of them was to concentrate large populations around small areas in the congested parts of the metropolis. Better by far they should encourage the working classes to go further afield.

Mr. W. Holder, a member of the Hull Corporation, stated that that body looked upon Part I. as cumbrous and costly. As regarded Part II., they desired an amendment, not altogether as a matter of equity and justice, but rather on the ground of expediency mingled with pity. The Corporation, though willing to help the freeholder of insanitary property to do the best he could, was unwilling to be hampered with its ownerships. Their plan was that the land when in single and unusable plots should by the Corporation be pooled together with other neighbouring and unusable plots for the benefit of the freeholders, or maybe leaseholders, though such leaseholders were almost unknown in Hull; that the Corporation surveyor should rearrange the areas into saleable plots, and advertise them for sale by tender

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or public auction as the Sanitary Committee of a Corporation may decide; that the proceeds should be awarded to the owners of the plots upon an agreement between themselves, and in case of their disputation by a majority composed of an equal number of themselves and members of the Sanitary Committee of the town. The next amendment of the Act they found desirable was that when once the first action for closing of an insanitary dwelling was adopted, that no evasion of the subsequent demolition order should be permitted if the premises could not be made sanitarily safe as a dwelling house. Another amendment would be the enlarging of the definition of "dwelling house." When it was defined as "any inhabited building" the restriction enabled an unlet dwelling house to stand as a menace to the respectability and renewal of neighbouring houses. The Act itself was not readable clearly under this definition, for it made Clauses 29 and Subsection 2 entirely ambiguous, and thus opened out unnecessary contention and litigation. A wider definition was therefore a desirable amendment.

Mr. J. Douglass Mathews, F.R.I.B.A., F.S.I., said that in the few minutes allotted to him he should confine his remarks to homes for the very poor, as it was for this class that it appeared provision was most necessary. The majority of the so-called working classes were skilled artisans, who were as well able to pay a house rent commensurate with their earnings as the clerk or small tradesman, and, except to distribute the population over a wide area by facilitating means of conveyance to and from their work, he saw no reason to interfere with the ordinary supply in houses suited to their requirements. In the very poor he included those non-skilled persons who earned very low wages, those whose employment was precarious, and also the dissolute and impecunious, who all had families to support, and from their small earnings could not pay a sufficient rent to afford a fair return for capital expended in building suitable houses. It was this class of persons whose work necessitated their residence in or near large centres, who had neither time nor money to expend in travelling, and now had to live in worn-out houses unfit for habitation; and to enable them to pay their rent one room was often occupied by several persons, the fruits being disease, immorality, and vice. The task he had set himself was to solve the difficult problem of providing dwellings suitable for such persons, at a cost which would not necessitate charity on the one hand nor pauperism on the other, and prove also a sound commercial investment. To popularise dwellings of this description the habits and prejudices of the poor must be considered, and some improvement in what they were accustomed to would be more readily accepted by them than the ideal plan of a reformer. In the plans that he had prepared three class of tenements were provided: No. 1, a one-room apartment with bed recess, to be let at 2s. 6d. per week; No. 2, a living-room with parents' bed-room and cubicle for a child, and also scullery, to be let at 4s. per week; No. 3, a living-room with parents' bed-room, two cubicles for children, also scullery and detached water-closet, to be let at 5s. 6d. per week. Each of the suites open direct from the landing of a fireproof staircase—in the centre of the building—and were all fitted with a ventilated food cupboard, dresser, coal store, and sink, which also served the purpose of a lavatory. The chief feature in the plans was that each tenement was self-contained, and the sleeping rooms open out of the living-room. The parents' bed-room was sufficiently large for all practical purposes, and was enclosed the full height of the room. The cubicles were large enough for sleeping and dressing, and the enclosure next the room was only 6 ft. 6 in. high, thereby allowing cross ventilation. As the fireplace in the living-room would be constantly in use, the chimney would be a valuable extractor of foul air.

The buildings were designed in height and space to accord with the London Building Act, so that every portion would be amply lighted, and good play yards provided in the rear. The requirements of the Public Health Act were also respected. The cost of the erection of A plan, containing twelve suites of room, including living-room, parents' bedroom, two cubicles, scullery, and water-closet was estimated at about 2,000*l*. The plan marked B, containing similar accommodation to A, but on a somewhat smaller scale, and only one cubicle, and also twelve single rooms, was estimated at 2,300*l*. The method of construction was of the simplest character, at the same time being substantial, and provision was made to guard against the rough usage of the probable tenants, and to minimise constant repairs. He was not an advocate for a public authority to undertake work which could be as well or better done by private enterprise, but in a matter of this kind both could work together with advantage. He, therefore, ventured to throw out the following suggestions:—That the public authority should purchase sites in as close proximity to the centres of trade as possible, and let them on building leases for sixty years at a ground rent equal to that which would be given for working-class dwellings in the suburbs, say 5s. per foot frontage, at the rate of 7,000*l*. per acre; that a sum equal to 75 per cent. on the cost of the buildings be advanced to the lessee, by instalments, during building, and this, together with 3 per cent. interest per annum, to be repaid by equal quarterly payments during the whole term. Considering the influence that these improved dwellings must exert on the habits and dispositions of the occupants, it was reasonable to assume that there would be less inmates in the workhouses, asylums, and prisons, and, therefore, only the rates for purely local purposes, such as cleansing, lighting, watching, &c., should be levied, and further, that the central staircase should be treated as a street, and cleansed, lighted, and watched by the authority. For similar reasons to the above the inhabited house duty should also be remitted, if it was now charged on this class of house. With these concessions the lessee would be enabled to let the rooms at the low rents before mentioned and yet obtain 7 per cent. interest on the remaining 25 per cent. of the cost which he would have to provide. The Local Authority would be no loser, as the repayment of the principal and interest quarterly would increase the security, and the reversion to the rack rental at the end of sixty years would be a valuable asset to the ratepayers within a reasonable period. The repayment would form a fund for future loans on similar property. One of the conditions for lending the money would be that the buildings were erected in accordance with approved drawings and in a substantial manner, and another thas the rents would not be increased without consent. As landlords the lessors would have powet to insist on the property being kept in good condition, and as the Sanitary Authority, care would be taken that there was no overcrowding, and that the premises were kept clean and wholesome. An objection might be raised to the novel idea of interference with the almost universal system of taxation of dwelling-houses, but the circumstances were special, *and* the very poor should not be expected to contribute towards the maintenance of paupers. It should be remembered that much of the difficulty in finding homes for this class arises from the crowding out of their dwellings by the exigencies of trade which render the land more valuable and the buildings erected thereon of a higher rateable value, so that after all the income arising from the rates is not less than it formerly was. In order to put these suggestions in a practical form, the following detailed calculations are submitted:—

Plan A.

To rents derived from twelve suites of rooms at 5s. 6d. per week = per annum				£171	12 0
Less outgoings:—					
Ground rent	£12	10	0		
Insurance	1	5	0		
Water rate	4	0	0		
Local rates: viz., Lighting, Public Health, Sewers, General Expenses and Police (2s. in £ on net rating at £100)	10	0	0		
Annual and periodical repairs	30	0	0		
Loss of rent and collection 15 per cent.	24	17	0		
Repayment of principal and interest at 3 per cent. on £1,500 advanced	54	0	0		
				136	12 0
Profit				£35	0 0

Equivalent to 7 per cent. on £500.

Plan B.

Twelve suites of rooms at 4s., and twelve suites at 2s. 6d. per week = per annum				£202	16 0
Less outgoings—					
Ground rent	£13	10	0		
Insurance	1	10	0		
Water rate	4	4	0		
Local rates (2s. in £ on net rating at £105)	10	10	0		
Repairs, &c.	40	0	0		
Loss of rent and collection	29	10	0		
Repayment of principal and interest, £1,725 advanced	62	0	0		
				161	4 0
				£41	12 0

Equivalent to 7 per cent. on £575.

He thought it would be admitted that the rents proposed to be charged were much lower than the poor now paid, and that the amounts for the probable outgoings were ample, and therefore the figures were not fictitious. So far, he had only dealt with individual houses, but if, as was probable, a large scheme was propounded, provision should be made at a small rental for workshops, stores for barrows and goods, cubicles in a separate portion of the building for single men who could board with a family (a source of income often resorted to), a crèche to enable the children to be taken care of whilst the mothers are out at work, a general needlework-room for women, a reading and games-room for men, and a bar with non-intoxicants — possibly a restaurant and kitchen, where meals could be had or food cooked, and stores established on the co-operative principle. Although the foregoing applies specially to London and other large cities, the principle could be applied to dwellings for the labouring classes in town and villages, and with better results, as the cost of the land and the heights of the buildings would be less, and the rents proportionately lower. There was also no reason why the same general plan should not be extended in size and accommodation to suit the requirements of those who can afford to pay higher rents. Although he had treated the subject generally from an investor's point of view, public authorities, if so inclined, could themselves build and secure a profit of at the least 1 per cent. per annum. Possibly the plans prepared might not be considered perfect, but his object had been to provide only such accommodation as was absolutely necessary. If larger rooms or more advantages were desired, it was simply to increase the rentals or reduce the rate of interest on the capital invested. He trusted that he had demonstrated the practicability of providing the very poor with healthy dwellings at low rents, without loss to the community, and that ere long the dens in which they now lived may give place to decent homes, which must tend to elevate the minds and habits of both parents and children,

Alderman Lupton (Leeds), Alderman Purcell (Liverpool), and Mrs. M. Dockrell (Dublin), also spoke.

Mr. Baillie Anderson (Glasgow), moved:—"That this Conference regards the present method of dealing with insanitary areas as so extravagant and unsatisfactory that Parliament should provide some inexpensive tribunal on the spot for deciding what areas are unsanitary and thus enable the local authorities to proceed at once to deal with them."

Dr. W. Smith (St. Pancras), seconded.

Mr. Phillips moved an amendment as follows:—"That this Conference regards the present method of dealing with insanitary areas as extravagant and unsatisfactory, and urges Parliament to provide some less expensive and more expeditious mode of procedure."

This was seconded by Mr. Holder (Hull), and on a show of hands adopted.

The members of the Conference afterwards inspected the plans and models at the Parkes Museum, and in the afternoon, by the courtesy of the London County Council, paid visits to the dwellings erected on the Millbank estate, Westminster, and on the Boundary-street area.

The second day's conference was held on Tuesday. The chair was occupied by Sir Sydney H. Waterlow, Bart., who in opening the proceedings said:—It affords me great pleasure to be here to-day, and to take part in the discussion of the subjects submitted

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by the Sanitary Institute, viz.:—(1) Improvement of the houses of town dwellers. (2) Improved means of communication. These two points are the main factors in the consideration of the best method of solving what is generally considered the most important question of the day, namely, the better housing of the working classes. Society is deeply indebted to the pioneers in this work, the late Prince Consort, Lady Burdett Coutts, the Society for Improving the Condition of the Working Classes, the Metropolitan Association, and several others. The late Earl of Shaftesbury, speaking in 1863, said, "The condition of the dwellings of the labouring classes is the besetting sin and difficulty of the time, for it stands in the way of every good moral impression." I have never forgotten his words. The question is not a new one to me. Nearly forty years ago I took the matter in hand, feeling then as strongly as I feel now, that the best way to help the "weekly wage class," for I prefer those words to the words "working class," to a happier and better life was to give them better family dwellings, together with homes in which the domestic virtues might be properly cultivated and developed — homes which would be sufficiently attractive to keep them away from the brilliant attractions of the palatial public houses. In 1862 I called a few friends together, amongst whom were Russell Gurney, the then Recorder of London, Samuel Morley, W. J. Thompson, Mr. J. Kemp Welch, Mr. George Moore, of Bow Churchyard, Alderman Finnis, and Mr. Chas. Morrison. With the help of these and other friends a private company was formed, of which I have been the Chairman for thirty-seven years. We have spent a million and a-quarter of money in the erection of 5,600 tenements occupied by nearly 30,000 persons. I refer to these facts in order to show what might be done by a few private individuals to help a movement which can only be adequately dealt with by local authorities responsible for the sanitary arrangements of every city. I quite agree with Lord Salisbury when, speaking on this subject the other day, he said: "You cannot hope, do what you will, you cannot hope to meet this great evil without the assistance of private individuals, it is absurd to suppose that the governing body of a great city like London will be able, without extravagant and uncalled for expenditure, to undertake the remedy, you must trust to private capital, but if we trust to private capital we must give that capital some kind of confidence. Investors must believe that the investments which they are going to make with their money will not be fraught with danger to themselves." But Lord Salisbury leaves the subject without any answer to the difficult question of how it is that the private individual can make the dwellings, for the weekly wage class, self-supporting, while the local authorities, raising money at 2½ per cent., cannot accomplish the same result. In 1862 I first built four blocks of dwellings on my own account, each containing seventy rooms. I was able to build them at 42*l.* per room, but at the present time the London County Council are unable to build at less than double that amount, and my company are this year completing fifty-eight new dwellings in the Old Kent-road at a cost of 75*l.* per room. I am quite willing to admit that the experience of forty years has taught us to make many improvements, both in the size and in the surroundings of the new tenements, but certainly not sufficient to justify the great increase in the cost. This increase has been gradual. In 1870 the cost was about 45*l.* per room, in 1875-85 55*l.* per room, in 1885-1900 70*l.* to 75*l.* per room. This increase is no doubt mainly owing to the fact that more money has to be paid to the workmen for shorter hours and less work. There is a prevailing idea that the workpeople employed by the County Council do not give as fair a day's work for a fair day's pay as when they are working for a private contractor. No doubt the contractor exercises a much more constant supervision over the details of his labour, and of the work generally, and this propably secures a better return for the wages paid. Passing for a moment from the question of cost, let me call your attention to the enormous increase in the outgoings, especially in the local taxation. In Waleran Buildings in the Old Kent-road, where I have to charge 3s. per room, the outgoings will amount to 56·3 per cent., or more than half the rent. In Bethnal Green parish, in 1884, my company paid local rates amounting to 2,197*l.*; in 1899, fifteen years later, they had to pay 2,587*l.* for rates on the same premises, an increase of 18 per cent. The increase in some of the West End parishes is relatively much larger. In 1871 we paid 117*l.* local rates on a block of buildings, and in 1899, twenty-eight years later, we paid 289*l.* on the same block, or an increase of 150 per cent., and on one estate the rates have increased 160 per cent. in twenty-four years. These totals furnish the following results:—That if the local rates had remained the same as they were when our buildings were first erected, my company would be paying 3,957*l.* per annum less than we are now paying. In the last *four* years only local rates have increased 1,023*l.* per annum on the same buildings, there can be no doubt that this very heavy increase at every quinquennial assessment deters capitalists from promoting new building companies. I do not suggest that workmen's dwellings should be assessed differently from other dwellings, but we must always bear in mind that an increase in rates must necessarily lead to an increase of rent. If the rates were colleeted direct from each occupier, he would have an interest in watching the local expenditure and keeping down any extravagance. At the present time the average rent charged by my company in all the buildings in occupation is 2s. 3d. per room per week, but in the new buildings which have cost so much more we shall have to charge 3s. per room per week, and the rooms have all been readily taken up at this price, for they are better in situation and in many other respects than some of those previously erected. The question of situation is almost as important to a weekly wage man as it is to a man of business. If he lives near his work he can afford to pay more rent, as he saves time in going and returning, and, as he is paid by the hour, "time is money" to him, and, if near a busy public thoroughfare, his wife and the junior members of the family can generally get some employment connected with the shops and business premises. This materially helps the family income. This brings me to say a word upon the Act passed this Session, enabling the London County Council to erect working-class dwellings "outside their district." It is said that the County Council propose to provide this class of dwelling at Tooting, or even at a longer distance from the centre of London. I am afraid such a scheme will not accomplish the result that some of their members seem to anticipate. The cost of the dwellings will be as great, if not greater, than in London, and the time spent by the bread-winner on the railway or in the tramcars will be a serious loss. In the absence of local markets the cost of living will be higher than in London, and in my opinion, it is not good policy to separate the weekly wage class from the more wealthy parts of the community. The rich should live amongst the poor that they may sympathise and help them in their troubles, and that the poor may feel that the rich are their friends and not their enemies. If the advice of Lord Salisbury is to be followed and we are to hope to have in the future the same help from private capitalists that we have had in the past, the government should be more liberal with reference to the charge they make for money advanced on mortgage by the Public Works Loan Commissioners. Thirty years ago they advanced the money at 4 per cent., redeemable in forty years, this necessitated an annual payment of 5*l.* 1s. per cent. per annum. By a recent Act of Parliament the rate was reduced to 3*l.* 2s. 6d., redeemable in thirty years, but this requires the payment of 5*l.* 4s. per cent. per annum. If they would advance the money at this rate and extend the term of repayment to eighty years it would be a great inducement to private capitalists to invest in workmen's dwellings. I think I am right in saying that the Government have never lost a single penny of the money advanced towards the construction of workmen's dwellings, but on the contrary have made a large profit. It has been said that the dwellings erected by private capitalists and by the County Council do not provide for the lowest and the poorest class. The theory that I have always acted upon is that the wisest plan in dealing with this difficult question is to attempt, in the first place, to meet the wants of that portion of the working class who are earning from 25s. to 2*l.* per week. As the pressure of this class in finding decent homes is lightened, and better accommodation provided for their use, the class immediately beneath them will shift into the quarters from which they gradually migrate, and this will be repeated until at last the lowest of all comprising what may be emphatically called the "lower orders," and who are least likely to appreciate the comforts of decent homes, will, slowly but surely, receive their share of the benefits enjoyed proportionately by those above them. If twenty Industrial Dwellings' Companies had been formed instead of one, our problem would have been solved to a much greater extent, but I well know the difficulty of forming and working such companies; the collection of capital and the daily supervision required to ensure economical expenditure is really the work of a lifetime.

I have always felt that the greatest benefit that has been derived from the erection of the "improved dwellings" for the working classes arises from the great reduction in the death-rate. The dwellings belonging to my company are spread all over London; in 1899 our average death-rate, as determined by the Registrar of Births and Deaths, was 11·5 in the 1,000, including forty-five deaths in hospitals, as compared with 19·8, the average death-rate in the County of London. It must always be borne in mind that a low death-rate means a low disease-rate. Another great advantage arises from the fact that by means of these new buildings a much larger population is accommodated, and under much better sanitary arrangements than were previously accommodated in the old buildings. The company's estates provide 746 persons to the acre, while the number in the County of London averages only 60·9 per acre. The best evidence of the necessity for more improved dwellings is to be seen in the fact that, with 5,600 tenements to be let, we have at the present moment less than 1½ per cent. empty. Another very interesting point is that the tenants pay their rent with such admirable regularity. On a collection of 115,361*l.* for the year 1899, the loss of rent accruing due amounted to only 2s. 11d. per cent., and this chiefly on the score of poverty and inability to pay. I have now only to thank you for the kind attention you have given to the facts which I have endeavoured to bring before you. Some of you may perhaps think they are rather too personal, but it must be borne in mind that what one company can do may be done by another company. When I first took up this work my greatest hope was that if I could make it a success many other companies would be formed, and in this way Lord Salisbury's suggestion that we "must trust to private capital" would be in every way realised.

The following address was presented by the Secretary on behalf of Mr. H. Percy Boulnois, M.Inst.C.E., who was unable to attend:—

"The problem of housing our labouring classes, especially in our larger towns, is not easy of solution. The primary question divides itself into three heads:

1. Who are the labouring classes for whom housing provision is required?
2. Where should these houses be erected?
3. What description of dwelling should be erected?

The answer to the first question as to who are the labouring classes for whom housing accommodation is required is, I think, the class known as the "poor" labouring class, whose weekly wages are less than 20s. per week, and who, at the best, can earn only a precarious living. There is, of course, a still lower class who can only be provided for in common lodging houses, and, unfortunately, a class even lower still who are provided for in our workhouses. The artisan and skilled workman can command a better wage, which enables him to pay a rental which will always induce private enterprise to provide him with the necessary housing accommodation. It is the man who cannot afford this rental, who has a difficulty in finding a home, to whom our energies should be devoted. 2. The answer to the question as to where these houses should be erected is, of course, as near to the man's work as possible. This, owing to the value of land in all industrial centres, is almost impossible, and consequently it would appear that the only solution is to spread the population by means of quick and cheap transit by tram or train. Much, however, might be done if the existing insanitary property could be acquired and destroyed by the Local Authority as unfit for the purposes of a dwelling, and, therefore, of no value except as bricks and mortar, but this would not affect the value of the land on which it stood, unless it could be held that the land was used for an improper purpose. An insanitary dwelling-house is as dangerous to

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the community as an offensive trade, and should be dealt with in a summary manner. 3. The answer as to what description of dwelling should be erected is one that can not easily be given in the course of a few short remarks. Many millions of pounds have been spent by private enterprise, and by Local Authorities, in the endeavour to provide accommodation for the labouring classes with more or less success, but hitherto very little has been done to grapple with the real problem of building homes for the poorer labouring classes I have described. The class of dwelling hitherto erected has been nearly always of too elaborate a character, too attractive, too good, if one may say so, and too expensive in rental to attract the class for whom the provision is really required. This class are naturally not desirable tenants, they are uncertain in paying their rents, often dirty and careless in their habits, even destructive to property in a drunken brawl, and are not unknown to sometimes break up the woodwork for firewood. They are not a class of tenant to attract private enterprise except in dwellings which are practically unfit for decent habitation. It is to meet these and many other difficulties that is the real problem which has to be solved. What description of accommodation should be provided for this description of tenant, and what rent can they afford to pay? The accommodation must be simple and even unattractive, or otherwise a better class tenant will be attracted; the rent aimed at should, if possible, approach some such unit as 1s. per room per week. Can this be done without taxing the more fortunate or harder working members of a community, under existing circumstances? It certainly cannot if the price of land exceeds a certain limit, but I believe it can be done with land of the value of about 15s. per square yard. The building may be either of the "block" type, or preferably, rows of self-contained cottages, two or three storeys in height, with two and three-roomed tenements. The rooms must not be too large or lodgers will be introduced, there need be no larder, as this class of tenant has inevitably to live "from hand to mouth." There need be no copper for washing, as what little fuel is bought is used for cooking, and washing may now be done at the nearest public wash-house. The living room may be the kitchen, as this class of tenant always makes it so. There should be, however, a scullery, the smallest possible size will do, fitted with a sink and cold water tap. There is no need for a hot-water tap, as this means a boiler and extra fuel. Any hot water required can be heated in a kettle or pot on the sitting-room range, which should, of course, have a small oven and hot-plate. Each tenement should, if possible, have a separate water-closet, as otherwise there is no responsibility for keeping it clean. All the plumbing must be the best possible, but no lead must be used, and everything must be strong and unbreakable. The buildings should be of plain but good brick. There is no necessity for plaster on the inner walls, with good brickwork a bright colour wash is all that is required. The floors should be of concrete, with grooved and tongued floor boards or pitched joints and absolutely impervious, as the tenant can hold the landlord responsible for any damage he may sustain from a careless tenant overhead. There should be as little woodwork as possible, and the doors should be thick "ledged" doors not easily broken. The windows should have very small panes of glass so that repairs may be very cheap, but they must be large and easily opened for light and air. All stairs, window-heads, door-sills, and any "dressings" should be of concrete. These are a few suggestions of many that could be made for cheapening construction, and I believe that it is in this direction, and in this direction alone, that the problem can be solved. It is no doubt perfectly right to have an "ideal" as to how these people ought to live, but it will take many years of education to bring them up to a high standard. At present they do not like large rooms, they are difficult and expensive to keep warm. They will not live in a number of rooms, they prefer to herd together. They cannot pay the rents demanded for "Model Dwellings," and consequently do not live in them. I am afraid that a great many people approach this problem from their own standpoint, and not from the standpoint of those whom they are anxious to serve. So long as this is done the problem will remain unsolved, and the poorer labouring classes will live in cheap hovels if they can be found. If cheap dwellings could be erected for them they will occupy them, but if they are made too good, the better class will give them a trifle to turn out and occupy them themselves, and the problem will be as far off solution as ever. There is, of course, the very difficult question of the value of land. This is a matter which can only be dealt with by legislation, and any interference with the laws of political economy generally brings some retribution. I have endeavoured in these few remarks to point out the difficulties besetting the question of housing the labouring classes, and I have endeavoured to show that, unless we modify our ideas as to the manner in which their dwellings are to be erected, the problem will remain unsolved."

Alderman W. Thompson, Richmond, said that the question under consideration was one which ought to gain the sympathy of everyone who took even the slightest interest in the welfare of such a well-deserving body of people as the working class. In dealing with it, however, they ought to be careful to lay party considerations entirely aside. The neeessity which exists for some improvement in the housing of the working classes appealed to all political parties and to all classes of people, and all should unite in seeking to bring about a remedy that would be beneficial and permanent. They should make every attempt, either by private enterprise or by some other means, to provide better houses for the working men of this country. A good many people considered that the true reason more workmen's dwellings were not erected in London was the exorbitant price of the land. But what, he asked in turn, was the cause of this? The fact of the matter was that there was a corner in land round about London, and the value placed upon it was largely of an artificial character. He ventured to say that if any municipality could secure ten thousand acres in their immediate vicinity, and threw it upon the market to be divided into sites for houses for the working classes, the landowners would at once rush into the market with their land, and the competition would be so keen that no difficulty would be experienced in procuring plenty of land at reasonable cost. Alderman Thompson took occasion to give a short description of the workmen's cottages recently erected at Richmond. These, he said, were erected at a cost which enabled them to let them at the moderate amount of 1s. 3d. and 1s. 9d. per room. Municipalities, he considered, would be able to do more in the way of erecting workmen's dwellings if the period for the repayment of the money they borrowed were extended over a greater period than at present. Then, again, they were unduly hampered by the great amount of red tape exercised by the Local Government Board in its dealings with Local Authorities. Unless some reform took place in that Government Department municipalities would continue to be checked and needlessly restricted in all their schemes for the welfare and benefit of the people residing within their respective areas. Alderman Thompson afterwards proposed the following resolution:—"That in the opinion of this Conference the Local Government Board should at once extend the period of repayment actually granted to Local Authorities for building loans, under Part III. of the Housing of the Working Classes Act, 1890, to the full statutory period of sixty years, and that they should relax and vary the restrictions on building cottages, especially in the direction of enabling more rooms to be provided at a less cost per room, where this can be done without prejudice to considerations of sanitation and safety. That Parliament should be asked to extend the period for repayment to 100 years in the case of land, and to facilitate the advance of money at the market rate of interest for the purpose of housing the working classes."

Mr. W. E. Riley, Superintendent Architect to the London County Council, was the next speaker. He said that he had been closely associated with the work of providing improved dwellings for the working classes for twenty-five years, and the other week had the honour of representing the London County Council at the Housing Congress at the Paris Exhibition. During that Congress he heard of nothing but "why people should house." Personally speaking, he never asked that question at all, but rather inquired how people should house. A good deal of discussion arose as to what percentage should be expected to be returned from the dwellings, and as a rule he gathered that the Frenchman expected 5 per cent. for housing his poor. During the period of his stay he saw some of the best styles of Belgian, German, and French workmen's dwellings. After describing some of these dwellings, Mr. Riley referred to the style of houses in London. For his own part he preferred a good, practical internal finish. Cheapness in building was, of course, essential, but he commended to them the desirability of getting the best internal finish. If they had any money to spare after providing for this they might remove from the exterior the sign manual of common barracks by adding some embellishment; but internal finish and good sanitation were the two important points to be observed. There was more overcrowding in first-class flats in London than could possibly exist in third-class dwellings. They could put more people, according to the area of ground covered, in two rooms in a first-class flat than they could under the permissive operation of the law which was adopted by the Government departments in connexion with working-class dwellings, and this was one of the points which required careful consideration. They required some data upon which they could start designing working-class dwellings without being hampered as to what they should or they should not do. The question of the cost of buildings in London had been a very vexed one, but it might interest them to know that where the London County Council had provided working-class dwellings they were receiving an average return of 3½ per cent. Of course there were some dwellings which yielded as small a percentage as 2½ per cent., but on the other hand there were estates which paid as much as 3·66 per cent. These buildings he thought formed a splendid monument to the competency of Mr. Blashill, his predecessor, in dealing with working-class dwellings.

Mr. E. Bond, M.P., said that he was chairman of the East End Dwellings Company which for the last fourteen years had been building in London, and which set itself in the first instance to build rather for a class that had been left out more or less by the companies which were already in the field. They set themselves to consider how far they could provide dwellings for that class of the population who do not usually earn more than from fifteen shillings to a guinea per week. Whilst he had taken part in this work he thought they ought to remember that there was no use putting up a building unless it paid them to do so. If they went in for a commercial enterprise they must get some appreciable return on their capital or their venture would be unfruitful. Municipalities were not hampered to that extent, but they did seem to be hampered in another way which made it exceedingly difficult for them to effectually deal with the housing problem. What the London County Council had done with all its effort and enterprise was simply to provide nice dwellings for a class of people who could just as well have been housed by the Dwellings Companies. It did not do for them to show off these buildings as proof of the work they were doing on behalf of the working classes. An ignoramus might, in being led through these buildings, express his delight at everything he saw, but he never inquired as to the occupations or the wages earned by those who resided in the dwellings. Municipalities had to consider that they were dealing with public moneys, and they should not, therefore, venture to put up houses which would not yield a return for the money which they had to borrow. If they did not take these points into consideration they would be met by all sorts of difficulties, difficulties that were greater to-day than existed thirteen or fourteen years ago. In London those difficulties were enormous. Recently there had been a great increase in the rate of wages paid in the building trade, as well as in the price of building material, so that what a few years ago cost 50*l*. or 60*l*. to-day cost between 75*l*. and 90*l*. It had been suggested by Mr. Riley that the price of land was a great question, but after all it was not the real question. The average ground rent of a room was threepence or fourpence per week. Though this was an appreciable sum to a working man, it was not a figure that made any great difference in grappling successfully with the matter in hand. Then they had restrictions—very proper some of them, others of them needlessly stringent—which were imposed by the various sanitary by-laws and some of which were very difficult to carry out—as a matter of fact many of them were not carried out—in respect to the overcrowding

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question. He could not hope to give in London for the very poorest class more than one or two plain rooms, one about 12 ft. square, and 8 ft. 6 in. high, and the other rather less in floor space, with a place of convenience on the staircase to be used in common by the people on the landing. The company of which he was chairman expected to get 5 per cent. for their money, and they could not let the rooms for less than 3s. 6d. each.

Alderman Terrett, Chairman of the Workmen's Dwellings Committee, West Ham, was the next speaker, and expressed the opinion that the Conference should, in addition to the resolution proposed, carry another in favour of the removal of the absurd restrictions which Alderman Thompson dealt with, and which the Local Government Board imposed upon municipalities when they desired to deal with the question of the housing of the poor. The Corporation of which he was a member had gone ahead a great deal more than any other public body in the country with regard to the administration of the third part of the Act. The Corporation of West Ham built fifty-four dwellings overlooking a park, each dwelling consisting of three rooms and a scullery, with a separate door and backyard to each. They built that by direct labour, paying the men the London trade-union rates—in some cases considerably more. Notwithstanding they had a strike, the cost of the dwellings only worked out at 6¾d. per cubic foot for the first twenty dwellings and 7d. for the remaining thirty-four. The average rental was from 2s. to 2s. 2d. per room, not including the scullery. At present the Corporation was obtaining the advice of the architects for the building of a number of flats near the dock district, and these dwellings, it was hoped, would let at from 5s. to 6s. per week. Their principal difficulty had been the bitter antagonism they had met with from all the interested parties, and from the wealthier sections of the community, and he was sorry to say they had to fight both political parties on the question.

Mr. Charles J. Hair, architect, of Southampton, thought that corporations were at present trying to attain the impossible. They usually purchased a slum area in order to build upon at a price far beyond its real value, simply because they were corporations, and having cleared out the people they at once demolished the slums without making any provision for them. The result was that building operations were not commenced for a year or two, and in the interval the people displaced did not know where to go. There was no doubt dwellings could be put up at a smaller cost, if only the Local Government Board would relax some of its cast iron rules, and if the Medical Officer of Health was less exacting in his requirements. He could not understand how they could erect cottages in big crowded districts. They would have to satisfy themselves with flats.

Mr. W. E. Harris, Sleaford, said that the Corporation of the city of Lincoln had desired to build about thirty cottages for workmen, but the Local Government Board insisted upon such stupid regulations that they could not possibly proceed with the scheme.

Mrs. Dockrell, Blackrock Urban District Council, Dublin, said that with regard to the slums she believed that if the Public Health Act were enforced in all its branches a good deal of the difficulty would be met.

Mr. A. B. McDonald, City Engineer, Glasgow, said that with the other gentlemen who came from Glasgow he desired to express his great interest in the proceedings. At the same time he had to express his respectful disappointment with the object lesson that was offered them the previous day. The experience they had had in Glasgow during the twenty-five years in which they had been embarked on this important question was different to that in London equally in the cost of erecting the building and the rent at which they let them to those for whom they were intended. It was with something approaching incredulity that the previous day he heard that the construction in London cost something like 8½d. to 9d. per cubic ft. In Glasgow they had put up houses which were very superior, and plans of which could be seen in the Parks Museum, at a cost per cubic foot of from 4¾d. to 5½d. They were constructed of stone, and in some cases with quite an elaborate architectural frontage. In one case, where they had to carry their foundation down to 25 ft., the cost only rose to 6½d. The buildings were erected in centres that were surrounded by an industrial community, none of them were placed in remote positions, and the land on which some of them stood cost 3,760*l.* and 4,752*l.* per acre. Apart from the work accomplished in these industrial centres, buildings were about to be commenced in positions a little more remote which would, of course, cost much less for land.

Dr. Collins, L.C.C., said he had the pleasure of visiting Glasgow and found many things there to stimulate his mind to covetousness. The housing question was one which required the attention of municipalities. Lazarus could not be allowed to sit at the door of Dives without receiving some attention, and if his wants were not attended to he might turn round on Dives and create a pestilence and epidemic which doors could not shut out, and which would ignore the restrictions of the Local Government Board.

The discussion was continued by Mr. Isaac Young, Sanitary Inspector, of Battersea, Mr. Fowler, of Manchester, Dr. Chalmers, Medical Officer of Health for the City of Glasgow, Bailie Anderson (Glasgow), and Mr. Bernard Shaw (St. Pancras).

Two amendments to Alderman Thompson's resolution were proposed, but were negatived by large majorities. Ultimately the resolution was put and carried unanimously.

Votes of thanks concluded the proceedings.

The company in the afternoon visited Richmond, where they inspected the workmen's dwellings recently erected by the local Corporation.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.*

THE proceedings of the Association were resumed at the Westminster Town Hall on Friday, July 20, Mr. C. H. Lowe, Hampstead, President, in the chair.

Manchester and Liverpool Electric Railway.

Sir William Preece gave a short lecture descriptive of the proposed Manchester and Liverpool Electric Railway. He said the Bill was before the House of Commons this session, and was rejected by the Committee. There were three principles involved in this lightning express railway. One was it was a single-rail railway, the second was that it was worked by electricity, and the third was that it was worked at speeds that had hitherto been scarcely dreamt of. The line proposed to start in the very centre of Liverpool, and to follow the dock estate to Dingle, going through Garston, Ditchford Green, Warrington, Barton, Salford, to Manchester. The distance was a little over thirty-four miles. The railway was fixed on trestles a little over 4 ft. from the ground line, and the weight of the carriage was carried by the single rail. On each side of the trestle there were four guide-rails of light section against which the guide-wheels touched and rotated when going round a curve. The whole object of the structure was to bring the specific gravity of the coach below the centre of support, and to enable the coaches to go round curves with speed and security. The only effect of going round a curve was to increase the resistance between the wheels and the guide-rod. It would not affect the speed of the train, but would make it absolutely secure, and would prevent it going off the line. The train consisted of only one coach, weighing forty-five tons, and carrying 100 passengers. The engineering structure of this line followed the practice of a short line of nine miles in length which ran from Listowel, county Kerry. The line had been in work for thirteen years, and when he inspected it he found there was scarcely an indication round the curves of any friction between the wheels and the guide-rails, and altogether the mechanical experience of that line was such as to justify the conclusion that there was nothing wrong mechanically or in any engineering sense to prevent this railway fulfilling its duty between Manchester and Liverpool. A peculiarity of this line was that there were no intermediate stations, no crossings, no points. The line ran from Manchester to Liverpool without interference of any sort or kind. There would only be one set of signals, at Warrington, where the electric generating station was fixed. It would be necessary only to get up speed at the one end and then run through with safety at the rate of 110 miles an hour. Many people thought a speed of 110 miles an hour dreadful to contemplate, and thought they could scarcely keep their seats, but as a matter of fact there was no doubt whatever that on many of our lines now going down inclines they frequently got speed up to eighty miles an hour. It was recorded that the Empire State Express on the New York Central line to Chicago had acquired a measured speed of 110 miles an hour. They had every reason to believe that with the character of the coach, traction due to electricity, and with a straight length of road, that passengers would be carried at 110 miles an hour between Liverpool and Manchester without the smallest feeling except that of greater comfort compared with travelling on an existing line. There were two reasons why electric traction was superior to steam traction—the first was that where they applied electric traction they brought at once on their driving wheel the whole power at their disposal; and the second advantage was that with steam locomotives the application of their power was variable. Their central station would be at Warrington, the current would be exported in three-core cables to Liverpool in the one direction and to Manchester in the other direction, and every three miles there would be sub-stations where current transmitted from Warrington would be reduced down by transformers to 1000 volts, and the coach as it went along would pick up this 1000 volts, working each motor with 500 volts. It was intended to run from Liverpool to Manchester in twenty minutes, and trains would start every ten minutes. The result would be that after a train had left Liverpool, in less than ten minutes it would have passed Warrington, and the line would be safe for a second train to go through. Thus there would be a continuous circulation of trains, all kept apart by the distance between Liverpool and Warrington, which was very nearly the half-way house. Thus collisions would disappear. Then another fear was derailing, but with the guide-rails derailing was an impossibility. Then another source of accidents on railways was at junctions and points; but here there were no points and no accidents from that source. But perhaps the most frequent cause of accident were the mistakes due to individuals; all were subject to error, and when the signalman did occasionally make a mistake the result was serious. Here they were not relying on the signalmen, and thus four causes of accident were removed from this line. When before the House of Commons the Committee suggested that there might be such a thing as a tree falling across the line, and his answer to that was that they must cut all the trees down. At the same time, something might fall upon the line, with the necessity to stop the train. That was a subject which occupied the minds of the Committee very much. Unfortunately at the time, they had not much experience or knowledge gained to answer the questions very satisfactorily; but since, they had found, from evidence in England and America, that there was no difficulty whatever in stopping a train going at 110 miles an hour at a distance comparable with trains going at less speed. On the train there would be a Westinghouse air brake, which, without any extraneous aid, would enable the train to be stopped in 900 yards, but in addition to that they had on the coach two motors, which, by reversing the action, could be converted from motors into dynamos, and which, they had no doubt whatever, would stop the train in 500 yards. That, he thought, was quite within the bounds of practice, and quite good enough for their purpose.

The President moved a vote of thanks to Sir William Preece, which was seconded by Mr. E. J. Silcock, Leeds, supported by Messrs. G. E. Collins, Manchester; MacBrair, Lincoln; Caink, Worcester; J. Price, Birmingham; J. T. Eayrs, Birmingham; and others, and carried unanimously.

Light Railways.

Mr. H. T. Wakelam, County Surveyor for Middlesex, read a paper on "Light Railways from a County Surveyor's Point of View." He contended that grave difficulties would arise in creating a thoroughly workable and efficient system if the provision of light railways and tramways were left in the hands of private companies, and also if the Local Authorities promoted short lengths within the areas of their respective districts. These difficulties were also anticipated by such far-seeing men as the Chairman of the Hornsey District Council and other representatives of local bodies, and projected railways within their districts were dropped in favour of the County scheme directly

* Continued from last week.

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the extreme value of the latter was appreciated. There was no doubt that, for advantages and convenient working, a uniform system under one authority was eminently the one to be desired. It appeared to be the general opinion that County Councils should take the place of private companies in light railway or tramway undertakings, and so relieve the ratepayers as much as possible of the cost they had to bear in maintaining their main roads.

Light railways and tramways were, no doubt, a source of considerable profit, otherwise private companies would not so readily grant such concessions as those already offered by them in some parts of the county of Middlesex. If companies could pay such large dividends and make such concessions as had been offered by them in various directions, the County Council of Middlesex might have very strong faith in its contemplated projects. A county scheme could insure uniformity of rates and fares throughout the system. Cheap trams for workmen could be conveniently arranged and insisted upon. Cleanliness of the cars could be assured. It was contrary to public policy to grant monopolies over main roads; and therefore if the latter were to be used for the purpose of light railways, the system should be as far as possible a complete one, and should be carried out by an authority representing equally the interests of all districts within the area—that was the County Council.

On the proposition of Mr. J. Price, Birmingham, a vote of thanks was accorded to Mr Wakelam for his paper.

This concluded the technical portion of the proceedings.

In the afternoon one portion of the members visited the reservoirs which are in course of construction at Staines by Messrs. Aird & Co. The holding capacity of the two reservoirs is 3,500,000 gallons. The other party visited Woolwich Arsenal. On Saturday the members visited Chatham, and enjoyed a river trip.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend the Fulham Vestry 7,000*l.* for erection of stabling; Lambeth Vestry 15,175*l.* and 21,200*l.* for paving works; Limehouse District Board 6,945*l.* for the same purpose; Rotherhithe Vestry 15,000*l.* for a street improvement; the Shoreditch Vestry 12,400*l.* for electric lighting purposes; the Islington Vestry 19,410*l.* for paving works and 1,175*l.* for various purposes; and the Lewisham District Board 1,000*l.* for coroner's court and mortuary.

Wilton's Palace.—On April 3 the Council authorised an expenditure of 27,300*l.* for the purchase of 17, Fleet-street, commonly known as Wilton's Palace. The freeholders have claimed 1,183*l.* 17s. 6d. in excess, and the General Purposes Committee recommended that the vendors be informed that the Council was not prepared to authorise the expenditure of a larger sum.

Mr. Benn moved an amendment to the effect that the solicitor be instructed to agree with the vendors for the payment of such sum as was payable to them under the Resolution of the Council on April 3, 1900. That, he said, would leave the door open for a settlement of the matter.

Mr. Beachcroft seconded the amendment, which was defeated, and the recommendation was carried.

Municipal Steamboat Service.—The Rivers Committee recommended:—"(*a*) That the Council do seek for powers in the next Session of Parliament to acquire, take over, and administer the river piers and landing stages on the River Thames, for constructing additional piers and altering the location of the piers from time to time, and to establish an efficient steamboat service on the river. (*b*) That it be referred to the Parliamentary Committee to take the necessary steps for this purpose."

Mr. M'Dougall, in moving the reception of the Report, said that the amount of money which was required would be great, and it was suggested that £200,000 would be required for piers and £300,000 for boats, which would give them a fleet of forty boats. The Statistical Officer estimated that 33,000,000 penny passengers would be required to pay the cost of maintenance. He believed in a little time, when the steamboat service was known and appreciated, there would be no charge upon the rates.

After some discussion the recommendation was carried.

Tramway Extensions.—Mr. Benn moved the adoption of the Highways Committee's recommendations that application be made to Parliament to construct a number of new tramways. The total estimated outlay involved was as follows:—Tramways connecting with the northern system, which will probably be worked by the North Metropolitan Tramways Company under their lease until 1910, 43,550*l.*; tramways to be worked by the Council, including 47,600*l.* for extra cars and car-sheds, 839,850*l.*; street improvements, gross cost, 1,058,400*l.*; total, 1,941,800*l.* Of this sum, 1,195,471*l.* was the estimated amount chargeable to tramways account, representing the cost and equipment of nearly twenty-nine miles of double line, with the necessary street widenings. The net amount to be borne by the Street Improvements account was 355,005*l.* The remainder would be met as to 326,684*l.* by contributions from Local Authorities, and as to 64,640*l.* by recoupments from sale of surplus lands. The Committee recommended:—

(*a*) That the standing orders of the Council relative to applications to Parliament for powers be suspended, in order that the Council may consider the following recommendation.

(*b*) That the Council do make application, in the next Session of Parliament, for powers for the construction of the undermentioned new tramways:—

Archway Tavern (tramways terminus) to the county boundary in Archway-road.

Seven Sisters-road (existing lines), *via* Amhurst-park, to Upper Clapton-road (existing lines).

Mildmay-park (existing lines), westward, to Balls Pond-road (existing lines).

Harlesden (near the county boundary), *via* Scrubbs-lane, Wood-lane, Shepherd's Bush-road, Brook Green-road, and Fulham Palace-road, to Putney Bridge.

Uxbridge-road (near the railway station), *via* Richmond-road, Netherwood-road, and Westwick-gardens, to Shepherd's Bush-road.

Brook-green-road, at its intersection with Hammersmith Broadway, *via* that thoroughfare to Glenthorne-road (London United Tramways).

Victoria Embankment (Blackfriars end) *via* Victoria Embankment, Victoria-street, Buckingham Palace-road, Commercial-road, Bridge-road, and Chelsea Embankment, to the northern end of Battersea Bridge.

Battersea Bridge, *via* World's End-passage, Chelsea Embankment, New King's-road, King's-road, and Putney Bridge Approach, to and over Putney Bridge.

Hampstead-road (tramways terminus), across Euston-road, and along Tottenham Court-road, to a point near Oxford-street.

Theobald's-road (tramways terminus), *via* Vernon-place, Bloomsbury-square, Hart-street, across Oxford-street and along Shaftesbury-avenue, to Cambridge-circus.

Farringdon-road (present lines), along that thoroughfare, to the City boundary.

Victoria Embankment over Westminster Bridge to Westminster Bridge-road (L.C.C. Tramways terminus).

Chelsea Bridge (north end) *via* Grosvenor-road, to a point near Lambeth Bridge.

York-road, Wandsworth (South London Company's lines), *via* the new street in course of formation between York-road and Red Lion-street, along Red Lion-street, across High-street, along South-street, Garratt-lane, and Defoe-road, to High-street, Tooting (L.C.C. lines).

St. John's Hill (South London Company's lines), *via* Strath-terrace, Bolingbroke-grove, and Bellevue-road to the Surrey tavern, at the junction of that road and Trinity-road.

Battersea Park-road (South London Company's lines), along Albert-road to the foot of Albert Bridge.

Camberwell Green (L.C.C. lines), *via* Denmark Hill, Champion Park, Grove-vale, Lordship-lane, and London-road, to Devonshire road, Forest Hill.

Goose Green, *via* East Dulwich-road and Peckham Rye, to the junction of Hall-road and Stuart-road, Peckham.

Southwark-street (South London Company's lines), at Hop Exchange corner, *via* Southwark-street, Stamford-street, York-road, and across Westminster Bridge-road, thence (single line) to Lambeth Palace-road (same company's lines), and returning *via* Stangate over a proposed connexion (No. 22), between L.C.C. lines and the company's lines near Westminster Bridge-road.

Waterloo-road (L.C.C. Tramways terminus), along that road to a point opposite the York Hotel.

Westminster Bridge-road (L.C.C. lines), *via* St. George's-road, to Lambeth-road (South London Company's lines)

Westminster Bridge-road (L.C.C. Tramways terminus, to Stangate (South London Company's lines).

Newington-causeway (L.C.C. lines) *via* Dantzic-street, to Southwark Bridge-road (South London Company's lines).

Newington-causeway (L.C.C. lines) to Borough-road (South London Company's lines), at junction with Southwark Bridge-road.

Newington-butts (L.C.C. lines) to St. George's-road (South London Company's lines).

St. George's Church (L.C.C. lines), *via* Marshalsea-road, to Southwark Bridge-road (South London Company's lines).

Great Dover-street (L.C.C. lines), to Bermondsey New-road (London, Deptford, and Greenwich Company's lines).

Old Kent-road (L.C.C. lines), to St. James's-road (London, Deptford, and Greenwich Company's lines)

The recommendations were agreed to.

Gas-meter Testing Office, Newington.—The Public Control Committee recommended, and it was agreed, that the estimate of 8,850*l.* to be submitted by the Finance Committee for the erection of a gas-meter testing-office at Newington be approved and the expenditure sanctioned; that provided the manager of works be satisfied with the architect's estimate of 8,550*l.*, the work be carried out by the Council without the intervention of a contractor, and that in that event the work be executed by the manager.

Improvements.—The following recommendations of the Improvements Committee were agreed to:—

That, subject to the Vestries of Chelsea and Fulham consenting to the proposed tramway from Battersea Bridge to Putney Bridge, and agreeing to contribute between them one-third of the net cost of the necessary street widenings. . . . the Council do apply to Parliament in the Session of 1901 for powers to widen World's End-passage, King's-road, and New King's-road. . . .

That, subject to the Vestries of Fulham and Hammersmith consenting to the proposed tramway from Harlesden to Putney Bridge, and agreeing to contribute between them one-third of the net cost of the necessary street widenings . . . the Council do apply to Parliament in the Session of 1901 for powers to widen Scrubb's-lane, Brook Green-road, and Fulham Palace-road. . . .

That, subject to the Vestry of Hammersmith consenting to the proposed tramway from Uxbridge-road to Shepherd's Bush-road . . . Parliamentary powers be sought in the Session of 1901, to enable the Council to widen Richmond-road. . . .

That, subject to the Vestry of Battersea and the Wandsworth District Board consenting to the proposed tramway from St. John's-hill to Trinity-road, and subject to the Vestry of Battersea agreeing to contribute one-fourth of the net cost of the necessary street widenings . . . the Council do apply to Parliament in the Session of 1901 for powers to widen Strath-terrace and Bolingbroke-grove. . . .

That, subject to the Wandsworth District Board consenting to the proposed tramway from York-road to High-street, Tooting, and agreeing to contribute one-third of the net cost of the necessary street widenings, such contribution not to exceed 91,316*l.* . . . the Council do apply to Parliament in the Session of 1901 for powers to widen Red Lion-street, South-street, Garratt-lane, Defoe-road, and High-street, Tooting. . . .

That, subject to the Vestries of Lambeth and Camberwell and the Lewisham District Board giving their consent to the proposed tramway from Camberwell-green to Devonshire-road, Forest-hill, and agreeing to contribute between them one-third of the net cost of the necessary street widenings . . . the Council do apply to Parliament in the Session of 1901 for powers to widen Denmark Hill, Champion Park, Grove-lane, Dog-kennel Hill, Grove-vale, Lordship-lane, and London-road, Forest Hill. . . .

That, notwithstanding any previous resolution of the Council, the estimate of 11,750*l.*, submitted by the Finance Committee, be approved, and that, provided the Wandsworth District Board undertake to give their formal consent to the construction at any future time of tramways along the portion of West Hill, between the police station and Santos-road, proposed to be widened by the District Board to 54 ft., the Council do give its statutory consent to and do contribute on the usual conditions one-half of the net cost of the said widening, such contribution not to exceed the sum of 11,750*l.*

That the estimate of 10,400*l.* submitted by the Finance Committee be approved, and that the Council do contribute on the usual conditions two-thirds of the net cost of the widening by the Wandsworth District Board of High-street, Tooting, to 60 ft. at the Castle public-house, and between the public-house and Defoe-road, such contribution not to exceed the sum of 10,400*l.*

That the estimate of 1,152*l.* 6s. submitted by the Finance Committee be approved, and that, subject to the Lee District Board undertaking to give their formal consent to the construction at any future time of tramways along the portion of Lee High-road between Nos. 102 to 124 proposed to be widened by the District Board, the Council do contribute on the usual conditions one-half of the net cost of the said widening, such contribution not to exceed the sum of 1,152*l.* 6s.

That the supplemental estimate of 2,028*l.* 7s. submitted by the Finance Committee be approved,

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that the Improvements Committee be authorised to take all necessary steps for the acquisition of the property in Plummer's-court required in connexion with the widening of High Holborn at Nos. 107 to 113, and that if necessary the Committee do arrange with the St. Giles District Board to serve notices under the Act 57 Geo. III., cap. 29 (Michael Angelo Taylor's Act), for the acquisition of the property in question.

That the working drawings, specification, and estimate of the cost (24,408*l.*) of the paving and other works in connexion with the portion of the new Tower Bridge southern approach between Purbrook-street and Star Corner, Bermondsey New-road, be referred to the manager of the Works Department, with a view to the work being carried out without the intervention of a contractor.

Covent-garden Theatre.—The Theatres and Music Halls Committee reported as follows :—"For some time past we have had under consideration the structural condition of Covent-garden Theatre, and in February, 1889, we caused a thorough inspection of the premises to be made by the various officers engaged on theatre work. As the result of this inspection a list of suggestions for improving the premises and bringing them as far as practicable up to the standard of a modern place of public entertainment was sent to the owner with an intimation that we should be pleased to discuss with him any observations which he might wish to make on the suggestions in question. We have now received three letters, dated July 9, 13, and 21, 1900, respectively, from Mr. E. O. Sachs, the architect to the Grand Opera Syndicate, stating that his directors contemplate making extensive alterations to the theatre, at the cost of about 15,000*l.* The proposals will meet about one-half of our suggestions. We pressed the directors to submit proposals on the remaining suggestions, but they state they are unable to do more in the present financial year than they have already proposed. The work which it is intended to carry out at once will undoubtedly effect a great improvement in the theatre, and we are prepared to accept it subject to some modifications on the distinct understanding that the remaining suggestions will be dealt with by the management within a short time." Various recommendations of the committee were agreed to.

Applications under the Metropolis Management and Building Acts Amendment Act, 1878.—The following applications were agreed to on certain conditions :—

Manager's room, Haymarket Theatre (Messrs. Lee & Pain).

Arrangements at Hyde Park-court (Messrs. Lee & Pemberton).

Arrangements at the new Grand Theatre of Varieties, Clapham (Mr. E. A. E. Woodrow).

Tenders.—The following tenders have been accepted :—

Farm buildings, Heath Asylum, Bexley ; Mr. S. Redhouse, Baldock, Herts, 8,320*l.*

Repainting Deptford Creek Bridge. Mr. A. H. Inns, 358*l.* 17s. 6d.

Repainting Lee Bridge (London and Essex). Mr. A. H. Inns, 169*l.* 4s. 10d.

Lighting by electricity Paddington Fire-station. Messrs. Tamplin & Makovski, 248*l.* 4s. 6d.

Supply of about sixty-five arc-lamp standards for electric light installation, Victoria Embankment and Westminster Bridge. Messrs. W. Macfarlane & Co., at 30*l.* each.

A 2-ton overhead traveller, required in connexion with the electric light installation, Victoria Embankment and Westminster Bridge. Messrs. J. Whitley & Co., 2,142*l.* 2s.

Swimming-bath, Mayford School. Mr. H. Hutchinson, 756*l.*

Alterations necessary to adapt a cow-house at Farmfield as an engine-house. Messrs. Pink & Moon, 170*l.*

Tar-paving materials, Maryon Park. Buxton Lime Firms' Company, Limited : Bottoming, 10s. 11d. per ton ; topping, 1*l.* 3s. 11d. per ton ; dust, 15s. per ton ; spar quartz, 1*l.* 10s. per ton.

Tar-paving playground, Walworth Recreation Ground. Buxton Lime Firms Company, Limited : Bottoming, 10s. 2d. per ton ; topping, 1*l.* 3s. 2d. per ton ; dust, 15s. ; and spar quartz, 1*l.* 10s. per ton.

Bacterial Treatment of Sewage.—The Main Drainage Committee reported as follows :—

"Our attention has been called to the desirability of making an experiment in what is generally known as the anaerobic bacterial treatment of sewage. In this process the sewage is allowed either to remain stagnant in a tank or to pass very slowly through it without getting into contact with the air. Experiments made on a small scale at Crossness, as well as those carried out by other authorities, tend to show that the sewage is thereby practically freed from all solid suspended matter, and that the greater part of the sludge disappears altogether through bacterial action We think it very advisable that the experiment should be undertaken for a period of six months, and that the necessary plant should be provided without delay. The cost of alterations to an existing tank and all incidental work is estimated at 150*l.*, while the expenditure for extra labour will be about 6*l.* per week. Sufficient provision has been made in the estimates for the current financial year to cover the cost of the experiment, and we therefore recommend—That an expenditure of 300*l.* be sanctioned for the purpose of making an experiment for a period of six months in the anaerobic bacterial treatment of sewage at the Crossness outfall."

The recommendation was agreed to.

The Council sat till a late hour, and at the close of the sitting adjourned until October 9.

Illustrations.

THE plates in this issue are all given as illustrations to the Annual Excursion of the Architectural Association, the concluded report of which will be found on another page.

The headquarters of the Excursion were at Bury-St.-Edmunds, and we give as one illustration the porch of St. Mary's Church in that town, well known as one of the finest and most interesting late churches in Suffolk. The most striking mediæval relic of Bury-St.-Edmunds, the Abbey Gatehouse, we gave a large illustration of some time since, and therefore do not repeat it. The porch of Woolpit Church is another exceedingly fine piece of late Gothic (the church work in the district is mostly late), and the photograph also shows very well the effect of the flint pebble walls, though it cannot show the fine and varied colour which pervades them.

Hengrave Hall has a picturesque and unusual front, but Rushbrooke Hall, one of the few moated houses remaining in England, is much superior to it in refinement of architectural style. We give three illustrations of it ; the south front, with its fine symmetrical treatment ; the detail of the entrance porch ; and the north front : the latter is given chiefly to show the effect of the house in conjunction with the moat.

The illustrations are all from photographs by Mr. W. S. Spanton, of Bury-St.-Edmunds.

XYLOSOTE : A WOOD-PRESERVING PROCESS.

ON Thursday, the 26th ult., some interesting experiments were made at Pitlake, Croydon, showing the method of impregnating wood by what is known as the Xylosote process. This process aims at preserving wood from decay, and in that sense is comparable with creosoting. The method may be briefly described as follows. A number of pieces of timber (railway sleepers were used in the experiments alluded to), being placed on trolleys, are run into a large cylinder, the lid of which is then shut down and securely bolted. The cylinder is carefully made so as to be air-tight. All air is then exhausted from the cylinder as far as possible ; heat is then introduced, and this brings the sap out of the wood ; the wood is then subjected to a highly heated solution of metallic and mineral salts under limited pressure. It is stated that the impregnating liquid consists of a solution of the sulphates of copper and iron, crystals of which are first made in the proportion of 20 per cent. of copper to 80 per cent. of iron, also alumina (condition not stated), and "Kanit," a salt mined at Stassfurt, in Germany, which consists chiefly of sulphate of potash and magnesia, and the chloride of magnesia. The sap brought out of the wood is, to a large extent, dissolved and carried off in the liquid, the copper arrests any tendency of the wood to decay from organic causes, whilst the iron is said to form a chemical combination with the woody fibre, the iron then becoming insoluble in water. After being subjected to this solution for three and a-half to four hours, the solution is drawn off, and the wood is almost immediately taken out in a heated condition. The experiments did not, *per se*, demonstrate what had happened during the process, but the following appeared to have taken place :—The quantity of sap removed occupied more space when in the wood than did the chemicals introduced into the wood during the process. The wood consequently shrank to some extent, and it became harder and more difficult to work than before. It possessed certain fireproofing qualities, as was demonstrated by shavings which could not be completely burned up. Of course, it was not possible to demonstrate in a day whatever improvements might have been effected so far as arresting decay is concerned, but the process is not altogether a new one, for it has been employed for a few years by governmental authorities in Germany and elsewhere in the preparation of railway sleepers, and is said to have given complete satisfaction. On scientific grounds we are quite prepared to believe this, and in our opinion the process has a successful future. It is applicable not only to the purposes mentioned, but to the preservation of blocks for wood paving, scantlings, and to practically all wood used in building. The advantages of the Xylosote process are best brought out, perhaps, when comparatively soft woods are dealt with, for in these, so far as we are enabled to judge, the most marked improvement is effected.

ARCHÆOLOGICAL SOCIETIES.

BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY. — The annual summer meetings of the Bristol and Gloucestershire Archæological Society were begun at Bath on the 18th ult. The members were received at the Guildhall by the Mayor of Bath (Mr. R. E. Dickinson, M.P.) and several members of the local committee. The Rev. William Bazeley (general secretary) read the annual report, which was adopted, and the members of the council were re-elected as follows :—Messrs. T. Dyer Edwards, E. C. Gael, J. Morton Ball, James Baker, J. E. Pritchard, Charles Bathurst, jun., V. Perkins, Douglas Wintle, the Revs. C. S. Taylor and W. T. Blathwayt. Thanks were also accorded to Mr. G. S. Bazley, the retiring President, for his services to the Society. Mr. G. S. Bazley responded, and in introducing Mr. F. F. Fox, the President for 1900-1, he congratulated the Society on the accession to the office of a member so distinguished in archæology, one who had belonged to the Society so long, and who was, he believed, eminent in various literary attainments. Mr. F. F. Fox then took the chair, and, after returning thanks for his election, he remarked that he thought it was a happy augury for his year of office that they met in the ancient city of Bath. Its Roman remains, its public buildings, its fine Abbey, the brilliant social life and the literary history of Bath for the last 200 years, made it one of the best known and most prominent cities of the kingdom.—In the afternoon a visit was paid to the Abbey Church, of which a description was given by the rector, the Rev. Canon Quirk. The canon related the well-known history of the church, and drew attention to features of interest in the building. After their inspection of the Abbey the visitors adjourned to the Roman baths. Here they were met by Major C. E. Davis, who acted as guide. After the company had inspected the remains, Mr. St. Clair Baddeley was invited to give some description of Roman baths which he had investigated at Rome. He first drew the members' attention to the fact that the bath they were inspecting was a provincial specimen. Although the Roman bath proper followed to some extent a conventional plan in the distribution of its offices and halls, at Bath they found that Nature had provided the hot water, which as a rule the furnaces had to do in Italy. He thought one ought not to forget in the secular appearance of the institution known as Roman baths that nevertheless behind it was always a sacred significance. All fountains, springs, rivers—in fact, all water was to the ancients a sacred element. Hence they found practically that all the early baths were dedicated in the name of some divinity or other. The decoration of baths in Italy was naturally different from what they saw here ; the remains of marble in British Roman edifices were very rare indeed, England being so distant a colony. That large bath in the centre was once entirely vaulted over in a peculiar way. They saw lying in the water large masses of hollow tiles, all stuck together still by their concrete. Those were portions of the vaulting which spanned the water, and were of that beautifully light construction caused by the tegulæ being hollow. These

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baths had been made in their restoration to face the wrong way. It had been laid down as an absolute law that baths must always face south, and in a country like England, situated so far north and exposed to bitter winds, it was doubly necessary that that should be the case. He thought that perhaps some day evidence would be found to show that the real entrance to these baths was on the opposite side to where the restorers had placed it.—A meeting was held in the evening at the Guildhall, when the President delivered an address on "Rood Screens," in the course of which he said: It is necessary to trace the descent of the rood loft from the screen, and of the screen from the ambo, because they were introduced into the church at different dates, and for not dissimilar purposes. In regard to the ambo, it was the custom of the Primitive Church, and long afterwards, to sing the Epistle and Gospel from two stone pulpits placed at the lower end of the choir, from whence they would be conveniently heard by the people, and for this reason they were termed "Ambones." Of these many examples remain in ancient basilicas, such as at San Lorenzo and San Clemente in Rome. These pulpits were also used for chanting the lessons of the divine office, and from the reader asking a blessing before commencing with "Jube Domine Benedicite" they were commonly called "Jubès," which name was afterwards retained when these pulpits were exalted into a lofty gallery or screen, reaching across the choir. We must observe, however, that the cathedrals built towards the end of the twelfth century and at the beginning of the thirteenth had not been arranged to receive jubès and choir screens. It was only towards the middle of the thirteenth century that the bishops or chapters raised jubès before the choirs of cathedrals. Jubès were sometimes of very large proportions. That of St. Sophia at Constantinople was large enough to enable the Emperors to be crowned in it—a function which would require space for a considerable number of persons. The French kings always ascended the jubè of Rheims Cathedral at their coronation; and on the accession of Charles X. of France, in 1824, the ancient rood loft having been demolished, a temporary one was erected for the solemnity of his coronation. The jubè was usually erected on a solid wall to the choir, and pillars with open arches towards the nave; and under these there were usually one or more altars for the parochial Mass. There is no country in Christendom where so many screens are still preserved and standing as in England. The counties most abounding in screens are Norfolk, Suffolk, Lincolnshire, Cambridgeshire, Somerset, and Devon; but every county presents some interesting examples, and it must be distinctly understood that every church, great and small, was originally provided with a screen. The Cathedrals of York, Lincoln, Southwell, Wells, Exeter, Bristol, Chichester, Canterbury, Rochester, Chester, Norwich, and Gloucester all have their old screens and rood lofts standing, but, of course, the roods themselves have been taken down and have been replaced by organs. When roods and rood lofts were ordered to be removed at the Reformation, screens were ordered to be preserved; and their wholesale destruction chiefly took place in the earlier part of the present century, when modern church restoration began. Devonshire screens have a distinct family likeness. They are altogether more elaborate than those in Cornwall, and, in some respects, are different from those in Somerset. They are, in the main, built of English-grown oak. No chestnut was ever used. The sills upon which the rood screens stood were nearly always massive, and often very effectively moulded. As a rule, these cills run right through from end to end, under doors and under panelling alike; thus they must have been constant stumbling-blocks to successive generations when entering or leaving the chancel. The arcades run from east to west, continuously, without a break, and, as a rule, there are no chancel arches in Devon, hence the greater necessity for some distinct line of demarcation between nave and chancel. Stone screens are few and far between; and save the splendidly conceived and superbly wrought one at Totnes, few perhaps have such distinct merit as to call for more than passing mention. The three screens at Collumpton are the most superb in the West of England. The rood screen is 54 ft. long, and has the three doors intact. High above the lovely rood screen itself is an ornamental rood beam, supported by angels. On the east side of this the iron stay is still remaining that helped to steady and hold the great crucifix beneath. This latter rested on the rood loft. The Golgotha is now in the western tower. It has evidently been carved out of the butts of two oak trees, measuring 9 ft. 6 in. by 1 ft. 6 in. by 1 ft. 9 in., and 6 ft. by 1 ft. 6 in. and 1 ft. 9 in. The rood is hewn and carved to represent rocks, with skulls, crossed thigh bones, and shoulder blades upon them. Every church in England had a screen down to the reign of Edward VI. There seems, however, to be no satisfactory evidence that in the early centuries these structures were surmounted by a rood. The rood-loft generally projected in front of both sides of the screen, so as to form a sort of groined cove, the ribs of which spring or diverge from the principal uprights of the screen beneath, and this cove supported the flooring of the loft. An earlier date than the eleventh century can hardly be assigned for the introduction of the rood with the figures of St. Mary and St. John into our churches, though in illuminated manuscripts somewhat before that period we find such figures portrayed with a crucifix. Up to the middle of the sixteenth century some of the rood-lofts were most elaborate and costly specimens of composition and wood-carving. The great crucifix and rood, with its attendant images, stood always in the centre of the loft. The cross was usually framed of timber, richly carved, painted, and gilt. At its extremities the four Evangelists were depicted, and frequently on the reverse the four doctors of the Church. The Evangelists were sometimes represented as sitting figures in the act of writing, but more frequently under the form of the Apocalyptical symbols. The extremities of the cross usually terminated in fleur-de-lys, and its sides were foliated and crocketed. The Blessed Virgin and St. John were the utmost invariable accompaniment of the crucifix, but cherubim were occasionally added. As these roods were of great weight their support was assisted by wrought-iron chains, depending from the great stone arch on the entrance to the choir and chancel, and the staples for these chains are frequently to be seen in churches from which the roods have been removed. These roods were at one time not uncommon, but they have now nearly all perished. The lecterns were either movable brass stands, like those in choirs, or marble desks, forming part of the masonry of the design. These are still left in many churches on the Continent. Those at the Frari at Venice are most beautiful, and to come nearer home, in a rood-loft at Tatershall Church is a curiously moulded stone desk for the reader of the lessons. Coronals of silver or other metal were suspended on all the great rood-lofts, and filled with lighted tapers on solemn feasts. Of the rood-loft images, out of the general destruction by authority in the reigns of Edward VI. and of Elizabeth, I know of one set only which has escaped. This is in the little church of Bettys-Gwerful-Goch, near Corwen, North Wales, where the images of the Crucifix, of St. Mary, and St. John, rudely carved in a wooden panel in a low relief, and formerly affixed to, or in front of, the rood-loft, are still preserved. Rood-loft screens in many of our churches appear to have been covered with painting and gilding. Of these the churches in Norfolk and Suffolk present the most perfect examples. The lower portions of these screens being panelled, the various compartments were painted, apparently in tempera, with single figures, mostly of saints distinguished by their several symbols. In the third and fourth year of Edward VI., 1548, an Order in Council was passed for "abolishing and putting away divers books and images." Images of stone, timber, alabaster, or earth, graven, carved, or painted, were to be defaced and destroyed. In the visitation articles of Archbishop Parker, 1569, we find inquiries were to be made, amongst other matters, as to whether the altars have been taken down; also, whether images and all other monuments of idolatry and superstition were destroyed and abolished; whether the rood-lofts were pulled down, and if the partition between the chancel and the church was kept. This last inquiry explains the fact why, when the rood-lofts were taken down, the screens beneath them were left.—The Rev. W. Bazeley gave an account of recent excavations at Hayles Abbey. Last year, he said, they cleared the cloisters, which of course were the centre of the old monastic life. They removed the rubbish from the walls and arches and cleared the walks. They repaired the arches where absolutely necessary with dry walling. They cleared out the Chapter House, the floor of which was about 7 ft. or 8 ft. below the surface of the field, and in doing so they found that the stone roof had fallen in bodily with all the ribs of the vaulting, the shafts, and the capitals, and among the débris they found six very beautiful thirteenth century bosses, five of them carved with conventional foliage, and one with the figure of our Lord as the spiritual Samson rending the lion. In the west cloister they found again the vaulting and six more bosses of the sixteenth century, carved with the arms of great people who in 1513 enabled the Abbot to repair the Abbot's lodging. A beautiful collection of floor tiles was also discovered. During the present year they had been excavating the great church of Hayles, which was about 320 ft. in length—as long as Gloucester Cathedral without the Lady Chapel. They had opened up the east end, and had found a very beautiful apse, with five polygonal chapels and two semi-circular ambulatories. In the centre of this chapel they had found the base of the shrine of the Holy Blood of Hayles—a most interesting discovery. Since that they had excavated the presbytery, where they had made many discoveries of interesting tiles, and, above all, they had come across the remains of a magnificent tomb, supposed to be the tomb of Edmund, Earl of Cornwall, with a part of his effigy and that of his wife. They had now got as far as the monks' choir, and they might excavate the nave.

[The above account is abbreviated from one which appeared in the *Bristol Times and Mirror*.]

METROPOLITAN ASYLUMS BOARD.

THE fortnightly meeting of this Board was held on Saturday at the Board's office, Embankment, E.C., Sir E. Galsworthy presiding.

Messrs. W. H. Barber & Son, of 22, Buckingham-street, Strand, were appointed to take out quantities of the works connected with the proposed reconstruction of the laundry at the Leavesden Asylum, in accordance with plans prepared by Messrs. Newman & Newman.

The revised plans prepared by Mr. Rowland Plumbe for the erection of the proposed homes for convalescent children at Rustington, Littlehampton, were, on the recommendation of the Works Committee, adopted and ordered to be sent to the Local Government Board for their sanction.

The Works Committee further reported upon the plans for the proposed Southern Hospital and recommended that the Architect's observations upon the letter of the Local Government Board be forwarded to that body with an intimation that, having regard to the fact that the scheme upon which it was based had received the full concurrence of the Local Government Board, and was drawn with the object of ensuring a more satisfactory separation and classification of convalescent patients, the Managers press for the Board's sanction to the expenditure upon the plans of which they had already signified their approval.

This was agreed to.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

AT the meeting of the London County Council on Tuesday, the following applications under the London Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

Lines of Frontage.

Dulwich.—A house on the south-west side of Townley-road, Lordship-lane, Dulwich, next No. 12 (Mr. F. A. Clark for Mr. W. A. Bois).—Consent.

Projections.

Strand.—A balcony and a three-story oriel window at the Lord Belgrave public-house, No. 60, Whitcomb-street, Leicester-square, at the corner of Sput-street (Mr. C. H. Flack for Mr. R. Ireland).—Consent.

Strand.—An additional iron and glass shelter at the entrance to the Tivoli Music-hall (Mr. W. Emden for the New Tivoli Company, Limited).—Consent.

Greenwich.—Wood and tile pent roofs over the entrance doorways of Nos. 28, 29, 30, 31, 32, and 33.

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Spencer Villas, Little Heath, Old Charlton (Mr. J. Bull).—Consent.

Lambeth, North.—Two oriel windows in front of Nos. 101 and 103, Lambeth-road, Lambeth (Mr. C. Ansell).—Refused.

Line of Frontage, Construction, and Projections.

Finsbury, Central.†—Houses in Muswell-road, Mavis-road, Rensburg Park, Colesberg Park, and Methuen Park, with bay windows, wood and slate pents over the entrance doorways, gables constructed with wooden framework, wooden balustrades, wooden mullions to the bay windows, wooden verandahs, porches, and balustrades, and the flanks of some of the houses in advance of the proposed building line in the streets upon which the flanks of such houses are shown as to abut (Mr. J. Edmondson & Son).—Refused.

Line of Frontage and Projections.

Marylebone, East.—A block of buildings with projecting bay windows, porches, and balconies on the site of Harley House, Marylebone-road, Marylebone, at the corner of Brunswick-place (Messrs. Boehmer & Gibbs for Mr. C. J. Hinsley).—Refused.

Width of Way.

Westminster.†—A two-story addition to St. Ermin's Hotel, Westminster, within the prescribed distance from the centre of St. Ermin's Hill (Mr. J. P. Briggs for the Mansions Propriety, Limited).—Consent.

Hackney Central.—A one-story workshop at the rear of No. 33, Middleton-road, Hackney, with the forecourt boundary or fence at less than the prescribed distance from the centre of Mayfield-road (Mr. E. Lawson for Mr. A. E. Maskall).—Consent.

Whitechapel.—Roofing over a passage-way leading to some baths at the rear of No. 18, Old Montague-street, Whitechapel, at less than the prescribed distance from the centre of Old Montague-street Mr. G. H. Elphick for Mr. J. Silverman).—Refused.

Lines of Frontage and Width of Way.

Paddington, South.—A building on the north side of Douglas-place, Queen's-road, Bayswater (Messrs. Howgate & Keith for Messrs. W. Whiteley, Limited).—Consent.

Kensington, South.—A two-story addition to No. 39, Victoria-road, Kensington, to abut upon St. Alban's-road (Messrs. C. Liney & Sons for Mr. J. E. Jarvis).—Refused.

St. Pancras West.—A one-story addition to the Regent's Park Riding School, on the north-east side of Park Village East, Regent's Park (Mr. W. Woodward for Mr. B. Perry).—Refused.

Width of Way and Projections.

Strand.†—A projecting doorway at the entrance to No. 1, Craig's-court, Charing Cross (Mr. J. H. Christian for Messrs. Cox & Co.),—Consent.

Formation of Streets.

Greenwich.—That an order be issued to Messrs. W. Houghton, E. Mytield, and G. Houghton sanctioning the formation or laying out of a new street for foot traffic, 10 ft. wide, to lead from Churchlane to Elliscombe-road, Charlton.—Agreed.

Kensington, South.—That an order be issued to Mr. W. G. Hunt sanctioning the formation or laying out of a new street for carriage traffic in substitution for the street sanctioned by the Council on February 15, 1898, to lead out of the east side of Addison-road, Kensington (for Messrs. Jones Brothers). That the name Oakwood-court be approved for the new street.—Agreed.

Kensington, South.—That an order be issued to Messrs. Drivers, Jonas, & Co., sanctioning the formation or laying out of a new street for carriage traffic to lead out of the north side of Melbury-road, Kensington (for Lord Ilchester). That the name Abbotsbury-road be approved for the new street.—Agreed.

Means of Escape from Top of High Buildings.

St. George, Hanover-square.—Means of escape in case of fire, on the two top stories of a block of residential flats, on the site of Nos. 1 and 2, Grafton-street, at the corner of Hay-hill, St. George, Hanover-square, for the persons dwelling or employed therein (Messrs. Boehmer & Gibbs for Mr. E. J. Cave).—Consent.

Holborn.—Means of escape in case of fire on the top story of the front portion of a proposed building on the site of Nos. 120, 122, and 124, Southampton-row, Bloomsbury, for the persons dwelling or employed therein (Mr. P. E. Pilditch for Mr. F. Parker).—Consent.

Building for the Supply of Electricity.

Whitechapel.—A furnace chimney-shaft, economiser chambers, flues, and cable-way at the electricity generating station, Osborn-street, Whitechapel (Mr. M. W. Jameson for the Board of Works for the Whitechapel District).—Consent.

Working Class Dwellings and Width of Way.

Greenwich.—That the Council do make an order as follows—Whereas Mr. J. Briggs, on July 16, 1900, under the provisions of Section 42 of the London Building Act, 1894, delivered, on behalf of the Housing of the Working Classes Committee of the Council, at the County Hall, plans, as revised by a further block plan signed by the chairman of the Building Act Committee, of intended dwelling-houses, to be inhabited by persons of the working class and proposed to be erected, not abutting upon a street, on a site on the south side of Old Woolwich-road and the east side of East-street, Greenwich. . . . . The Council does by this order sanction plan No. 2, dated July 16, 1900, and the block plan signed by the chairman of the Building Act Committee, so far as Section 42 of the said Act is concerned. . . . .—Agreed

Greenwich.—A block of working-class dwellings on the south side of Old Woolwich-road, with a boundary fence at the eastern end of such block (Mr. J. Briggs for the Housing of the Working Classes Committee of the Council).—Consent.

Dwelling-house on Low-lying Land.

Woolwich.—That the Solicitor do prepare a licence under Section 122 of the Act to Mr. H. Histed for the erection of a dwelling-house on low-lying land, situated on the north side of Bostal-lane, Abbey Wood, Plumstead, in accordance with the tracing submitted on his behalf by Mr. T. J. Young.—Agreed.

The recommendations marked † are contrary to the views of the Local Authorities.

THE HOUSING PROBLEM IN MANCHESTER.

THE housing problem, which has recently been under discussion in special reference to the necessities of the congested area in Hulme, has actively exercised the mind of the Manchester City Council for the past ten years. Earlier than 1890 there was agitation in regard to the abolition of "the slums." But it was not until that year that a practical scheme which aimed at the rearrangement and reconstruction of the streets and houses in certain densely populated and insanitary districts was adopted. The scheme was given the title of "The Manchester Labourers' Dwellings Scheme," and under its provisions some important and highly interesting experiments have since been carried out. Attention was first paid to Ancoats, where the state of affairs had become so serious that the death-rate ran up from 26 per 1,000 to an average of 50 per 1,000, and in some courts to more than 80 per 1,000. A large area of land, some 18,269 square yards in extent, was acquired at a cost of 97,481*l.*, and the 239 dilapidated buildings upon it, with all their attendant unwholesomeness, were demolished. The land was divided, and upon one-half of it there were put up the "barrack" buildings which were the subject of so much discussion. Although these are now always full residence in them is not popular. Prejudice, however, has had to give way to necessity. They have accommodation for 848 persons. This block of buildings proved more expensive than had been anticipated, and as a consequence the revenue from rents is insufficient to return an adequate percentage on the outlay. The second half of the land was utilised for buildings of a totally different class, as will presently be shown. Another unhealthy Ancoats area was in Pollard-street. There the Corporation acquired eighty-five back-to-back houses and fourteen shops, all old and worn out, at a cost of 9,546*l.* The area was 3,383 square yards. Buildings very similar in general arrangement to those in Oldham-road were erected.

Both the Oldham-road and the Pollard-street buildings were ready for occupation in 1894, but several other groups built with the same double purpose of ridding congested areas of plague spots and of providing decent housing accommodation for working folk, although arranged for in a reconstruction scheme passed in 1891, were not completed till last year. One of these later undertakings is in Harrison-street and Providence-street, Ancoats. Here the acquirement of an area of 3,442 square yards, upon which there were seventy-nine insanitary houses, cost 5,147*l.*, and when these houses had been cleared away a lodging-house for men was built at a contract price of 10,980*l.* This is a model lodging-house in the proper sense of the word, and its provision has been justified by the extent to which its accommodation is taken advantage of. Electric light, lavatories, baths, lockers, barber's, tailor's, and bootmaker's shops, reading-room, smoke-room, and separate sleeping cubicles are amongst the comforts of this excellent house.

It is a different type of building to which those who are interested in the present phase of the housing question are turning their attention just now. Examples of this type are to be found on the second half of the Oldham-road site, on the Potts-street area, also in Ancoats, and on the Chester-street area in Hulme. The plans for all these buildings were prepared by the City Surveyor. On the second half of the site cleared in Oldham-road there have been built thirteen shops, with five-roomed dwellings over, two rows of two-story tenement buildings, and eighteen five-roomed cottages. The shops let at 70*l.* per annum, the one-roomed tenements at 3s. per week, the two-roomed tenements at 4s. 6d. per week, the three-roomed tenements at 5s. 9d. per week, and the cottages (which are arranged for, on an average, seven persons each) at 7s. 9d. per week. There is accommodation for 525 persons, and the cost of these buildings—the contract price of 25,114*l.* was closely adhered to — was proportionately much cheaper than the five-storied "barracks" adjoining. It may be noted, however, that the "barracks," with 848 residents, only occupy 261 square yards of superficial area more than the shops, tenements, and cottages, which only accommodate 425 people. The Chester-street area scheme is one of the most successful which the Corporation has so far undertaken. This area was a particularly unhealthy one, and the Corporation purchased a site upon which were 133 old houses. These were removed and replaced by four rows of two-story tenement buildings very similar in arrangement to those on the Oldham-road area. There are thirty-six two-roomed tenements at 4s. 6d. per week, eighteen three-roomed tenements at 5s. 9d., and a similar number at 6s. The area of the land occupied is 4,554 square yards. Its acquirement cost 15,141*l.*, and the contract for the building of the tenements was 11,750*l.* The Chester-street area improvement is one of the best of its financial results that the Corporation can show, for there is a return on the capital outlay of a trifle over 3 per cent. One other reconstruction scheme remains to be mentioned—that on the Pott-street area. Here, on an area of 5,819 square yards, acquired at a cost of 14,621*l.*, 127 houses were demolished and two rows of tenement dwellings, three stories high, were built at a contract price of 16,756*l.* There are thirty-six two-roomed tenements at 4s. 6d. per week, thirty-nine three-roomed tenements at 5s. 9d. per week, and three four-roomed tenements at 6s. 3d. per week. Here, as in Chester-street, the dwellers on the upper floors have the advantage of an open balcony at the back of the building, a provision which goes largely to neutralise the handicap, especially where there are young children, of living "upstairs." Where land is very dear, as it is in many of the congested districts near the heart of the city—extension of warehouses are constantly absorbing the old cottage property—it is thought that these two and three-storied tenement dwellings will answer best when future clearances of insanitary areas are made.

So far reference has only been made to the Corporation dwellings built under schemes which have been impelled by the urgency of sanitary requirements, but these do not exhaust the municipal activities of Manchester in regard to housing matters. Various schemes of the Improvement Committee have necessitated the building of cottages—122 altogether—for the accommodation of tenants disturbed in Gaythorn-street and South Junction-street, in Shudehill, Miller-street, and Moston-lane, and in an area in New-street. These cottages are to be found at Miles Platting—some of them, by the way, still in course of erection, and the tenants in the New-street area will not be disturbed until the new houses are ready. The cottages, it is estimated, will, after allowance is made for water and poor rates, chief rent and empties, give a satisfactory return on the capital expended. Sixty of them, containing four rooms, are let at 5s. 6d. per week. The total cost was 13,202*l.*; 7s. 6d. and the return is reckoned at 3½ per cent. Twenty-two rented at 7s. per week cost 6,000*l.*, and the net return is reckoned at 3¼ per cent. The remaining forty, which are now in hand, will, at a rent of 7s. per week, it is calculated, return 4 per cent.—*Manchester Guardian.*

THE HOUSING PROBLEM IN EDINBURGH.

IN his annual report, just issued, the Burgh Engineer of the city of Edinburgh (Mr. John Cooper) gives the following in reference to the housing of the poor:—The question has again and again been raised, and rightly raised—Are you providing housing for the evicted slum dweller? That is to say, for those persons whom the civic authority are bound to provide for in this way. It would be a matter of satisfaction were it possible to answer this question in the affirmative, but let us see first of all the number of houses of the cheapest class which have been erected in Edinburgh during the last five years. In the central parts of the city, that is to say, in the neighbourhood of Cowgate, which has hitherto been regarded as the habitat of the very poorest class, the Corporation have erected two tenements at High School Yards, consisting of fifty-six houses and eight shops. These have been provided at a total cost of 11,079*l.* 6s. 7d. The Corporation has also enlarged and improved a block of houses at South Back Canongate, consisting of twelve separate houses, the total cost of which was 1,884*l.* 0s. 8d. The Corporation has also erected two tenements at Tynecastle, which is a district in the western suburbs of the city, containing sixty-four houses, at a cost of 8,059*l.* 15s. 7d. The total number of houses thus provided by the Corporation equals 132, at rents ranging from 5*l.* to 10*l.* 10s. It may, however, be admitted that few of the actual evicted slummers have been rehoused under these schemes, although a corresponding class are thus housed. On a slum clearance situated between High-street and Cowgate, immediately behind the Police Chambers (called area D), a further group of 105 houses is now in course of erection, of which seventy-seven will be ready for occupation on or before Whitsun-

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day first. This scheme is about as cheaply executed as ordinary material and workmanship will permit of. It is being executed under contract. The buildings consist of brickwork cemented and harled. The total estimate, including caretaker's house, levelling up and cementing courtyard, forming stairs of access, amounts to 17,010*l.*, which amounts to an average of 105*l.* per house. The total number of houses thus provided by the Corporation at Whitsunday will be 257, with rents ranging, as stated, from 5*l.* to 10*l.* 10s. The North British Railway Company have given effect to their statutory obligations with reference to workmen's houses by erecting at St. John's Hill, Pleasance, 118 new houses, with rents ranging from 5*l.* to 10*l.* 10s. This scheme consists of forty-four single-room houses and seventy-two two-room houses. A body of citizens interested in the welfare of the poor, called St. Giles' Dwelling-house Company, have done good work by the partial remodelling of old property, combined with the erection of certain new tenements at the eastern end of the Cowgate, by providing 112 houses, with rents ranging from 3*l.* 10s. to 12*l.* 2s. 9d. Forty-one of these are single-apartment houses and seventy-one two-room houses. In all we have thus 467 houses, and allowing an average of three persons per house, 1,401 persons are thus housed. One is bound to confess, after describing all the foregoing schemes, that the question of rehousing evicted slum dwellers is scarcely answered. No doubt the sanitary conditions of the new housing must be taken into account, but people cannot live on sanitary conditions alone, however superior. Why should not Part III. of the Housing of the Working Classes Act, 1890, be taken advantage of? Should cheap and handy travelling facilities be provided in order that the people travelling to and from their work and otherwise be fully accommodated? Will the labouring classes take advantage of such houses when erected? Short of this there does not appear a way out of the difficulty, excepting municipal aid, and most people will admit that this is fraught with mischief to attempt to pauperise. It is out of all reason to suppose that slum clearances are the remedy, or that the persons displaced by such clearances can be rehoused on the same areas. The remedy for overcrowding, which is one of the main evils which are struck at by our slum clearances, involves the acquisition of new sites on which to erect new housing. For such new sites one naturally turns to unoccupied suburban areas, and the available existing enabling legal machinery is Part III. of the Housing of the Working Classes Act, 1890. To my mind the Corporation should, without loss of time, possess itself of sufficient suitable cheap lands for the purpose.

THE HOUSING PROBLEM IN BIRMINGHAM.

The Birmingham Health Committee, in their report to the meeting of the City Council on Tuesday, state that they have for some time past been giving considerable thought to the subject of the housing of the working classes. They are of opinion that the time has come for the Council to carry out a larger housing scheme than any that they have hitherto sanctioned. The condition of a good deal of the small house property in some of the older parts of the city, as well as the inadequacy of the total supply, renders it desirable that the Council should take action in the matter.

As to the unsatisfactory condition of part of the existing small house property, the Council are aware that the reports of the Medical Officer of Health have from time to time directed attention to the large death-rate in certain parts of the city, notably in parts of St. Mary's, St. Bartholomew's, and St. Stephen's Wards. It seems impossible that any great improvement can be effected short of the clearance of some of the more old, insanitary, and crowded areas. But to undertake this work while the present lack of housing accommodation in the city continues is a course the Committee could not for a moment recommend. That would be to carry out an un-housing scheme, and would lead to overcrowding in neighbouring areas, to increased rents, and generally would accentuate the evils which the Committee are anxious to remove, and be a hardship to the very class whom it is most desired to help.

As to the total supply of small houses in the city, the Committee have endeavoured to obtain as much information as possible from various sources. Inquiries addressed to the Overseers of the parishes of Birmingham, Aston (within the city), Edgbaston, and Harborne have elicited the fact that there were last year on the rate-books about 54,448 houses assessed at 5s. per week or under, as against 57,450 about ten years ago. The Assistant Overseer for the parish of Balsall Heath was unable to give exact figures, but stated that from his personal knowledge "there was a great reduction in the number of houses let at 5s. and under now as compared with ten years ago." It was hardly, he thought, too much to say that the reduction was 40 per cent. The reduction in this case was chiefly brought about by increased rentals. How far the reduction in the other parishes is due to demolition, and how far to increased rentals, is not clear. Still the fact remains that there are available to-day, for an increased population, fewer small houses than there were ten years ago. It should be borne in mind that the figures refer to houses assessed at 5s. per week and under, and that a considerable proportion would be actually let at rentals above this figure. Information obtained from Birmingham house agents also confirms the opinion arrived at by the committee that there is a lack of cheap houses. Inquiries were addressed to twenty-nine firms. The total number of vacant houses at rentals of 5s. per week and under on their books was 174, and most of these were vacant only by reason of unavoidable changes of tenancy. One agent with about 1,000 houses on his books of the class referred to, and another with over 600, had not one house vacant, while several agents, out of a lesser number, were in a similar position.

The Committee thought it well also to obtain information as to how far the operations of the Council had contributed to the decrease in small house property. They found that during the nine years 1891-1899 536 houses, almost all of the class under consideration, had been demolished through action taken by the Health Committee, and that a large number—possibly greater than the number demolished—had been closed in the same period by owners, as an alternative to carrying out sanitary improvements. Then, too, the operations in connexion with the Improvement Scheme involved the destruction of a large amount of small house property in the centre of the city. Eight hundred and eighty-nine houses at rentals of about 5s. per week and under were taken down, and of the 103 erected only fifteen are let at so low a rental as 5s. per week. There have been sixty-two workmen's dwellings erected by private enterprise on a site let on lease by the Corporation for that purpose in Cowper-street. The sixty-one workmen's dwellings in Milk-street are practically completed, but they only take the place of about the same number that were demolished on the clearance of the site. The inadequate supply of houses, as was to be expected, has led to a certain amount of overcrowding, instances of which are not infrequently coming to the knowledge of the department.

The Committee have, therefore, for some time past been making inquiries in several parts of the city with the view of selecting a site suitable for the erection of workmen's dwellings under Part III. of the Housing of the Working Classes Act, 1890. This is the part of the Act which authorises the building of such houses apart from the previous acquisition and clearance of insanitary areas. Amongst other sites to which their attention was drawn was one on an accompanying map, lying between Bordesley Green-road and Yardley-road, having an area of 17 a. 2 r. 3 p. The site is about three miles from the centre of the city and about a mile from the Coventry-road at its junction with Green-lane, where the new baths are in course of erection. The site is certainly superior, both as regards situation and as to the character of the soil, to any other that the Committee have had under consideration. The levels are convenient for the necessary road-making and draining, and altogether the land appears to be admirably adapted for a housing scheme. The committee have not yet had time to mature a complete scheme for the laying out of the land and the erection of dwellings. They recognise that this must necessarily be the subject of further and most careful consideration. So far as they have been able to go into the matter they believe that about 500 houses can be erected on the site, which means, taking an average of five persons to a house, that a population of 2,500 can be provided for there. They will lose no time in preparing a scheme, and in reporting their recommendations fully to the Council. In the meantime they recommend that the land be purchased. They have obtained an offer of it from the owner (Mr. Joseph Smallwood) at the sum of 6,562*l.*, plus 120*l.*, vendor's costs, and less half the cost of making certain roads alongside a part of the site sold to the School Board. This amount is estimated at 500*l.*, so that the amount to be paid will be about 6,200*l.*, a price which the Committee consider reasonable. They further recommend that the Finance Committee be authorised to borrow this sum for the longest period they can obtain.

In connexion with this subject the Committee have had under consideration the Housing of the Working Classes Act Amendment Bill—a Government measure for amending Part III. of the 1890 Act. They felt that it would be of great assistance to municipalities in devising housing schemes if the period for the repayment of loans could be extended to ninety-nine years, and they accordingly communicated with the Members of Parliament for the city and with the Local Government Board, with the object of securing the inclusion in the Bill of a clause to this effect. The period usually granted by the Local Government Board for land is fifty years. For buildings it is generally less. On a house costing 200*l.*, and reckoning interest at 3 per cent., a fifty years' loan costs, for repayment of interest and sinking fund, 3s. per week; while a ninety-nine years' loan costs 2s. 5¼d. per week, so that, could the desired amendment have been obtained, it would have enabled houses to be provided at an appreciably lower sum per week than can be done under present conditions. Amendments in the desired direction were moved to the Bill. They did not, however, meet with acceptance in Parliament, and it does not appear that any further steps can profitably be taken in the matter at present.

A recent Council minute asked the Committee to report upon the following resolution of the Birmingham Board of Guardians:—"That this Board calls the attention of the Local Government Board and the Birmingham City Council to the urgent and pressing need of providing proper housing accommodation for a very large number of the poor, especially considering the extreme overcrowding and consequent misery caused in the city in consequence of the Sanitary Authorities enforcing the Public Health Act without providing the necessary dwellings to meet the requirements of the class thus affected." The Committee communicated with the Guardians with the object of obtaining from them, and at once inquiring into, particulars of any cases of overcrowding that they might have had before them when they passed the resolution. A list of fourteen cases was forwarded by them. Most of these were not of a serious character. There is, as the Committee have stated in another portion of this report, a certain amount of overcrowding in the city, and this has inevitably been contributed to to some extent by the necessary operations of the Committee in closing insanitary houses, &c. On the whole, however, the Committee are glad to report that, while in a city like Birmingham cases of bad overcrowding will from time to time occur, the general condition of things is not so bad as might be inferred from the Guardians' resolution.

THE HOUSING PROBLEM IN LIVERPOOL.

A conference of delegates from trades-unions, co-operative societies, places of worship, and other bodies interested in the housing problem was held in the small lecture-room, William Brown-street, on the 27th ult., under the auspices of the Liverpool Housing Committee. The Chairman (Mr. R. Robinson) remarked that the overcrowding difficulty was of long-standing in Liverpool, as evidenced by a pamphlet issued in 1871 by Dr. French and the Rev. Charles Beard, in which it was stated that at least one-third of the population of the city lived in houses the arrangements of which were a menace to both morality and health. Of course a great amount of insanitary property had been demolished, but in many cases this had made things worse, because the people who had inhabited the condemned dwellings were driven into crowding the immediate neighbourhoods still more. Before the problem could be solved there would have to be purchase of land by the community and the use of that land for building purposes for the public benefit, but as a necessary prelude to that the local authority ought to have power to rate the land by itself.

Mr. S. D. Shallard, of London, proposed the following resolution:—"This conference urges upon the Legislature to take the following steps towards simplifying the housing problem:—(1) To confer upon towns and Urban District Councils full powers to acquire and hold land without their boundaries. (2) To extend their borrowing powers as follows:—(*a*) time for repayment of loans to be not less than 80 years for urban districts, and 100 years for towns, so far as concerns the portion of the loan allocated to building, and even a longer period for that portion secured upon the sites; (*b*) disabilities contingent upon the extent of existing municipal debts to be removed; (*c*) suspension of sinking fund operations for at least three years to be allowed, or a longer period, subject to sanction of the Local Government Board; (*d*) money to be advanced by the Government at 2½ per cent. per annum. (3) To remove any restrictions as to building upon areas cleared under Part I. or II. of the Act of 1890 or any other special or general Act. (4) To reform the incidence of local taxation so as to throw a considerable share of the cost of all improvement schemes upon urban land values. (5) To relieve Rural District Councils from need of any consent other than that of the Local Government Board. (6) To confer powers on all Councils to compulsorily acquire land on the basis of assessable value after six months' notice to the owner, with power of appeal on the owner's part. 7. To remove medical officers of health from any other than central control." He contended that the overcrowding difficulty was due to the apathy and utter lack of foresight displayed by the governing authorities in the past. Hitherto all the efforts put forth by Local Authorities had meant an increase rather than a decrease of the overcrowding, and the reason was because they had gone about the matter in a paltry spirit, instead of making a determination that the provision of houses should no longer be left in the hands of private speculators. Mr. Shallard refuted the general assertion that municipal dwellings were a great loss to and burden upon the ratepayers, and expressed the hope that public opinion in Liverpool would be the means of speeding on the Corporation to promote a comprehensive scheme of municipal dwellings. He also argued that the medical officers would perform their duties more efficiently if they were removed entirely from local control.

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Rev. R. A. Armstrong, in seconding the resolution, remarked that the people in the Liverpool slums were not only cramped up in miserable houses, but were paying rents far exceeding those paid by his listeners for domiciles as good as any one could wish for. In his opinion the problem could only be solved by the municipality.

The resolution was carried.

It was also resolved, on the motion of Mr. John Edwards, seconded by Mr. Samuel Reeves :—"That the number of healthy dwellings in Liverpool is insufficient for the proper housing of the people ; that overcrowding, both of people in houses and of houses upon land, exists to a dangerous extent, and is mainly responsible for the high rate of mortality ; that private builders have admittedly failed to provide suitable accommodation ; therefore this conference respectfully urges the City Council to deal more diligently and more effectually with the matter than they have hitherto done, (1st) by erecting municipal cottages on available sites near the outskirts of the city, to be let at rents suited to the resources of working people ; (2nd) by reducing tramway fares and giving special facilities to working men going to and from work ; (3rd) by vigorously enforcing the provisions of the Public Health Acts and local Acts regarding insanitary property."

NATIONAL ASSOCIATION OF MASTER BUILDERS.

MEETINGS IN NOTTINGHAM.

THE National Association of Master Builders of Great Britain and Ireland have just held their half-yearly meetings in Nottingham, in the Exchange Hall, under the chairmanship of Mr. William Sapcote, of Birmingham, the President. Amongst those present were Ald. H. Houldsworth, J.P., Past-President, Bradford ; Messrs. A. Krauss, Senior Vice-President, Bristol ; C. W. Green, Hon. Treasurer, Liverpool ; G. Macfarlane, Manchester ; S. Smethurst, Oldham ; W. Church, Bristol ; W. Myers, Leeds ; J. Wakeham, Plymouth ; J. Walker, Derby ; F. G. Whittall, Birmingham ; J. Skett, Wolverhampton ; A. Chambers, Leicester ; G. H. Walters, Hull ; J. Bowden, Potteries ; Jas. Woods, Liverpool ; Chas. Wall, London ; G. Mansfield, York ; J. Bycroft, Barnsley ; W. P. Lewis, Hereford ; E. Porter, Portsmouth ; Jas. Wright, Nottingham ; W. Edgar, Nottingham ; E. Hind, Nottingham ; J. Bell, Cambridge ; J. Greenwood, Mansfield ; L. W. Sinclair, Scarborough ; C. Haywood, Coventry ; T. Mawson, Lancaster ; C. Griffiths, Middlesbrough ; J. H. Wright, Leigh ; C. Kirk, Loughborough ; Z. Pike, Stalybridge ; and H. Smith, Jun., West Bromwich.

The Mayor of Nottingham (Ald. A. Pyatt), who attended at the commencement of the proceedings, extended a cordial welcome to the delegates on behalf of the city.

The President thanked the Mayor on behalf of the Association for his kindness in attending and for granting the use of the Exchange Hall to the delegates for their meetings. He added that that was not the first time the Association had visited Nottingham, but the last occasion was some thirteen years ago.

The ordinary business of the Association was then proceeded with. The adoption of the annual report was proposed by the President, seconded by Mr. Marshall, and carried with unanimity, and the treasurer's accounts for the past half-year, presented by Mr. Green (Liverpool), were also approved.

It was decided to make a grant of 100*l.* towards the Hull and Halifax Law Costs Fund, and it was also decided to make a special appeal on behalf of the Fund to those associations which had not contributed.

Mr. Green (Liverpool) proposed that any federation or association requiring assistance from the National Society should first submit the case to that body and obtain sanction before any financial aid was given.

After some discussion this motion was agreed to.

The next business was the consideration of a report with regard to the affiliation of the National Association of Master Plasterers with the Builders' Association.

Mr. Green (Liverpool) brought forward a recommendation of the Council to the effect that the question should be postponed until the next half-yearly meeting, so that a special committee might deal with the subject and the question of the terms upon which that and other associations should be affiliated.

Mr. Walters (Hull) seconded.

This was agreed to.

The report of the committee appointed to prepare evidence to give before the Parliamentary Joint Committee on the question of municipal trading was presented. The Council recommended that a committee of five should be appointed to collect evidence and select a representative to appear before the Joint Committee, the committee consisting of the President, Messrs. Mansfield, Smethurst, Dawson, and Walters.

This was carried.

Mr. Smethurst (Oldham) brought forward proposals framed by the Lancashire and Cheshire Federation and the Yorkshire Federation for the formation of a Builders' Foremen's Society. He explained that the object was to get the foremen out of the operatives' societies, and although they might not be able to do that just now more favourable opportunities might occur. Rules had been constructed, and under them foremen would receive better benefits than now. It was a very important matter.

Mr. Green (Liverpool) seconded.

Mr. Walters (Hull) did not think that there would be any difficulty in getting the foremen to leave their union, seeing that they would receive better benefits under the scheme brought forward.

It was decided that the scheme should be adopted as a national one, and that the recommendations should be carried into effect. A sum of 50*l.* was also voted towards the expenses of the northern centre in the matter.

On the question of builders' estimates the Council recommended the adoption of the following clause :—"This estimate, should it be accepted, is subject to a written contract containing all usual and proper terms being signed by the parties, and shall not be taken as in itself constituting a contract."

A long discussion ensued, several suggestions being made, but ultimately the recommendation was adopted, along with a proposal to the effect that a form of tender should be issued, and that all members should be recommended to use it and no others.

Upon the question of quantities the following resolution by the Midland Federation came forward :—"That when a builder's tender has been accepted and the priced quantities deposited, the said quantities shall be placed under seal and only used for the purpose intended, viz., the settlement of accounts. Further, that when the accounts are settled the quantities shall be returned to the builder."

Mr. Wall (London) proposed as an amendment that the resolution should read :—"That when a builder's tender has been accepted and the priced quantities deposited, and the schedule of prices verified, that the said priced quantities shall be placed under seal, and only used for the purpose intended—namely, the settlement of the accounts. Further, that when the accounts are settled the quantities shall be returned to the builders. In case of instalments the builder's verified copy shall be used for sales and prices." This was adopted.

A long discussion took place upon the following notice of motion by Mr. Cunliffe (Bolton) :—"That all specialists' provisional amounts in quantities should in future include the costs of all attendances on the part of the general contractor or contractors, and where the payment of such sums devolves upon the contractor they should carry to per cent. to him or them. Also that in the case of all P.C. sums in quantities, all goods should be ordered through the contractor."

Mr. Macfarlane, Manchester, proposed, as an amendment, that the words "not less than five per cent." should be substituted, but this was lost.

The Bristol Local Association had given notice of the following :—"No priced quantities shall be sent in with the estimate, but should members receive an invitation to tender for work where it is stipulated that quantities are to be sent in with the tender the members are to immediately inform the secretary of the federation, and the committee will at once take up the matter with a view to avoiding friction between the contractors and architects."

This was confirmed.

Mr. Wakeham (Plymouth) proposed "that a committee be formed to meet and appoint from themselves a deputation to wait on the largest railway company's engineers with a view of inducing them to receive tenders unaccompanied by priced bills of quantities."

Mr. Walters (Hull) seconded, and the motion was carried.

The committee was appointed as follows, with power to add to their number :—President, Mr. W. Sapcote ; Vice-President, Mr. A. Krauss ; Messrs. R. Neill (Manchester), W. Shepherd (London), Nicholson (Leeds), and B. J. Greenwood (London).

The resolution from the South-Eastern Counties Federation in regard to the division of their centre into three separate districts was agreed to.

The following resolution passed by the Emergency Committee of the Lancashire, Cheshire, and North Wales Federation was also agreed to :—

"That it be a reccommendation to the National Association to amend the form of contract, by substituting 90 per cent. for 80 per cent., at the end of line 4, in clause 19, which at present reads—'When the value of the works executed, and not included in any former certificate, shall from time to time amount to the sum of £ or otherwise, at the architect's reasonable discretion, the contractor is to be entitled to receive payment at the rate of 80 per cent., &c.'"

A special grant of 75*l.* was made to the secretary, Mr. J. Ali. S. Hassal, of Liverpool, for his extraordinary labours and expenses during the masters' lock-out.

A considerable amount of correspondence, chiefly relating to matters of detail, was gone through, and the proceedings concluded with a vote of thanks to the chairman for presiding.

At the invitation of the President (Mr. William Edgar) and Committee of the Nottingham Master Builders' Association, the delegates were entertained at a banquet at the George Hotel. Mr. William Edgar presided, and was supported by the Mayor of Nottingham (Alderman A. Pyatt), the Sheriff (Dr. Roberts), Mr. A. Krauss, Sir T. Roe (Derby), Alderman Houldsworth, Mr. A. N. Bromley (Nottingham), Mr. W. Sapcote, Mr. W. F. King (Vice-President London Association), and Mr. E. Jardine (Vice-President of the Nottingham Engineers' Association).

After the loyal toast had been honoured,

Ald. Houldsworth proposed "The Municipality and City and Trade of Nottingham," and the Mayor and Dr. Roberts replied.

Mr. Krauss proposed "The Architects, Engineers, and Surveyors." He said one could not do without the other, and the feeling at present between master builders and architects and engineers was much better than it was twenty years ago.

Mr. Evans responded.

Sir Thomas Roe proposed "The National Association of Master Builders of Great Britain." He referred to the contract system and the difficulties builders had to contend with in tendering for jobs which extended over one or two years, owing to the difference in the price of materials. He asked them to drink to the success of an organisation which had as its desire the wish to protect themselves against any unexpected event which was likely to interfere with their fair dealings and profit, at the same time without any wish to crush the working man.

In acknowledgement, Mr. W. Sapcote expressed appreciation of the cordial reception Nottingham had given to the Association, and thanks to the gentlemen who had made the arrangements for the meetings. The principles of the National Association might be put down thus :—They desired only to obtain relations with the men on fair and reasonable terms, and with architects and surveyors agreements for carrying on work that were beneficial to all parties.

Mr. Walters, in the absence of Alderman J. Bowen, of Birmingham, proposed "The Nottingham Master Builders' Association."

In acknowledging the compliment, Mr. W. Edgar, the President, said there was nobody more willing than himself to extend a hearty welcome to the Association, and he returned thanks for his name being coupled with the toast.

Other toasts were "Kindred Associations" and "The Guests."

[The above is abbreviated from the report which appeared in the *Nottingham Guardian* for the 25th ult.]

Correspondence.

To the Editor of THE BUILDER.

VENETIAN FORTIFICATIONS IN CYPRUS.

SIR,—All lovers of historical remains will be grateful to you for the interesting sketches and plans of Venetian fortifications in the island of Cyprus which figured in your issue of July 21. Your readers will be glad to learn that the Italian Government have received unofficial information to the effect that the Colonial Office no longer entertains the idea of authorising the destruction of the unique walls of Famagusta. I have reason to believe, however, that in the island there are two currents of opinion on the subject prevailing among the British authorities, and that in some quarters the persons who have been fighting for the preservation of these invaluable relics are denounced as unprogressive fanatics. It will be wiser, therefore, to keep the matter before the public lest the party of destruction should still have its way.

When I wrote to the *Times* in December, 1899, about the threatened vandalism the case seemed hopeless ; it must be very satisfactory to all who, like myself, have been working from then till now to save these precious monuments, that there seems at least a fair prospect of their being preserved.

EVELYN MARTINENGO-CESARESCO.

Palazzo Martinengo,
Salò, Lago di Garda.

*** We are very glad to learn that there seems to be a prospect of Famagusta being preserved. We shall be able to give next week a plan of this fortress by Mr. G. Jeffery, to whom we were indebted for the plan of Nicosia published in our issue of July 21, and also a view of part of the fortifications of Famagusta, from a water-colour drawing by Mr. Alexander Graham.—ED.

BUILDING BY-LAWS.

SIR,—The vexations and inconveniences caused to architects, builders, and building owners by the present want of uniformity, the vagueness, the

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stringency and the lax or arbitrary administration of by-laws governing new buildings in provincial districts have been repeatedly brought before the public. They were particularly emphasised at one of the recent meetings in connexion with the Congress of Architects, and reported in your journal (June 30). It is to be hoped that the efforts of the Institute to obtain some relief from the Local Government Board in the matter will be successful. In the meanwhile it is desirable that those of us who suffer from the evils described should lose no opportunity of ventilating the subject and bringing to public notice the anomalies and injustices which exist.

In this Borough the authorities have recently decided to put in force a section of a local Act of Parliament, which gives them the power to compel those desiring to build, not only to submit complete drawings (plans, sections, and elevations) to one-eighth scale, and a block plan to 20 ft. scale, and duplicate copies of all, but, in the event of their withholding their approval of the same, to give up possession of the duplicate copies.

When I add that the by-laws with respect to new buildings in this town were framed in 1869, that they are administered by a Committee who contend they are under no obligation to give the reasons of their disapproval of plans, and that it is not at all unusual for a set of drawings to be rejected more than once, you will see that the Borough Surveyor may accumulate in his office complete schemes for new buildings which are never carried out, which is an obviously objectionable state of things.

In London an architect prepares his working drawings and one copy for the contractor; in this town he has always to prepare an extra copy of his working drawings for the Corporation, which drawings run the risk, if he wants to withdraw his application and submit a new scheme, of being impounded.

I should be glad to know if a similar rule exists in any other towns. One grumbles, but submits to making the Local Authority a present of working drawings when they are approved, but to be compelled to leave them a copy *whether they are approved or not* seems to me rather unreasonable.

C. H. STRANGE.

Tunbridge Wells, July 30, 1900.

BLACKPOOL WESLEYAN CHAPEL COMPETITION.

SIR,—I wonder if any one has heard anything about the Blackpool Wesleyan Chapel; if so, perhaps they could give me some information *re* the awards.

The Committee very kindly returned my drawing without any packing boards or any notice of the awarding of the premium.

Perhaps some one will enlighten me on the matter.

SOLD.

BOOKS RECEIVED.

EARLY CONNECTICUT HOUSES. By Norman M. Isham and Albert F. Brown. (Providence, U.S.A.: The Preston and Rounds Company.)

FARNHAM AND ITS SURROUNDINGS: "Homeland Handbooks" Series. (The St. Bride's Press.)

SURVEYING WITH THE TACHEOMETER: By Neil Kennedy, M.Inst.C.E. (Crosby Lockwood & Son).

FIRE TESTS WITH TREATED WOOD (No. 57 of publications of the British Fire Prevention Committee).

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

4. BOILERS. STEAM ENGINES AND TURBINES. WATER TURBINES.

IN choosing a boiler the following are some of the points that have to be considered, the pressure at which the steam is to be generated and the quantity of it that will be required per hour, the floor space necessary, the attention required, and whether a skilled attendant is needed. The steam pressure and the capacity of the boiler are determined by the engine we are going to employ. If the engine has only one cylinder the customary pressures now employed vary from 80 to 100 lbs. per square inch. It must be remembered that the pressure of the atmosphere is roughly about 15 lbs. per square inch. For example, if we have a hollow cube with a vacuum inside then the pressure in pounds of the air on any face of the cube will be the area of that face in square inches multiplied by fifteen. Steam at a pressure of 80 lbs. per square inch can be expanded to five or six times its volume before its pressure is reduced to atmospheric pressure. If the exhaust steam be allowed to escape into the air there will be nothing gained by allowing it to expand below atmospheric pressure, but if it escape into a condenser, which is a large cold chamber to which it has access, then it can be expanded considerably below atmospheric pressure, and useful work got out of it. The perfection of the vacuum in the condenser measures its efficiency.

In large engines the steam is expanded in several cylinders in successive operations. In a compound engine, for example, that is, one with two cylinders, the steam may be expanded to three times its volume in the high-pressure cylinder and then passing to the low-pressure cylinder may be expanded to four times its new volume before passing into the condenser. This would give a total expansion of the steam to twelve times its initial volume. Hence double expansion engines have to be fed with steam at a higher pressure than single expansion engines. The pressure usually employed is about 150 lbs. per square inch. With triple or quadruple expansion engines still higher pressures are employed.

The necessity of expanding high pressure steam in several cylinders arises from the fact that the steam cools very rapidly as it expands. The temperature of the steam and water in the boiler depends on the pressure. If we know the reading of the pressure-gauge then we can tell the temperature of the water and steam in the boiler. At atmospheric pressure the water and steam have a temperature of 212 deg. Fahr., but when the pressure on the gauge is 80 lbs. then the temperature is 312 deg. Fahr., and at higher pressures the temperature is higher. Now when steam at 80 lbs. pressure is admitted into the cylinder of a single-cylinder engine then its temperature is 312 deg., but when it is expanded to atmospheric pressure its temperature drops to 212 deg. The walls of the cylinder are therefore subjected to temperatures varying by 100 deg., and hence there is an alternating flow of heat to and from the sides, which causes a dissipation of energy. The very hot steam coming from the boiler meets the cold walls of the cylinder and some of it is condensed. Towards the end of the stroke some of this steam may be re-evaporated, but this taking place at a lower pressure, a considerable fraction of the total work that it ought to have done has been lost. In triple expansion engines the range of temperature in any one cylinder is limited. The high pressure cylinder, which is much the smallest, is at a higher temperature than the intermediate cylinder, and the low pressure cylinder, which is the largest, is at the lowest temperature. In the best modern electric lighting engines at central stations, triple expansion is used. The cranks are arranged at 120 deg., so as to give an even turning moment. On the Continent, where low speed engines are more commonly employed, there are often two low pressure cylinders. One low pressure cylinder is in tandem with the high pressure cylinder, and the other is in tandem with the intermediate cylinder. The cranks are directly opposite one another (180 deg.), and the engines being of much larger size than our quick-running engines, smooth running is obtained by the inertia of the heavy rotating parts.

Boilers may be divided into two classes: (1) locomotive or fire-tube and (2) water-tube boilers. In a fire-tube boiler the hot gases go through flues or tubes which are surrounded by the water in the boiler. In the Cornish boiler there is only one flue and in the Lancashire there are two. These boilers generally work at about 80 lbs. pressure. They do not require skilled attention and they are easy to examine. As the fires in the furnaces require to be banked when not in use, they are not very suitable for small electric lighting plants. The attention required and coal consumed when not in use is a serious item, especially in summer, when they may only be wanted for one or two nights in the week. The locomotive type, which has many flues running through the boiler is, perhaps, the most suitable for this class of work. The steam can be raised rapidly as there is great heating surface, and the fire need not be banked, as sudden variations of temperature have not the same destructive effect on it that they have on a Lancashire boiler.

In a water-tube boiler the tubes contain the water, and they are surrounded by the fire. It is, in fact, the inverse of a fire-tube boiler. This type can be made to stand pressures as high as 300 lbs. per square inch. It is difficult to examine, however, in order to find out its weak points, but, on the other hand, when a leak has started it is not difficult for an ordinary mechanic to replace the burnt-out tube. The best-known boiler of this type is the Babcock and Wilcox. These can be steamed up from cold very rapidly, and, generally speaking, they are much safer than the fire-tube class, as the tubes are much smaller. Their disadvantages are that they have small steam capacity and are not easily cleaned.

Whatever the boiler used, it is advisable always to use the best and most modern fittings. There ought to be a high and low-water alarm. This generally consists of floats attached to a blow-off valve, and so arranged that steam at once escapes and blows a whistle if the water-level be too high or too low. The pressure-gauge ought to be in a conspicuous position, and ought to be easily read from a distance. The pressures at which the safety valves act ought to be prominently marked on it. In addition there ought to be a duplex safety valve and a water-gauge. If there is a large proportion of carbonates in the feed-water, then it is exceedingly likely that scale will form inside the boiler. In Lancashire boilers this does not matter so much, but if scale once forms inside the tubes of water-tube boilers the process of cleaning is a very troublesome and expensive one. Hence the water should be tested before the boiler is chosen.

A Lancashire boiler requires considerable floor space, but is easily cleaned and examined, and has great steam capacity. A locomotive boiler requires much less floor space, but has less capacity, and the pressure is therefore apt to fluctuate. A water-tube boiler requires small floor space, is very safe, and steams rapidly, but its capacity is small.

From the theoretical point of view the heat required to convert the water in the boiler into steam at the same temperature—that is, the latent heat of the steam—is not utilised in the engine. Hence there have been numerous attempts to utilise this heat. Two German inventors have recently utilised it in the following fashion:—The low-pressure steam passes into a surface condenser, through which pass tubes containing sulphurous acid. The heat converts the sulphurous acid into sulphur dioxide, which works an auxiliary engine, and the exhaust gas is cooled in a condenser, becoming sulphurous acid. This acid is then pumped back to the steam condenser, and the cycle is gone through over again. The efficiencies so far obtained are not sufficiently high to justify the greatly increased expense, and the possible dangers arising from the formation of sulphuric acid.

Another method of getting power from high-pressure steam is to use a steam turbine. In the Parsons' steam turbine there are a series of inward and outward flow wheels fixed on the revolving shafts. These wheels are separated by intermediate guide blades, and as the steam expands in its passage outwards, these wheels get larger. One great advantage of this prime mover is that it is thermally correct. After it has run for a few minutes each part of the turbine is at the same temperature as the steam in contact with it and hence there is no loss by condensation. Another advantage is that the turning moment is constant and consequently there is no vibration. The turbine now in use at the Hotel Cecil is merely placed on the floor with no holding-down bolts, and yet no vibration is felt in the rooms above.

In the De Laval steam turbine high pressure steam is directed from a nozzle on to curved vanes fixed on a light rotating shaft. The steam after hitting the vanes escapes into the air. In a 100-h.-p. turbine the wheel is about 1 ft. in diameter and makes 13,000 revolutions per minute. The speed is reduced by means of a very efficient helical gear. The steam pressures employed are very high. In some recent tests the pressure was 1,735 lbs. per square inch, corresponding to a temperature of 600 deg. Fahr. The velocity of the escaping steam was 2,000 ft. per second. The boiler employed is peculiar, consisting simply of a single tube twisted into a spiral shape. Special precautions need to be taken to prevent over-pressure. The boiler and turbine take up very little floor space, 20 ft. by 12 ft. being sufficient for a 100-h.-p. plant. These turbines are being extensively tried in France.

For a water-power plant turbines are now practically universally used. Their efficiency is much higher than water-wheels, and they are much more suitable for driving dynamos. They may be divided into two classes, reaction and impulse turbines, according to the way the water acts inside them, or into outward flow, inward flow, or parallel flow, according to their

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construction. Every turbine is furnished with a set of fixed guide blades which direct the water on to the moving blades at the best angle. In the outward flow turbine the water is made to flow away from the vertical axis by means of fixed blades and strikes the moving blades at right angles, and in the inward flow the reverse is the case. In the former case the water is discharged outside the axis, and in the latter case inside the axis. In the parallel flow turbine the guide blades are above the moving blades, and the flow all through is parallel to the axis.

All turbines have a speed at which their efficiency is a maximum. Starting from rest where the power and consequently the efficiency is zero, the power increases until for a certain speed it attains its maximum value. It then decreases for greater speeds. The reason of this is easily seen. The power is the product of two factors, speed and torque. The torque depends on how much the water is deflected out of its course by the rotating vanes. It is a maximum at standstill and diminishes as the velocity increases. At the highest speed the torque would be practically zero, as the vanes would be moving with a velocity nearly equal to that of the water, and hence at this speed also the power would be zero. Between these two zeros, therefore, namely standstill and maximum velocity, the power must pass through a maximum value.

In electric lighting, when the fall is sufficiently high, the turbine is directly connected to the dynamo. The spindle of the armature is coupled to the shaft of the turbine. If the load is fairly constant the regulation of the automatic governors now in use is satisfactory, but for very fluctuating loads the speed and therefore the electric pressure is apt to vary. For low falls the turbines are proportionately larger in size, and their speeds are smaller. In this case a direct belt or rope drive is necessary. This, of course, lowers the efficiency. The maximum efficiency of a good modern turbine is about 80 per cent.

When very high water pressures are available, such as a head of over 150 ft., then a Pelton water-wheel can be used. The principle is the same as that of the De Laval steam turbine. A jet of water is projected against vanes carried on a disc mounted on the shaft, which consequently rotates with a high velocity. These wheels are found to be most satisfactory, but there are, of course, few places in this country where such a head of water is available.

GENERAL BUILDING NEWS.

Reopening of Castle Bytham Church, Lincolnshire.—The parish Church of Castle Bytham was opened on the 14th ult. after undergoing restoration. The work was carried out by Messrs. Bowman & Sons, of Stamford, from designs by Mr. C. Hodgson Fowler, of Durham. It is stated that during the restoration a pre-Norman window and west wall, a recess, with mural painting (which has since crumbled), and a rood staircase were discovered. A new clock has been erected, and Messrs. Taylor, of Loughborough, have rehung the bells. The cost of the restoration was about 1,300*l.*

Church, Blairs College, Aberdeen.—The work of erecting the new church at Blairs College is progressing steadily. The building is from designs by Messrs. Curran, architects, Warrington. The east window is 30 ft. in height, and the sanctuary at the west end, which is semi-octagonal in form, is lighted by three smaller windows. The public entrance is in the north-east angle below the tower, and consists of a deeply-recessed doorway, flanked by polished granite pillars, with foliated capitals and moulded bases. On the side of the church next the old college buildings is an arcaded cloister, and from this cloister there are two entrances into the church for the use of the clergy and students. The roof is of pitch-pine. An organ will be accommodated in a wing or transept which projects from the north side of the sanctuary There will be at least three side altars in addition to the high altar, and stalls will be provided for the students in the body of the building, the congregation being accommodated at the east end. The building is mainly built of grey granite from a quarry on the Blairs estate, the dressings and carved work being of granite from Rubislaw and Kemnay Quarries. The next part of the college extension scheme to be proceeded with is the front block, which will form the connecting link between the new west wing and the church, and when this is finished a north wing will be erected, thus forming three sides of a square with the main front towards the river. The church will be an offshoot, as it were, from the north-east corner of this quadrangle. It is in view to erect at a later period a library on the west front corresponding to the position of the church on the east.—*Aberdeen Journal.*

Wesleyan Church, Lytham, Lancashire.—The memorial stones of a Wesleyan chapel at Lytham were laid recently. The architects are Messrs. Bradshaw & Gass, of Bolton.

Church, Morecambe.—On the 13th ult. the new Church of St. Barnabas, at the west end of Morecambe, was dedicated by the Bishop of Manchester. The church is from plans prepared by Messrs. Paley & Austin, of Lancaster, and is in the Transitional style. It will consist, when completed, of nave with five bays, 72 ft. 6 in. long by 24 ft. wide, chancel 35 ft. by 24 ft., both nave and chancel being the same height, 43 ft. to ridge. The north and south aisles are 18 ft. and 11 ft. wide, there is a chapel on the north side opening into the chancel by two arches and having a porch as entrance, and the organ transept is on the north side. The vestries are at the east end, with separate porch. At the west end there will be a tower 20 ft. square externally, rising 96 ft. to a parapet, with porches on north and south side of same entering the church through the tower arch 32 ft. high to apex. The church is lighted by five four-light tracery windows in aisles, east window of six lights, and west window of three lights. The materials used in the construction are—for walls rubble of Heysham stone, with external dressings of Darley Dale stone; for internal facings and dressings flecked red Runcorn stone. The roofs are of pitchpine, and the chancel stalls, altar rails, and table are of oak. All roofs, except aisles and tower, which are leaded, are covered with Ruabon red tiles The heating is by low-pressure hot water. The contractor has been Mr. John Edmondson, and the cost of the entire scheme is estimated at about 6,000*l.* The portion now built will cost about 3,500*l.* The sitting accommodation is for 400, but when entirely completed this will be extended so as to afford provision for between 600 and 700.

Church, Slyne, Lancashire.—The new church dedicated to St. Luke, and situate at Slyne, was consecrated recently by the Bishop of Manchester. The church is in the Late Decorated style, and consists of a nave 36½ ft. long, 17¾ ft. wide, and 15 ft. to the wall plate of the roof. There is a north aisle 51 ft. long by 9 ft. wide, and 10 ft. to the wall plate of the roof. The chancel is 23 ft. long and 17 ft. wide, the height being the same as the nave. A tower, 22 ft. by 18 ft., is placed over the east end of the nave, and is carried by arches on the north-east and west sides. Ultimately this will be covered by a timber shingle-covered spire. On the north side of the chancel are the organ chamber and vestry, the heating chamber being situated under the chancel. The nave and aisle are divided by an arcade of four arches. The porch, an open timber one, is placed at the north-west angle of the aisle. The church is lined internally and externally with Hutton Roof stones, the floors under the seats being laid with wooden blocks, whilst the chancel and passages are tiled. The roofs are covered with brown pressed roofing tiles, and the woodwork to roofs and seats is of pitch pine. The accommodation is for 180 worshippers, and the cost of the present scheme is 2,358*l.* The contractors are Mr. J. Dawson, of Kirkby Lonsdale, for masonry; Messrs. Holmes & Son, Arkholme, joiners and carpenters; Messrs. Abbott & Co., Lancaster, plumbing and glazing; and Messrs. Cross & Sons, Lancaster, tiling. The church has been built from the designs of Messrs. Paley & Austin, architects, Lancaster.

Mission Church, Willesden.—The Ven. the Archdeacon of Middlesex recently laid the foundation-stone of a new mission-room in Taylor's-lane, Willesden. The new building, which is being erected at a cost of 1,250*l.*, from the designs of Mr. Fry, architect, of Craven Park, is being constructed of red bricks and Portland stone, and will provide seating accommodation for 200 worshippers. The builders are Messrs. Tennant & Co., of Willesden-green.

Reopening of Stickney Church, Lincolnshire.—Stickney Church was reopened on the 13th ult. after undergoing extensive restoration. In 1853 the chancel was rebuilt at a cost of 1,000*l.* In 1855 the nave was restored at a cost of 677*l.* In 1882 the tower, which was built principally of local sandstone, was found to be very unsafe, and, at the suggestion of the late Mr. Butterfield, a wooden frame was erected inside the tower to take the weight of the bells off the walls, at a cost of over 100*l.* This was found to be of little or no use, large masses of masonry falling out of the south-east corner of the bell-chamber in 1884. Mr. Bassett Smith, architect, was then called in and asked to report on the state of the tower. He suggested that the bells should be taken out, the upper half of the tower taken down and the lower half temporarily roofed over. This was done in 1887; and the porch, which had become very unsafe, was also rebuilt; the total cost of the work being 330*l.* In 1898 tenders were asked for, and that of Mr. S. F. Halliday, of Stamford, was accepted for rebuilding the tower, the price being 1,735*l.*, including re-hanging of the bells. On thorough re-examination it was found that part of the walls were quite good enough to stand, so the order was given to restore instead of entirely rebuild; and it was hoped that the money thus saved would be sufficient to restore the south aisle, which was in a most dilapidated condition. But wants did not end here. The tiles on the north side of the nave roof were in a very bad state and had to be renewed, and new spouting was also required for the nave and the north aisle. The porch was rebuilt by Messrs. Sherwin & Son, of Boston, at a cost of 150*l.* The estimated cost of the present restoration is about 2,500*l.* The architects employed were Messrs. W. & C. A. Bassett Smith, of Adelphi, London, and the clerk of the works was Mr. William Chell, of Uttoxeter. The new clock in the church tower was supplied by Messrs. W. Potts & Son, of Leeds. Messrs. Warner, of London, have rehung the bells.—*Boston Guardian.*

New Church, Brynmawr.—The Bishop of St. David's recently consecrated the new parish church of St. Mary's, Brynmawr, erected on the site of the structure consecrated by the late Bishop Thirlwall in 1872. The work has been carried out by Mr. J. Jenkins, Brynmawr, from designs by Messrs. Nicolson & Hartree, Hereford, at a cost of nearly 3,000*l.*

Wesleyan Church, Samlesbury, Lancashire.—The foundation stone has just been laid at Samlesbury of a new Wesleyan church. The building is to be of Gothic design, and will be constructed of brick with stone dressings. It is to be 33 ft. in length, 22 ft. in breadth, and is estimated to accommodate about 130 persons. Mr. Thornley, of Blackburn, is the architect, and the contract has been let to Mr. Wm. Edmundson, of Blackburn.

Presbyterian Church, Sunderland.—The foundation stone of a new Presbyterian church was laid on the 26th ult. at Sunderland, on a site adjoining the Peter Turnbull Memorial Hall in St. Mark's-road. The church is estimated to cost a little over 4,000*l.* The architect is Mr. Neil Macara.

Restoration of Goodmanham Church, Yorkshire.—The ancient church of Goodmanham, Market Weighton, has just been reopened after restoration. The work has been carried out under the supervision of Mr. Temple Moore.

Enlargement, St. James' Church, Northampton.—The Bishop of Peterborough dedicated recently the additions which have been made to this church, by which the accommodation has been increased by some 300 sittings. Mr. M. H. Holding was the architect.

Church Schools, Willenhall, Warwickshire.—On the 17th ult. the foundation stone was laid of an infant school connected with St. Giles's Church at Willenhall. Plans were prepared by Messrs. Johnson & Baxter, of Wolverhampton and Willenhall, and the building is to be erected by Mr. John Tildesley, of Willenhall. The cost is estimated at 2,000*l.* The building will be of red brick, with Hollington stone dressings, and will be one-story high. It will provide accommodation for 225 children, and will be so arranged as to be divided into three class-rooms and a babies' room.

Schoolroom, Myton-on-Swale, Yorkshire.—The Bishop of Beverley recently dedicated the new schoolroom at Myton-on-Swale. The room is built of brick, with timbered gables and bell turret in centre of roof, from the designs of Mr. J. Bradley, architect, of Ebberston. The room is 40 ft. by 20 ft., and is lighted by five windows. The brickwork was done by Mr. Gatenby, of Helperby, and the plumbing by Mr. Sutcliffe, of Helperby, and the woodwork by Mr. L. Wheatley, of Myton.

United Methodist Free Church Hall, West Jesmond, Northumberland.—The United Methodist Free Church in Newcastle are erecting a new church and hall in West Jesmond. The site for a church was obtained at the corner of Coniston-avenue and St. George's-terrace. The architect of the new hall, which will accommodate 350 people, is Mr. W. H. Knowles, Newcastle, and the contractor is Mr. A. Bruce.

Working Girls' Home, Manchester.—The extensions which have been made at the Working Girls' Home in Charter-street, Manchester, were opened on the 25th ult. by the Duchess of Sutherland. The total cost of the present additions, which exhaust the site, has been about 6,700*l.* Messrs. Maxwell & Tuke, who are the architects to the Ragged School and Working Girls' Home Committee, have carried out both the 1892 and the 1900 extensions.

New Fire Station at Islington.—On the 20th ult. Mr. J. D. Gilbert, the chairman of the Fire Brigade Committee of the London County Council, opened a new fire station which has been erected in Upper-street, Islington. The new station has a frontage of 54 ft. to Upper-street and 50 ft. to Florence-street. Accommodation is provided for a steamer, a horse-escape, a hose-cart, and a hand-escape, with rooms, fitted with the latest modern sanitary requirements and conveniences, for nineteen firemen and two coachmen, and stabling for four horses. The building has been erected by the Works Committee of the County Council, and the total cost, including the site, is 20,594*l.* 2s. 8d.

Infirmary, Highgate Hill.—The Duke and Duchess of York opened, on the 16th ult., the new infirmary erected by the Islington Board of Guardians on Highgate Hill. The new infirmary, which has been erected in the grounds of the late Small-pox Hospital, Highgate-hill, will accommodate 800 inmates. The late small-pox hospital building is being altered and adapted to form part of the administrative section, and will contain about ninety bedrooms for nurses, baths, lavatories, &c., in addition to suites of rooms for the medical superintendent, assistant medical officers, and matron, &c.

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The declivity of the ground has rendered it necessary to make the wards on the lower part of the ground four stories high, and those on the higher side only three stories high, with the roofs all on one level. The whole of the wards, rooms, corridors, &c. in connexion with the same will have fireproof floors and dadoes 5 ft. high above the floors of white glazed bricks, with bull-nose bricks to all angles. The external walls are executed in grey stock bricks with red bands and arches. The wards are 100 ft. apart, and are connected together by means of enclosed corridors on the two lower floors, and open corridors on the two upper floors, and also by means of open iron galleries for fire escape purposes. The centre building forms the principal administrative block, which is two stories high, except the centre portion of same, which is three stories high and wherin are situate the dispensary, surgeons' and operation-rooms, anæsthetic-room, &c. The laundry, mortuary, coffin, store, and other buildings will be erected in rear of the old small-pox hospital; communications will be made to same from the new buildings by means of a subway. Mr. William Smith, of Chancery-lane, was the architect for the work, and Messrs. Kirk & Randall, of Woolwich, were the contractors.

BOYS' CLUB, BARKING-ROAD, CANNING TOWN.—On the 14th ult. was opened the Passmore Edwards Boys' Club and Institute in Barking-road, a branch of the Mansfield House University Settlement in Canning Town. The new premises, which have been built by Messrs. James Smith & Sons, of Norwood, from the designs of Mr. H. C. Lauder, have a frontage towards Barking-road of 78 ft. The site is irregular in shape. The central part of the ground floor will be occupied by the clubroom, which will be lighted by the two semicircular windows. Near the entrance to this room, and separated from it by a glass screen, will be the managers' office, which will also serve the purpose of a general inquiry office. At the opposite end of the room is a counter where tea, coffee, and light refreshments will be on sale. This room will be the general meeting place for members. A staircase will lead from the back of the clubroom to the reading-room immediately overhead; on the same floor will be two classrooms, also facing the Barking-road, and two smaller rooms at the back. Returning to the same staircase access will be given to the top floor, the greater part of which will be occupied by a billiard-room. Adjoining the billiard-room, and occupying the remainder of the top floor, will be the caretaker's apartments. At the back of the main block on the ground floor will be the large hall. This will be entered from the Barking-road by the same doorway as that which serves the club premises. The hall will accommodate 280 persons; at the further end will be the stage. Communicating directly with the stage will be three retiring-rooms. In the half-basement under the stage and retiring-rooms will be three slipper-baths with hot and cold water and drying and store rooms for linen and towels, and boiler-room. The workshop will occupy the top floor of this rear block. In addition to the club premises will be the public refreshment department; this will also be situated on the ground floor towards Barking-road, and will be entered by a door on the extreme left. Electric light will be fitted throughout. The main front will be of red pressed bricks, with terra-cotta dressings and strings. The mullions and transoms of the windows will also be of terra-cotta. The cost of the buildings will be about 7,828*l.*

THE HOTEL MAJESTIC, HARROGATE. — The Frederick Hotels Company, Limited, have erected an hotel at Harrogate, to be known as the Hotel Majestic, near the Ripon-road, overlooking the Valley Gardens and Spa Concert Rooms. The hotel, which is built of red brick and yellow sandstone was planned by Mr. G. D. Martin. The front of the building faces south, and extends some 100 yards along a grassy terrace. The façade is broken up by means of semi-circular windows, projecting bays, balconies, and a loggia; whilst the whole is dominated by a cupola. On the Ripon-road side is a winter garden, with a floor space of some 5,000 square feet. On the north side of the hotel is the main entrance. Messrs. Maple & Co., Limited, of London, have carried out the decoration and furnishing. One of the chief features of the hotel is a lounge, more than 100 ft. long, running from the front to the rear of the building. This lounge is backed by a gallery, and further provided with an ornamental bridge that supports part of the staircase. The dining-hall is adapted to accommodate 300 guests. Adjoining is a supper-room, whilst the north-east wing includes a ballroom, panelled throughout in yellow silk, and capable of accommodating 500 guests. The reception and reading rooms are to the south. Folding-doors divide the reading-room from the drawing-room. In the north-west wing is the smoking-room. Adjoining is a billiard-room, fitted with four full-sized tables. The lighting of the building is by means of electricity.

NEW ISOLATION WARD, COVENTRY HOSPITAL.—The new isolation ward in connexion with the Coventry and Warwickshire Hospital was opened on the 12th ult. Some time ago Mr. H. W. Chattaway, architect, was consulted, and was finally instructed to prepare plans for new buildings, which would include an isolation ward, extra bedroom accommodation for nurses, and all additional store-rooms. The contract of Mr. R. Wootton, of Coventry, was accepted for the building, and the whole of the extensions are now complete. The new isolation ward is situated at the rear of the present buildings, with the first floor of which it is connected by the main central corridor. The principal entrance is closed with folding-doors, and is cross-ventilated. The first floor of the isolation ward consists of two wards, with accommodation for five patients each, four bedrooms for nurses, and bathroom and lavatory. The space on the ground floor is to be utilised for storerooms for linen and dry goods, an enlargement of the kitchen larder, and a new store-house. The total cost of the new buildings is estimated at 1,000*l.*

SCHOOL, NETTLEHAM, LINCOLNSHIRE. — The Dean of Lincoln laid the corner-stone recently of a new infant school at Nettleham. Mr. H. H. Dunn, of Lincoln, is the architect; and Messrs. Bany & Kirk, of Nettleham, are the contractors for the new school. The entire length of the interior will be 44 ft., but a movable partition will divide the room into two, the one measuring 27 ft. 6 in. by 18 ft. 6 in., and the other 16 ft. 6 in. by 18 ft. 6 in. A small square building jutting out in front is designed as a cloak-room. The buildings will be of stone.

SWIMMING-BATHS FOR THE SEAMEN'S ORPHANAGE, LIVERPOOL.—On 20th ult. the Lord Mayor of Liverpool opened a new swimming bath in connexion with the Seamen's Orphanage. The building, which has been constructed at a cost of 3,500*l.*, from the designs of Mr. Culshaw, architect, forms a separate wing of the institution, and may be used both for swimming and as a gymnasium. The bath has been constructed on the latest principles, the floor being especially suitable for water polo, the side walks covered with non-slipping tiles, and galleries, dressing-rooms, and other conveniences being provided. The dimensions are 60ft. by 26 ft., and the capacity 40,000 gallons.

BUILDING IN SHEFFIELD.—House-building in Sheffield has been going on at a very rapid rate during the past two years, but there are signs now that the boom is at an end. From inquiries amongst local builders we learn that there is a considerable diminution in the amount of new property projected. The cost of building material is now so high that it is impossible to erect houses which, at the rents obtainable, will afford a fair return upon capital. Hence investors are fighting shy of this kind of investment. Owing to the spell of good trade and to the development of the suburbs of the city under the stimulus of tramway facilities, house property has been planned and carried out very rapidly of late. In 1899 the number of houses sanctioned on plans by the Corporation Sub-Committee which deals with the matter was 3,018, as compared with 3,566 in the previous year. The average growth of the city since the by-laws were adopted in 1864 has been 970 houses per year, and it will be seen, therefore, that the years 1899-1900 were exceptionally brisk in the building trade. The present year opened under similar conditions, and up to the last meeting of the City Council the number of houses for which plans were submitted and approved was 1,530. This does not look like any great-falling off, but it is worthy of note that it was in the early months of this year that most of the property was projected, and, of course, all of it may not be immediately carried out. Lately the Plans Sub-Committee have not had many plans for new house property before them. At a meeting of the Committee on the 20th inst. only sixty-nine new houses were approved, and at the two previous fortnightly meetings the numbers were sixty-two and seventy-seven. These figures are considerably below the recent average. It does not follow at all because there is no longer a boom in house-building that more houses are not wanted. Overcrowding still exists in some part of the city, and it is simply the high cost of building which has given a check to enterprise. At Walkley, where new dwellings have sprung up very rapidly, the supply seems to have overtaken the demand, and we are informed that there are few unlet houses. This is not the case in other parts of the city, however, and building is still going on pretty rapidly in the Ecclesall and Abbeydale districts, which do not seem to have yet shared in the general lull.—*Sheffield Independent.*

SANITARY AND ENGINEERING NEWS.

SWANSEA WATERWORKS ARBITRATION.—An arbitration is now being held in London for the purpose of settling differences between the Corporation and the contractors for the construction of the Cray Waterworks (Messrs. Paterson & Son). Mr. Hill, the consulting engineer of the Corporation, is the arbitrator, and the amount involved is said to be about 100,000*l.*—*South Wales Daily News.*

PIER, CROMER.—Since last season, says the *Eastern Daily Press*, a very considerable improvement has been effected on the sea front at Cromer by the Cromer Protection Commissioners. New sea walls have been constructed on either side of the town, giving a marine promenade of about one mile in extent. In some places the esplanade is about 80 ft. wide, and a number of semi-circular bastions are placed at intervals along the entire frontage. At a point equi-distant from the eastern and western ends of the promenade a bastion leads to the entrance of a pier. The central approach to this is by a flight of steps, with on either side wide slopes of easy gradient, surmounted by iron railings. At the entrance are two iron gates. To the right and left of these are kiosks and turnstiles, while on the nearest pillars on either side is inscribed "C.P.C. 1900." The pier will be 500 ft. long when finished; 240 ft. is now fully completed, and this, after Board of Trade inspection, was formally opened to the public on the 16th ult. At the entrance and sea end it is 60 ft., and in the narrowest part 40 ft. wide. At the far end a bandstand is erected. Near it, on either side, are shelters. Spaced at intervals down the centre are four three-lamp incandescent lights, with others at the entrance gates. The total cost of sea front improvements involves an outlay of 50,000*l.* The engineers are Messrs. Douglass & Arnott, Westminster; the contractor for the pier, Mr. A. Thorne, Westminster; eastern promenade, Messrs. A. Fasey & Son, Leytonstone; and western promenade, Messrs. B. Cooke & Co., London.

FOREIGN.

FRANCE.—The Conseil-Général of the Seine has under consideration a project for the reconstruction of the bridges of the Ile Saint-Denis, at an estimated cost of 2,000,000 frs.——The "Société Académique d'Architecture" of Lyons has opened a competition, for all artisans in the Department of the Rhône, for the best piece of work in wrought iron, and the best design for a mantel for a large hotel dining-room.——The jury in the competition organised by the Municipality of Marseilles for schools in the St. Victor quarter have awarded the first premium to MM. Cravio and Pacaud, and the second to M. Lombard.——A bust of Petrarch's "Laura" is to be put up at the fountain of Vaucluse. M. Clovis Hugues is the sculptor.——The Municipal Council of Paris has approved of the erection of a new church in the Twelfth Arrondissement, to replace the old church of Saint Antoine des Quinze-Vingts.——The autumn exhibition of the Société des Amis des Arts of Bordeaux will be open from October 11 to November 11.——The death is announced of M. Georges Marye, curator of the Museum of African Antiquities at Algiers. He was the delegate of the Algerian Government to the former Paris Exhibition at the Trocadéro.——The death is announced, at the age of seventy-six, of M. Guillaume de Rochebrune, the etcher, who since 1845 exhibited at the annual Salons engravings and drawings of the celebrated buildings of France, among others of the historic châteaux, such as Blois, Chambord, Azay-le-Rideau, Chenonceaux, &c. He received medals in the Salons of 1865, 1868, and 1872, and the decoration of the Legion of Honour in 1874.

UNITED STATES.—It is announced that the capitol of the State of South Carolina, at Columbia, is to be completed nearly according to the original designs. The building was commenced nearly two generations since from designs by the late Mr. J. R. Niernsée, of Baltimore, and it was intended to be the most costly capitol in the Union. The blocks of granite and marble which have been lying on the ground for nearly fifty years are still to be used in the building. The unfinished building suffered greatly during the American Civil War.——A scheme is on foot in New York to build an artificial island in the harbour, which island shall be accessible to vessels and to railways on the New Jersey side of the river. The object of the scheme is to enable steamers unloading to have the goods sent direct by rail, and to save the excessive wharfage charges on the mainland.

CANADA.—Mr. Alcide Chausse, architect, has recently been appointed chief of the Building Inspection Department of Montreal. He is a member of the Council of the Province of Quebec Association of Architects.——The Canadian Society of Civil Engineers have appointed a committee to conduct tests and establish standards of quality of cement.—— The unusually high price of most classes of building materials in Canada is, together with the demands of workmen for increased wages, unfavourably affecting building enterprise.

ITALY.—Signor Maes, an eminent Italian archæologist, has submitted a memorial to the Government, in which he states that about 3,000 bronze tablets, constituting the records of Rome from its foundation to the time of Vespasian, are buried in the marshes at Ostia; he suggests that these marshes should be well drained to recover the tablets. He has evidence that they were carried to Ostia after being rescued from a fire which took place in Rome in the first century A.D.

INDIA.—The Bombay Improvement Trust is proceeding rapidly with the first scheme of improvement, which consists in removing a number of houses in one of the congested districts, and their replacement by more sanitary dwellings and open spaces. The population displaced is to be accommodated at Agripada, in buildings erected for the purpose.——An entirely new survey of the northern portion of the island of Bombay is to be carried out; the work has been undertaken by Mr. C. E. Tapsell, until recently superintendent of the Bombay Forest Survey.——The Torsa bridge, near Cooch Behar station, has recently been opened to traffic. It consists of seven spans of 80 ft. girders of the triangulated Warren type with pin connexions; the

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abutments are of brickwork. —— Another large portion (118 miles) of the Hyderabad-Godavari Valley railway, from Secunderabad to Basar, has now been opened. Mr. G. P. Rose is the chief engineer of the railway.——The restoration of the roads and drains and protection of the ravines in Darjeeling, which, it will be remembered, were extensively damaged by a cyclone in September last, is now so far completed that the residential portion of the station is regarded as being perfectly safe from attacks of a similar nature.——Rapid progress is being made in the erection of the Pasteur institute at Kasauli.——The Foreign and Public Works Departments of the Government of India have under consideration plans and estimates for the proposed public offices in Bangalore. Mr. J. E. O'Shaughnessy, C.E., is the architect.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The partnership between Messrs. E. Guy Dawber & Whitwell, architects, of 22, Buckingham-street, Adelphi, W.C., terminated on June 30 last. Mr. E. Guy Dawber will carry on his practice, at the same address, as previously.——The Blackman Ventilating Company, Limited, have removed their central offices to 443, Holloway-road, but their engineer representatives for the London district will remain at, and work from, the old City address, No. 63, Fore-street, E C.

APPOINTMENT.—A special meeting of the Scarborough Marine Drive Sub-Committee was held at the Town Hall, Castle-road, recently, when the number of candidates for the vacant post of Resident Engineer on the Marine Drive works was further reduced. The following four candidates appeared before the committee:—E. J. Beard, aged thirty-nine, St. Leonard's-on-Sea; T. H. E. Coad, aged twenty-eight, Gibraltar Dockyard Extension; W. Davidson, aged twenty-seven, Seaford, Sussex; and A. Harley, aged thirty-seven, Forest Hill, London, E.C. After some discussion the number was reduced to two—Mr. E. J. Beard and Mr. A. Harley, and these gentlemen attended before a meeting of the Streets and Buildings Committee, when the final appointment was made, Mr. E. J. Beard being appointed. The salary is 300*l.* a year. There were originally forty-seven candidates for the post.

STATUE OF KING ALFRED THE GREAT.—The Mansion House Committee announce that the contract with Mr. Hamo Thornycroft, R.A., for the colossal statue of King Alfred the Great has been entered into, and the work will be completed by midsummer next. The full-sized model in clay has already been finished. The statue itself measures 14 ft. from the crown to the feet. The figure of the King is represented standing with one arm resting on his shield, the other held aloft, the hand grasping his sword so that the cross belt is held uppermost. The pedestal, of rough hewn granite in a single block, will be over 20 ft. high.

SCOTTISH BUILDING TRADES FEDERATION.—The quarterly meeting of the executive of the Scottish Building Trades Federation was held in M'Master's Temperance Hotel, Perth, on the 25th ult., Mr. Thomas Kay, wright, Glasgow, President of the Federation, in the chair. The Central Secretary submitted his report, which narrated the principal business of the past quarter, including the steps taken to render the organisation still more effective in the interests of master tradesmen throughout the country, the assistance given in various trade disputes, the appointment of a Consulting Committee to confer on questions arising with reference to strikes and disputes of any kind, and reference was also made to the visitations of the branches by members of the Executive for the purpose of rendering them more effective, and generally to the organising of branches in districts not hitherto represented. Special reference was made to the question of general conditions of contract, and the confident hope was expressed that some arrangement would be come to shortly with the architects and others in regard thereto. Reference was also made to the matter of cultivating closer relations with the National Association of Master Builders of Great Britain and Ireland, and it was agreed to extend a cordial invitation to that body to send representatives to the annual meeting of the Federation in October next. The report was passed after a discussion of the various questions. In the afternoon the members lunched together under the chairmanship of Mr. Beveridge.

IMPROVEMENTS IN THE CITY.—On the 26th ult. a meeting of the Court of Common Council was held at Guildhall, the Lord Mayor presiding. The Improvements and Finance Committee brought up a report relative to the rebuilding of houses in Leadenhall-street, and the opportunity afforded for an improvement between Billiter-street and Aldgate. It would be desirable to make that portion of Leadenhall-street 50 ft. wide, and they recommended that the London County Council should be approached with a view to ascertain whether the Council was prepared to contribute towards the cost—estimated at 636,500*l.* This was agreed to.—A plan was approved for continuing the improvement of Blomfield-street, by making it 50 ft. wide between East-street and the corner of Eldon-street.—A letter from the London County Council was read, asking the views of the Corporation as to the erection of a kiosk and a block of shops, with rooms over, in the forecourt of Ludgate-hill station; the Committee recommended that the Council be informed that the Corporation was unable to consent, inasmuch as the erection might interfere with the alterations and improvements at the station, which was merely a timber structure, badly lighted, and quite unsuitable for the requirements of the public. The report was adopted.—At the instance of the County Purposes Committee, it was resolved to levy a county rate of twopence in the pound for the year ending September, 1901, for the provision of 40,000*l.* required by the Government for the purchase of the male wing of Newgate, under the scheme for rebuilding the Sessions House.

BRITISH INDUSTRIES.—We are asked to call attention to the fact that, with a view of increasing British trade and spreading a better knowledge of articles manufactured in this country, the "National Lecture Society" are arranging a series of illustrated addresses on British industries, to be given in all important commercial centres throughout the world. Those who are desirous of availing themselves of this movement are invited to write to the Honorary Secretary, National Lecture Society, Imperial Institute, London, S.W.

PLUMBERS' EXAMINATION AT KING'S COLLEGE.—Fourteen master and operative plumbers applying for registration under the National Registration of Plumbers attended at King's College on the 28th ult. for examination by the Worshipful Company of Plumbers. The candidates were from various parts of London, and also from Barnet, Guildford, Leicester, and Northampton. The practical test included lead bossing and the making of large and small joints, and the examination in sanitary plumbing included the subjects of contamination of drinking water from faulty connexions, roof covering, arrangement of bath, sink and closet wastes, drainage of town houses, and disconnexion with sewers. The examiners were: — Mr. Charles Hudson, Master Plumber, Chairman of the Board of Examiners; Mr. F. Nichols, Master Plumber; and Messrs. F. Randall and J. K. McIntosh, representing the United Operative Plumbers' Association of Great Britain and Ireland. Four candidates succeeded in passing the practical examination.

BRISTOL CATHEDRAL RESTORATION. — On the 25th ult. a meeting of the General Committee in connexion with the restoration of Bristol Cathedral was held in the Chapter Room to receive the report of the executive as to the work done during the last eight years. The Dean presided. The Ven. Archdeacon presented the report of the executive committee, which he had drawn up with the assistance of the hon. secretaries. It stated that at the public meeting at the Merchants' Hall which inaugurated the work on June 13, 1892, the requirements brought before the meeting were as follows:—I. Restoration of the central tower and Elder Lady Chapel. II. The internal rearrangement and fittings of the choir, including (1) the restoration of the stalls, (2) marble flooring and steps, (3) altar table and communion rails, (4) reredos, (5) choir screen, (6) side screens, (7) Bishop's throne. III. Lighting of the Cathedral. IV. The provision of a new organ. Most of these works have now been executed; but as the work of restoration proceeded the extremely dilapidated and even precarious state of the more ancient portions of the external structure, especially on the southern and eastern sides of the choir, was forced upon the attention of the Committee; and they decided to make no further general appeal to the citizens for the completion of the remainder of the interior fittings (such as the reredos with sedilia, the Bishop's throne, the choir screen, and the organ) until they could assure them that the building itself was in a sound and substantial condition worthy of the cathedral of a great city. "Your committee," to quote the report, "believe that a walk round the whole Cathedral, with especial scrutiny of the southern and eastern sides, will show to all interested in the mother church of the city and diocese that, under the guidance of the late Mr. Pearson, Messrs. Cowlin have ably and conscientiously carried out their work, and that in the place of dilapidated roofs, broken battlements, decaying stonework, and crumbling window tracery you have a restored building which the present generation need not be ashamed to hand down to those who shall come after them. The true principle of restoration has been adhered to throughout, for wherever the original stonework was in a sound condition it has been carefully and religiously preserved. During the progress of the work just described, but independently of the Restoration Committee, the costly reredos has been erected. . . . . In conclusion, your Committee, while recording their gratitude to all who have aided them in making the Cathedral of our city more worthy of its position, entertain the confident hope that before very long what still remains to be done may be carried out, and they would venture to suggest that the sedilia, the completion of the choir screen, the Bishop's throne, a more dignified pulpit, and an organ more suited to modern requirements may well be the objects of private gifts, or be offered as memorials of distinguished citizens or benefactors of the Cathedral. . . . . The total sum contributed amounts to 19,331*l.* 17s. 10d. Of this 13,152*l.* 4s. 6d. has been paid to the builders, Messrs. Cowlin & Sons. Their work includes the following items:—Restoration of central tower, 4,805*l.* 17s. 3d.; Elder Lady Chapel, 1,866*l.* 12s. 5d.; northern side of cloisters, 712*l.*; and the entire restoration of the exterior fabric of the choir, choir aisles, Berkeley and Newton Chapels, and south transept, with roofs, parapets, pinnacles, &c., 4,490*l.* The reconstruction of the stalls cost 1,407*l.* 10s.; the marble flooring and steps, 1,367*l.* 15s.; and other internal improvements, 1,125*l.* 14s. The cost of the reredos does not appear in this account, the funds for which were raised by a separate effort." Mr. Jere Osborne proposed the adoption of the report. Canon Alford seconded, and said that the 20,000*l.* which had been spent in the past eight years had enabled them to do much to the fabric, but there was a great deal more to be done. The resolution was carried.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.—At a meeting held on July 31 for the election of a pensioner, Mrs. Fanny Hicks, widow of the late Mr. C. J. Hicks, a builder's clerk, was elected by a majority of 833 votes, and becomes entitled to a pension of 24*l.* per annum, paid monthly in advance. The committee hope to hold another election in a few months.

WINDOW, WESTMINSTER ABBEY.—The memorial to the late Duke of Westminster, K.G, Lord Lieutenant of London, is to take the form of the filling of the Rose window in Westminster Abbey and the twelve lights below it with stained glass. The work will be executed under the general direction of Mr. Bodley, A.R.A., and will cost about 3,000*l.*

LEGAL.

THE BUILDING ACT AND SHOW CASES.

AT the Lambeth Police-court on Tuesday afternoon Mr. W. H. Ricketts, a builder, of Bedford-road, Lambeth, appeared before Mr. Hopkins to answer a summons taken out by the London County Council complaining that he had retained a structure to which Part VII. of the London Building Act applied without having obtained a licence from the Council. Mr. Thomas Chilvers, from the Solicitors' Department of the Council, appeared in support of the summons, and the defendant was represented by Mr. Condy, barrister. In opening the case Mr. Chilvers said the defendant was summoned for setting up in the forecourt of his premises a building for which a licence was required. Section 200, Sub-Section 3 of the Building Act provided that any person who set up a building or structure to which Part VII. of the Act applied without having obtained a licence should he liable to a penalty of 40s. Under Part VII., Section 84, it was provided "No person shall set up in any place any wooden structure (unless it be exempt from the operation of this part of this Act) except hoardings enclosing vacant land and not exceeding in any part 12 ft. in height, without having first obtained for that purpose a licence from the Council, and the licence may contain such conditions with respect to the structure and the time for which it is to be permitted to continue in the said place as the Council think expedient." There was this proviso: "Provided that a licence shall not be required in the case of any wooden structure of a movable or temporary character erected by a builder for his use during the construction, alteration, or repair of any building unless the same is not taken down or removed immediately after such construction, alteration, or repair." The facts of the case were these: In the latter part of last year the defendant put up in his forecourt a show-case. He was then served with a notice under Part VII. of the Act, and also with a notice under Part III., Section 22, with regard to the line of frontage, the structure being beyond the general line of frontage. In reply to those notices, the defendant called upon him (Mr. Chilvers) and stated that he had made the show-case himself and wished to sell it, and asked whether the Council would give him time. Acting upon his suggestion, the defendant wrote to the Council, stating that he was not aware that such structures were not allowed by the Council, and asking whether they would allow it to remain for a time to enable him to dispose of it, or grant him a licence to keep it there for a time. The defendant called attention to the fact that the case was quite empty and was labelled for sale. The Council sent a reply, allowing the defendant two months from November 13 for the removal of the structure. Nothing more was heard from the defendant, but in April of this year the Lambeth Vestry called the Council's attention to the fact that the defendant was still retaining the show-case in his forecourt, not merely as an empty show-case, but for the exhibition of builders' fittings. Inquiries were made, and on May 24 a letter was sent to the defendant informing him that unless the structure was removed, the matter would be reported to the Building Act Committee with a view to proceedings being taken. He (Mr. Chilvers) submitted that the show-case was clearly a structure within the section, and quoted the case of Brown, appellant, and the Corporation of Leicester, respondents (*Justice of the Peace*, February 4, 1895). This structure was on wheels, but he contended that that fact did not take it outside the section. This show-case question had formed the subject of a decision of the High Court. That case had not been reported, but he had a shorthand note in Court

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if his worship would like to see it.—Mr. Condy: I do not think there is any dispute as to the facts. The only question is whether it is a structure. I am going to say that it is a chattel built for sale.—Mr. Hopkins: Oh, no.—Mr. Condy remarked that "structure" was a very vague term. He drew his worship's attention to the decision in the London County Council and Humphreys (2 Queen's Bench, 1894).—Mr. Hopkins said he had better hear the evidence.—Mr. W. G. Perkins, an architect and surveyor in the office of the Council, stated that upon the receipt of a letter from the Vestry of Lambeth on April 10, he inspected the structure, which was 8 ft. 4 in. long, 6 ft. 6 in. wide, and 10 ft. high. It was constructed with a wooden frame, glazed sashes, a wooden floor, and a wooden roof covered with lead, and the whole supported upon four small iron wheels. There was a ticket in the window—"This case for sale"—and inside the case were bundles of wallpaper, several water-waste preventers, and other articles.—Mr. Chilvers: What are known as builders' fittings?—Witness: Yes.—Mr. Chilvers: Is there a door to this structure?—Witness: Yes.—Mr. Hopkins: Has it got a board over the top with the name?—Witness: It had, but Mr. Ricketts removed it to-day.—Mr. Condy: That board was tied on, was it not?—Witness: Yes.—Mr. Condy: It was not fixed?—Witness: No. Mr. W. H. Ricketts, the defendant, said he built this case himself. He began it in 1897. He put it in the forecourt as he had no other place to show it. The notice, "This case for sale," had been in it all the time. The case was not fixed in any way to the premises. The articles which Mr. Perkins spoke to seeing in the case were put there to be stored. He was still trying to sell the case. He did not want it for any purpose of his own.—Mr. Hopkins: You began the show-case in 1897, and put it up on your ground; it is still unsold in 1900. Will you tell me how you can possibly say it is any part of a builder's business?—Mr. Condy: As a matter of fact is it part of your business to make these things?—Defendant: Yes, I am a shop-fitter.—Mr. Condy said that was his case. He submitted that the fact that things had been put in the show-case did not affect the question. He did not know whether the gentleman who represented the Council would say that if a man put his boots in a dog-kennel the kennel would therefore become a structure.—Mr. Hopkins: The judges thought that the iron building case (the County Council and Humphreys) was very near the line and difficult. I may say I think this case is well across the line and easy. What are you asking for?—Mr. Chilvers: I am asking for a penalty and for an order under the section, sir. I only ask for a nominal penalty. Mr. Hopkins made an order upon the defendant for the removal of the structure within twenty-eight days, and directed the defendant to pay a nominal penalty of 3s. and 2l. 2s. costs.

THE NEW MASONIC HALL AT PORTLAND.

This was a case referred from the High Court to Mr. Edward Pollock, official referee, the parties principally interested being Mr. John Thomas Whetham, jun., builder, of Weymouth, plaintiff, and Mr Richard Score and others, Portland, defendants. Originally the action was commenced by the plaintiff against the defendants, who are members of the Building Committee of the New Masonic Hall, Portland, and arose in this way:—The plaintiff entered into a contract to erect a Masonic Hall, according to certain plans, specifications, and bills of quantities, for a certain amount. After the building was commenced certain alterations and additions were made by the order of the architect, Mr. E. J. Eliord, which entailed a further expense. Amongst the principal was that the thickness of the walls was increased from 4½ in. to 9 in., it being considered that the walls as specified were not sufficiently strong to support the roof. After the completion of the building a dispute arose between the plaintiff and the defendants as to the sum which should be paid him in respect to the extras incurred in the contract, and an action was ultimately brought to recover 515l. 16s. 1d. One of the terms of the contract was that the building should be completed by plaintiff within six months from the signing of the same, the date of which was March 26, 1898. Owing, however, to the extra amount of brickwork involved and other alterations ordered by the architect, the time allowed by the contract was considerably exceeded, and the defendants claimed by way of counter-claim the sum of 420l., being at the rate of 2l. a day for every days delay beyond the time specified in the contract. The result of that was that the case was referred from the High Court for adjudication on the 24th ult. at the Crown Hotel. The plaintiff was represented by Mr. C. C. Scott, barrister (instructed by Messrs. Andrews, Barrett, & Wilkinson), and the defendants had for their counsel Mr. Clavell Salter (instructed by Messrs. Bowen & Symes). On the case coming on for hearing the defence admitted that the alterations had been ordered by the architect, and that they had necessitated a certain amount of extra time in the erection of the hall. After considerable argument by counsel on both sides, the referee supported the plaintiff's contention, that as the alterations and additions had been ordered by the defendants' architect, and had necessitated a further time in the erection of the buildings, the defendants could not claim penalties under the contract. This being the main point involved in the action, and having been decided in favour of the plaintiff, the defendants submitted to a verdict for 410l. 8s. 5d., with costs. It should be stated the defendants at an early stage of the action paid 250l. in court in full settlement of the claim, and this the Official Referee directed to be paid to the plaintiff in part payment of his claim.—*Southern Times.*

SHEFFIELD CORPORATION BUILDING BY-LAWS.

In the Sheffield City Police-court on the 19th ult., before Mr. E. M. E. Welby (stipendiary magistrate), Mr. Harry Ripley, builder, of 246, Penistone-road, was charged that he was erecting on March 22 eleven houses in Eden-street, the complete plans of which had not been sent in and approved by the City Surveyor, and also that on March 22 he was erecting a new building to be used as a dwelling-house at the corner of Eden-street and Driffield-street without having at the rear an open space of at least 150 square feet free from any erection thereon. The prosecution was conducted on behalf of the Corporation by Mr. G. R. Battams, of the Town Clerk's office.—Mr. Battams explained that the defendant, on November 24, 1899, sent in a plan for twenty-four houses to be erected, including ten houses in Eden-street, and that that plan was approved of, and the work of erection commenced. Since then the building inspector found that the end house, which was to have also been used as a shop, with two rooms fronting Eden-street, had been converted into two houses without internal communication. The houses had not been kept exactly on the site on which they were originally intended to stand, and the end house had not the regulation allowance of air space. Before the defendant made the deviation from the approved plans he should have submitted fresh plans.—Arthur Greenwood, building inspector, said that Ripley sent in plans of ten buildings in Eden-street and other buildings. On March 22 he visited the buildings which were then in course of erection, and he found that the premises at the end which were down as one house had been converted into two houses with no internal communication. He called the defendant's attention to the deviation from the original plans, and when he called again in April he found one of the workmen making a doorway between the two places. There were separate staircases, one for each house.—Mr. E. A. Green, Chief Building Inspector, said that the buildings had not been put up according to the plan, and, with the two houses instead of one at the corner, the air space at the rear of the end house did not amount to 150 ft.—Mr. Ripley (defendant) said that the two houses referred to were only one house, as intended originally.—Mr. Green: On March 22 there were two houses, but a doorway has since been made between them.—Mr. Ripley: Do you say I have not 150 ft. of air space behind the end house?—Mr. Green: On March 22 you had not more than 68 ft.—Mr. Ripley: I say there is nearly 300 ft., and it is only one house.—Mr. Battams explained that the corner house had been made into two houses, but had since been made into one again.—Mr. Ripley: Do you approve of houses before they are finished?—Mr. Battams: We approve of the plans before they are commenced.—Mr. Ripley: I suppose you approve of houses when they are finished and have the tenants in. There are only ten houses, and the end house complained of has only one tenant. They have always been intended to be one and have always been one, but it appears these gentlemen thought they were going to be two.—The Stipendiary: It is plain that you thought it possible to make the one house into two, but after the division was made you found it was complained of, and you knocked away the obstruction, leaving it only one house, and now it is all right.—Mr. Ripley: It always has been one house.—The Stipendiary: What was it on March 22.—Mr. Ripley: I say it was neither one nor two. I call it then "a building in course of erection," and when it is completed I ask the authorities to pass it.—Going into the witness-box, Mr. Ripley stated again that on March 22 the building was neither one house nor two, but was intended to be one exclusively for one tenant.—Mr. Battams: On March 22 were these buildings fitted with two sets of stairs to the bedrooms?—Witness: Yes.—Two attics?—Yes.—Two kitchen ranges?—Yes.—Two sinks?—Yes.—And was the doorway in that wall blocked up?—I believe it was.—What does one house want two sets of stairs and two kitchen ranges for; it is not usual to put them in, is it?—No.—Have you had them taken out?—I certainly have.—On March 26, was a man making a hole in the wall for the doorway?—Mr. Ripley: I don't know to a day. I have admitted that the doorway was blocked up. It is now one building. I consider it is my right to inspect the buildings and see if the work is carried out according to the plans, and if not, have it put right. About that date I found that the doorway had been made up and two staircases put in, and ordered the foreman to make the alterations according to the plans.—The Stipendiary: That was after the complaint had been made.—George William Huscroft (clerk of the works) said that the building was only intended to be one house, and now it was completed as one house he could not understand why they were summoned.—The Stipendiary said that the defendant evidently intended to make the house into two, but having a complaint made he had had the matter put right again. He would have to pay half the maximum penalty, 2l. 10s., and 7s. costs.—The defendant gave notice of appeal.—The second summons against him was withdrawn.—*Sheffield Independent.*

AN ARCHITECT'S CLAIM.

At Southwark County Court on Tuesday last week, before his Honour Judge Addison, Q.C., Mr. Edward Crosse, architect and surveyor, of Bermondsey-square, sued William Neaves, a carman and contractor, of Stoney-lane, Tooley-street, to recover 29l. 10s. for preparing pencil drawings of a proposed new house to be erected at Bromley-rd., Catford, preparing specifications thereof, colouring and finishing drawings and inviting tenders, and 10s. out-of-pocket expenses.

Mr. Moyses was counsel for the plaintiff, and Mr. Minton Senhouse represented the defendant.

Mr. Moyses said the defendant was desirous of having a house erected on a piece of land he possessed, and he instructed Mr. Crosse, who was introduced by Mr. Stuart, a builder, and a mutual friend of both, to prepare drawings. He wanted a 30 ft. frontage with stables at the rear and a conservatory at the side, the cost not to exceed more than 600l. or 700l. Plaintiff prepared pencil drawings, but defendant altered his mind and wanted a building with 40 ft. frontage and no conservatory. Two or three alterations were submitted, and subsequently defendant approved of some drawings and requested that an estimate should be taken out. This came out at 1,580l. Upon this the defendant appeared to abandon the idea of building and plaintiff sent in his bill for eight guineas, a very nominal charge for all the work he had done. This was eventually paid. Subsequently defendant again consulted Mr. Crosse and they visited some houses in Catford which defendant said he liked. Plaintiff took measurements and a rough sketch of the architectural features of the houses, and afterwards, on the order of the defendant, prepared a full set of drawings of a similar house. After making several alterations, defendant approved of the drawings which were then coloured and a specification was prepared. Mr. Stuart was then consulted by the defendant, and he gave it as his opinion that the house desired could not be built for 900l., the price suggested by the defendant. Plaintiff was thereupon instructed by the defendant to put the matter out to tender, and the lowest received was that of Mr. Stuart for 1,475l., the highest being 2,250l. Defendant on learning this said the cost would be too much, and he would not have it. Some time later plaintiff sent in his account, which was but 2 per cent. on the lowest tender, and only 10s. out of pocket expenses, but this had not been paid.

Plaintiff, who stated that he had been twenty years in practice, was called, and bore out in detail his counsel's statement. He denied that there was any stipulation that the cost of the house should not be more than 1,200l.

Defendant said he told the plaintiff he wanted an eight-roomed cottage built, and plaintiff told him the cost would be somewhere between 600l. or 700l. Subsequently it was fully understood that the cost was not to be more than 1,200l., including plaintiff's fees.

Mr. Stuart, J.P., and Chairman of Rotherhithe Vestry, said it was agreed at first that he should build the house. Mr. Neaves told him it was not to be more than 1,000l. or 1,200l., and Mr. Crosse was clearly instructed to that effect.

After hearing further evidence at great length, his Honour said he was always inclined to give judgment for a professional gentleman who had rendered services, but in this case he was obliged to find that there was an undertaking to prepare plans for a house at not more than 1,200l. Therefore, he gave judgment for the defendant with costs.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

6,978.—A Method of Ventilation: *F. T. Cope*—The contrivance is devised to moisten, disinfect, and separate dust or microbes from the air; the air-propeller, in one form, has two fans that are mounted upon one and the same axis, and are so arranged that the vanes of the fan in the rear shall, by reason of the angle at which they are set, impel the air more rapidly than it is propelled by the vanes of the fan in front. A tubular casing surrounds the space between the two fans, in a modification the front fan is driven at a speed less than that of the fan in the rear; a cone-shaped frame, covered with asbestos or some other absorbent fabric, constitutes the moistening or disinfecting apparatus, worm-gearing turns the cone slowly upon its axis, so that its lower edge shall dip into a trough into which water flows through a pipe, or the disinfectant flows from a branch cistern; the air from the main pipe is impelled through the wetted fabric

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before it is driven into space where it is to be ventilated.

6,981.—Levels: *C. Q. Hett.*—Upon a pendulum which hangs by pivots from screws is mounted an optical square opposite a telescope that has spider webs or their equivalent, the pendulum being rendered adjustable with a weight which is to be set, as may be found necessary, with screws; a spring catch obviates any accidental return, and lugs upon the casing pass over the head of the stand. The general apparatus is after the kind specified in No. 13,035 of 1897.

6,988.—Pipe Fittings: *G. Morris.*—The fittings are intended for radiators and other hot-water apparatus; the required joints and water-flow are provided for by means of tee-connexions, which contain a passage between the interior of the pipe and the socket, or two passages, one at either side, leading from the interior to the socket. If the pipe happens to be below the radiator the fitting—which may be elbow-shaped, tapped, or flanged—can be utilised for the return-flow connexion, and if it is above the radiator for the flow-connexion.

6,992.—Electrical Lighting: *W. Schloesser & H. Moeres.*—The contacts and connexions are arranged in a manner that will allow only one of a pair of lamps to burn at one time, and a key switch is fitted on to one of the pair. In one form of the contrivance the lamp which bears the controlling switch may be made loom-shaped, the switch comprising a drum, which carries contact-faces that engage with contact-springs. The arrangement of the contacts upon the drum enables one, on giving the key a quarter-turn, one after another, to light first one lamp and then the other lamp, the circuit becoming finally broken together with the extinction of both lamps.

7,000.—Window Sashes: *J. Walker.*—Single or double jointed hinges are employed for joining two sashes to sliding stiles, in order that they may be turned inwards for purposes of cleaning, &c., and spring catches fix the sashes within the stiles. Each sash and its stiles have rabbetted or interlocking joints, whilst air grooves in the sliding stiles prevent the passage of water through capillary action. An upper cross-bar joins the upper sliding stiles, and may be fastened in the window-head when it is desired to turn the sash inwards, the sash being swivelled upon the bottom rail, and not lowered within the frame.

7,065.—Venetian Blinds: *R. Rogers.*—The inventor affords means for joining the laths to the ladder and tumbler tapes. He screws metal strips, furnished with hooks and eyes, on to the laths, and through loops at the ends of the tapes he puts pins which engage with the hooks upon the metal strips, or in lieu of two separate strips he forms the four hooks upon one plate, which he fashions with a dish for covering the knot of the end when it is used for the bottom lath, or he uses a separate dished disc for covering the knot.

7,082.—Lifting-jacks: *C. R. Prévost.*—Upon a shaft is a pinion with which the rack-bar is brought into engagement; another pinion, also mounted upon the shaft, is caused to gear with a worm upon the crank-shaft; to meet certain conditions an extension length can be fitted upon the crank-shaft.

7,139.—An Appliance for Closing Doors, &c: *D. Morgan.*—The appliance comprises an air-brake for shutting doors, casements, gates, &c.; a squared end, fitting into a squared socket in the door, joins its axis to the door beneath which the appliance is laid; when the door is opened an arm winds up a spiral spring, a chain joins the arm to a lever upon the axis, and on the axis is a crank placed in gear with another lever, whose end is joined to the piston-rod of the air-brake which turns about a vertical pivot; for use with double folding doors the levers, chains, &c., are made in double sets.

7,176. — Sewage and Similar Filters: *W. O. E. Meade-King.*—The filter is built up of rings, laid the one upon the other, so that the spigot of one ring shall fit into the faucet of the ring next beneath it, and that each joint shall be surrounded with an air-space by means of projections that keep the several parts asunder. A perforated diaphragm inside every ring sustains the filtering material (which may consist of manganese dioxide, coal dust, gravel, or coke breeze), a space for air being formed between each diaphragm, and the layer of filtering material next below it; after the liquid has been discharged upon the topmost ring's diaphragm the resultant filtered liquid escapes through an outlet in the lowest tray; the diaphragms are made of cocoanut matting or some similar substance.

7,192.—Method of Opening and Closing Grabs: *W. T. Priestman & H. Richardson.*—A spiral spring is coiled and held within the winding-barrel of the dredging-machine in such a manner that when the opening chain (which is wound upon the barrel) is unwound the spring becomes coiled and *vice-versa*; when the grab has been lowered the energy accumulated in the coiled spring serves to wind the opening chain on to the barrel as the grab is being raised; the winding is regulated with a friction-brake. In another form of the brake a block, an arm, an eccentric, and an axle are moved by the turning of an handle and its axle, whereby the winding-barrel is driven into, or out of, contact with the brake-block.

7,208.—An Appliance for Making and Testing Drawings: *T. Jones.*—The instrument, devised for use in drawing from models and other objects, contains two graduated arms that are pivotted on to another graduated and slotted bar; in operation the bar is held in one hand, the model is observed through the slot, and the two pivotted arms are adjusted in correspondence with the position of any part of the object, and the instrument thus adjusted can then be applied for testing the drawing.

7,213.—A Lift Valve: *F. J. Warren, H. Brecknell, E. M. Munro, and H. I. Rogers.*—A section, which can be rotated, of the pipe is joined to the fixed sections by means of stuffing-boxes, a valve being secured to the cross-bar upon the section, whilst to the upper fixed section is fastened another cross-bar wherein the screwed valve-spindle operates, so that the rotation of the first-named section closes or opens the valve; the appliance is intended to serve for sanitary, domestic, and manufacturing purposes, as well as for fire-hose, for liquids or gases, &c.

7,247.—Bricks, Tiles, Slabs, &c.: *L. Galecki, J. Lopatin, and P. Lopatin.*—A compound is made of sand—about 100 parts, milk of lime—130 litres, asphalt tar—4 litres, and carbonate of soda—1½ lbs. It is moulded into shapes under a high pressure, and the articles are then ready for the kilns or ovens; of the ovens the first is heated to a temperature of 20 deg. C., and the second is heated with pipes supplied with carbonic-acid gas and steam; the temperature of the third drying-chamber is maintained at 100 deg. C.

7,277.—Quantity Meters (Electrical): *H. Aron and Aron Electricity Meter, Limited.*—The meters are fitted with clocks which automatically alter the registration at any desired time or times in the course of the day; that is effected either by connecting and disconnecting resistances or shifting change-wheels in order to alter the meter's rate, or by shifting connecting wheels in order to record registration upon two or more separate sets of dials during the different times; two wheels are turned by the clock at one revolution in twenty-four hours, each of the wheels slides upon a fixed pin, and its single-notched hub is pressed by a spring end-wise against a projection upon a fixed cam. The cams are set by hand by means of their arms, so as to enable either wheel to slide forwards at any required time, the wheels as they revolve being returned backwards by the sloped sides of the notches; as they slide the grooved hubs operate levers, which impinge upon the opposite ends of a horizontal T-lever, which, together with some connected links, is shifted in either direction as soon as the notches come into engagement. Movement is imparted by means of wheels, from the meter-wheel to either one of the two registering-trains, the wheels being mounted upon a rocking frame which a spring-arm joins to one of the links, and that link turns a pointer which indicates which of the trains is in gear at any desired time; the clock is equipped with 12-hour and seconds dials, and also with a day and night indicator—the indicator consists, for preference, of a disc that has black and white semicircles.

7,286.—Frames of Filing-Cabinets, Chests of Drawers, &c.: *J. Hillebrand.*—The invention applies to the construction and erection of the frames of cabinets, chests of drawers, and so forth, whereof the front rails are commonly tenoned to the up-rights; when the frame has been put together and placed in its position the side-runners for the trays, which have rounded or squared dowels tangs at their ends, are screwed on to the upright, corresponding holes being cut in the rails.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 16.—By Franklin & Son (at Thaxted).

Thaxted, Essex.—Malting Mead, 6 a. 1 r. 30 p., f.	£300
The Chip Yard and Town Field, 19 a. 3 r. 35 p., f.	740

July 17.—Walter Pye (at Abergavenny).

Longtown, Herefordshire. — Manyferden Farm, 162 a. 1 r. 13 p., f.	2,000

By Dyer, Son, & Hilton (at Lewisham).

Lee.—23 and 25, Church-st., u.t. 18 yrs., g.r. 6*l.*	230
97, Burnt Ash-rd., u.t. 64 yrs., g.r. 7*l.* 10s., r. 36*l.*	275

By Dilley & Son (at Thrapston).

Brington, &c., Hunts.—Church Farm, 288 a. 1 r. 0 p., f.	3,400

July 18.—By Beadle, Wood & Co. (at Bury St. Edmunds).

Hopton, Suffolk. — Enclosures of land, 17 a. 2 r. 11 p., f.	260
Thelnetham, Suffolk. — Two enclosures, 15 a. 3 r. 0 p., f.	130
Seven cottages and 26 a. 3 r. 30 p., f.	570
The Lodge Farm, 180 a. 2 r. 5 p., f. and c.	2,350
The Poultry Farm, 23 a. 1 r. 28 p., f. and c.	430
Thripskin Farm, 36 a. 1 r. 22 p., f. and c.	490
Hinderslay, Suffolk.—Cottage and two enclosures, 5 a. 3 r. 26 p., c.	155
The Walnut Tree Farm, 127 a. 1 r. 26 p., f. and c.	1,200
Wattisfield, &c., Suffolk.—Bobby Hill Farm, 81 a. 0 r. 22 p., f. and c.	980
Malting Farm, 211 a. 1 r. 7 p., f. and c.	2,350
Cottage, shop, and yard, 0 a. 0 r. 33 p., c.	115
Enclosure of land, 21 a. 0 r. 35 p., f.	350
Hepworth, Suffolk.—Five enclosures, 20 a. 0 r. 24 p., f.	180
Hepworth Hall Farm, 167 a. 1 r. 4 p., f.	2,800
The Manor of Reeves Hall, otherwise Rusalls, with Mast Stevens in Hepworth	160

By P. M. Puckridge (at Hungerford).

Inkpen, Berks.—Westcourt House and 7 a. 1 r. 8 p., f.	£500
Kingston's Meadows and Hop Garden Paddock, 8 a. 1 r. 13 p., f.	235
Batt's Cottage and 8 a. 2 r. 25 p., f.	275
Swan, &c., meadows, 13 a. 2 r. 5 p., f.	280
Hayne's Great Mead, 5 a. 1 r. 22 p., f.	175

By M. Dérome & Son (at Sedbergh).

Sedbergh, Yorks.—Fell Gate and Sarthwaite Farm, 131 a. 0 r. 18 p., f.	3,675

July 19.—By John G. Villar (at Cheltenham).

Shipton Sollars, &c., Glos.—The Manor House Farm, 367 a. 2 r. 38 p., f.	7,000
The Upper and Lower Farms, 080 a. 1 r. 19 p., f.	5,850
Whittington, Glos.—Sierford Farm, 219 a. 0 r. 21 p., f.	2,250
Shipton Oliffe, Glos.—Freehold cottage and shop, r. 6*l.*	100
Two cottages, u.t. 2 yrs., g.r. 2*l.*	105

By Gray & Walker (at Birmingham).

Belbroughton, &c., Worcester.—The Brookfield Estate, 179 a. 0 r. 35 p., f.	£1,950

By Dyer, Son, & Hilton (at York Town).

York Town, Surrey.—3 and 4, Albany-place, f., r. 42*l.*	600

By C. C. & T. Moore.

Canonbury.—17, Quadrant-rd., u.t. 45 yrs., g.r. 6*l.* 6s., e.r. 48*l.*	470

By Stimson & Sons.

Battersea.—567, Battersea Park-rd., u.t. 74 yrs., g.r. 7*l.*, r. 60*l.*	500
Camberwell.—9 to 13, Elmington-ter., and 2, Ada-rd., f.	£800
Clapham.—27, Fitzwilliam-rd., u.t. 66 yrs., g.r. 6*l.* 10s.	420
Brixton.—23, Barrington-rd., u.t. 22½ yrs., g.r. 7*l.*	365
Southwark.—7, Merrick-sq., u.t. 25½ yrs., g.r. 5*l.*	330
Fulham.—84, Bishop's-rd., u.t. 76½ yrs., g.r. 6*l.*, r. 30*l.*	£65
Norwood.—Beulah Hill, f.g.r. 90*l.*, reversion in 22½ yrs.	£8,000

By Wyatt & Son (at Chichester).

Maudlin, Sussex.—A freehold cottage and shop, r. 10*l.*	180

July 20.—By Sewell & Barnes (at Diss).

Hopton, Suffolk.—Five houses and 1 a. 1 r. 0 p., f.	£13
Two enclosures, 21 a. 2 r. 3 p., f.	410
A freehold farm, 18 a. 3 r. 30 p.	375

By Phibbs Gibson & Co.

Dulwich.—52, Carson-rd., u.t. 90 yrs., g.r. 9*l.*, r. 50*l.*	525

By A. Robertson.

Dulwich.—36, Wood Vale, u.t. 74 yrs., g.r. 6*l.*, e.r. 34*l.*	£80

By A. J. Sheffield.

St. George's East.—18, St. George's-st., and 14 and 16, Artichoke Hill, u.t. 49 yrs., g.r. 20*l.*	£10
Canning Town.—2 and 4, Queen's-rd., f.	£80

By Wootton & Green.

Battersea.—18 to 24 (even), Auckland-rd., u.t. 81 yrs., g.r. 28*l.*, r. 132*l.*	£1,165

By Giddy & Giddy.

Fulham.—44, 46 and 48, Hurlingham-rd., u.t. 90 yrs., g.r. 22*l.* 10s., r. 120*l.*	£1,265

By Norton, Trist, & Gilbert.

Notting Hill.—10 and 12, Manchester-rd., u.t. 63 yrs., g.r. 6*l.* 6s.	350

July 21.—By C. R. Morris, Sons, & Peard (at Taunton).

Angersleigh, Somerset. —The Leigh Court Estate, 130 a. 1 r. 38 p., f. (including advowson)	£9,150
Upottery, Devon.—Higher Luxton Farm, 164 a. 3 r. 31 p., f.	£1,025

By Sewell & Barnes (at Norwich).

Thurston, Norfolk.—A freehold and copyhold farm, 22 a. 1 r. 20 p.	520
Wacton, Norfolk.—The Grange Farm, 31 a. 0 r. 32 p., f.	£480
Le Grys Farm, 48a. 0r. 1p., f. and c.	£640
A freehold cottage and 3a. 0r. 20p.	£145
A freehold farm, 84a. 1r. 16p.	£740
Pulham St. Mary, Norfolk.—Two enclosures, 13a. 3r. 2p., f.	£300
A freehold cottage and 1a. 2r. 33p.	£140
Long Stratton, Norfolk.—Three enclosures, 14a. 3r. 1p., f.	£300
Hardwick, Norfolk.—Two cottages and 0a. 1r. 21p., f.	£143
Hempnall, Norfolk.—Road Green Farm, 65a. 1r. 15p., f.	£520

By Brodie, Timbs & Co. (at Canterbury.)

Canterbury, Kent.—St. Peter's-st., The West Gate Commercial and Temperance Hotel, f., r. 35*l.*	£950
26, St. Peter's-st., together with the Exotic and Rose nurseries, area 1¼ acres, f., r. 60*l.*	£2,030
St. George's-st., the Coach and Horses p.-h., area 750 ft., f., r. 35*l.*	£1,500
Old Dover-rd., cottage and blacksmith's forge; also market garden land, area 6 a., f.	£2,300

July 23.—By H. J. Bromley.

Rotherhithe.—39 and 41, St. Mary Church-st., u.t. 46 yrs., g.r. 12*l.* 12s.	£150
40, 42, 46, and 48, Paradise-st., u.t. 9 yrs., g.r. 40*l.*	£100
Shadwell.—44, Cornwall-st., u.t. 28 yrs., g.r. 6*l.*	£100

By Dowsett, Knight, & Co.

Nateley Scures, Hants.—The Bungalow and 1 a. 3 r. 4 p., f.	£1,000
Enclosures of land, 9 a. 0 r. 19 p., f.	£1,360

By W. B. Hallett.

Greenwich.—Stockwell-st., the Rose and Crown p.-h., f.g.r. 100*l.*, reversion in 77 yrs.	£2,500

By G. Herbert-Burns.

Stamford Hill.—22, Eastbourne-rd, u.t. 70 yrs., g.r. 6*l.*, e.r. 32*l.*	£90

By Reynolds & Eason.

Caledonian-rd.—Nos. 376 and 378, u.t. 49 yrs., g.r. 14*l.*, r. 100*l.*	£1,000
Hampstead-road.—15, Seaton-st., f., r. 50*l.*	£810
Chiswick.—High-rd., f.g. rents 134*l.*, reversion in 67 yrs.	£4,370

By Robins, Gore, & Mercer.

Kentish Town.—178, Kentish Town-rd., u.t. 15½ yrs., g.r. 85*l.*, r. 120*l.*	£300
St. Pancras.—115, 116, and 117, Chalton-st.; and 1 to 5, Christopher-pl., u.t. 27½ yrs., g.r. 72*l.*, r. 236*l.* 10s.	£985
Eckleton, Cambs.—Victoria Cottage and 1 a., f., e.r. 26*l.*	£350

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By Alfred Richards.

Hornsey.—107 to 115 (odd), Myddleton-rd., u.t. 67 yrs., g.r. 36*l.* 15s. £630
North Mimms, Herts.—Thornton-rd., a block of freehold building land 115

By Rogers, Chapman, & Thomas.

Belgravia.—60, Eccleston-sq.; and 60, Eccleston-sq. mews, u.t. 27 yrs., g.r. 1s. 2,325
Kensington.—18, Kensington Pk.-gdns., f. 3,650

By Jenkins & Sons (at New Cross).

Peckham.—101, Peckham Rye, u.t. 41 yrs., g.r. 5*l.*, r. 38*l.* 350
Deptford.—33, Edward-st., f., r. 26*l.* 345
11, Snead-st., f., r. 26*l.* 330
7 and 9, Childers-st., u.t. 43 yrs., g.r. 4*l.* 370

July 24.—By Beale & Capps.

Clerkenwell.—10, 11, and 12, Berkley-st., area 2,408 ft., f., r. 130*l.* 1,995
23 and 24, St. John's-lane, area 5,305 ft., f., r. 140*l.* 3,200
Notting Hill.—9, Cambridge-gardens, u.t. 62½ yrs., g.r. 11*l.*, e.r. 60*l.* 430
Westbourne Park.—62, Tavistock-rd., u.t. 63 yrs., g.r. 10*l.*, e.r. 60*l.* 500
Edgware-rd.—12, 13, and 14, Bell-st., f., r. 65*l.* .. 1,850

By C. Rawlev Cross & Co.

Shepherd's Bush.—6 to 12 (even), Cobbold-rd., u.t. 69 yrs., g.r. 24*l.* 840

By John Davies.

Old Ford.—28 to 38 (even), Dace-rd., f., r. 117*l.*.. 1,200
Chingford.—The Avenne, Redthorn House, f. .. 800

By Drivers, Jonas, & Co.

Haymarket.—6, Panton-st., area 990 ft., f., r. 140*l.* 4,400
14 and 15, Panton-st., area 1,970 ft., f., r. 250*l.*.. 6,680

By William Weston.

Paddington.—1, Shirland Mews, with cab-yard, u.t. 63 yrs., g.r. 30*l.*, r. 150*l.* 1,235

By Debenham, Tewson & Co.

Bethnal Green.—187 to 211 (odd), Bethnal Green-rd., f.r. 555*l.* 9,315
Bethnal Green-road, f.g.r. 24*l.*, reversion in 72 yrs. 630
Turin-st., &c., f.g.r. 21*l.*, reversion in 71 yrs. .. 570
Turin-st., f.g.r. 14*l.*, reversion in 71 yrs. 390
Turin-st., freehold yard and stabling, r. 35*l.* .. 700
Turin-st., the Panther, p.-h., with forge and stabling, f., r. 47*l.* 3,950
Thorold-st., f.g.r's. 90*l.* 10s., reversion in 71 yrs. 2,545
Satchwell-st., f.g.r's. 68*l.*, reversion in 50¼ yrs. 1,740
22, 23, 24 and 25, Satchwell-st., f., r. 78*l.* 1,005

By Moxton & Riches (at Clapham Junction).

Wandsworth.—90, Melody-rd., u.t. 90 yrs., g.r. 7*l.*, r. 36*l.* 390
44, Tonsley Hill, u.t. 61 yrs., g.r. 5*l.* 300
48, Fullerton-rd., u.t. 75 yrs., g.r. 4*l.* 10s. 250

By Franklin & Son (at Saffron Walden).

Thaxted, Essex.—Duckett's Farm, 48 a. 2 r. 15 p., f. 400
Lindsell, Essex.—Duck End Farm, 161 a. 2 r. 13 p., f. and c. 650

By C. P. Whitelev (at King's Lynn).

West Rudham, Norfolk.—A freehold and copyhold farm, 116 a., o r. 35 p. 1,600

By Henry Manley (at Crewe).

Hankelow, Cheshire.—Hankelow Villa, house, blacksmith's shop, and 49 a. 3 r. 12 p., f. 6,300
Over-the-Water Farm, 166 a. 2 r. 36 p., f. 7,000
Cooke Pilate, Cheshire.—House, blacksmith's shop, o r. 3 r. 28 p., f. 155
Audlem, Cheshire.—The Crown Hotel, and 12 r. 34 p., f., also the right to the market tolls of Audlem 2,400
House, shop, and range of buildings, f. 765
Ideston, &c., Cheshire.—Tithe rent-charges of 7*l.* 2s. 1d. 740

By Fleuret, Sons, & Adams (at Masons' Hall Tavern).

Forest Hill.—Devonshire-rd., the Royal Signal Hotel, u.t. 25 yrs., r. 100*l.*, with goodwill.... 15,100

By Messrs. Crow (at Newcastle).

Bolton, Durham.—The Hyldon Bridge Estate, 120 a. 1 r. 2 p., f. and c. 12,000

July 25.—By Fleuret, Sons, & Adams.

Regent's Park.—Munster-sq., &c., i.g.r. 90*l.* 18s., u.t. 22 yrs., g.r. 41*l.* 6s. 465
City-rd.—17, Cottage-ln., u.t. 9¾ yrs., g.r. nil, r. nil, with reversion 275
Wood Green.—10, Cherson-ter., u.t. 80 yrs., g.r. 6*l.*, r. 86*l.* 285

By J. & W. Johnson & Co.

Rotherhithe.—9 and 11, Hadland-st., f. 645
City-road.—22, 32, and 34, City Garden-row, f. .. 545
St. Luke's.—35, 45, 47, 49, and 51, Graham-st., f. 1,730
Rotherhithe.—2 to 8 (even), Aylton-st., u.t. 93 yrs., g.r. 14*l.* 15s. 510
Bermondsey.—1 to 4, New-place, u.t. 33½ yrs., g.r. 11*l.* 10s. 470
34 to 62 (even), Tranton-rd., u.t. 33½ yrs., g.r. 17*l.* 10s. 305
Walworth.—4 and 5, Blewitt-st., u.t. 58 yrs., g.r. 7*l.* 310

By W. T. Marsh.

Hammersmith.—76 and 78, Shepherd's Bush-rd., u.t. 76 yrs., g.r. 18*l.*, r. 130*l.* 1,760

By May & Philpot.

Dulwich.—22 and 34, New Clive-rd., u.t. 97 yrs., g.r. 14*l.*, e.r. 82*l.* 750

By Orgill, Marks, & Lawrence.

Fenton.—New-road, The Colonnade, p.-h., f. .. 8,200
Rochester, Kent.—High-st., The Royal Victoria and Bull Hotel), f., r. 150*l.* 7,900

By Wagstaff & Sons.

Holloway.—1 Rupert-rd., f., r. 30*l.* 360

By Douglas Young & Co.

Lambeth.—25 to 33 (odd), Gray-street, f. 1,800
Plaistow.—9, Boddy's Bridge, f. 200
Walthamstow.—Coppermill-lane, f.g.r. 77*l.*, reversion in 97 yrs. 2,042
Streatham.—Oakdale-rd., Parkhurst and Woodville, u.t. 99 yrs., g.r. 24*l.*, e.r. 130*l.* 1,280

By W. R. Nicholas & Co. (at Hereford).

Grosmont, Monmouth.—The Part-y-Seal and Upper Dyffryn Estate, 295 a. 1 r. 6 p., f. 5,500

By T. H. Newman (at Braintree).

Felstead, Essex.—Draper's Farm, 212 a. 2 r. 11 p., f. 2,300

By Maddison, Miles & Maddison (at Yarmouth).

Stockton, &c., Norfolk.—Two grazing marshes, 13 a. 1 r. 8 p., f. 305
Fritton, Suffolk.—Low Farm, 40 a. 1 r. 13 p., f. and c. 910
A freehold residence and cottage adjoining £520
Norton Subcourse, Norfolk.—A house and 1 a. 2 r. 9 p., f. 150
Hickling, Norfolk.—A freehold and copyhold farm, 233 a. 1 r. 31 p. 3,200

July 26.—By C. Atkins.

Greenwich.—11, Thornham-st., u.t. 44 yrs., g.r. 1*l.* 15s. 170

By Chesterton & Sons.

Mayfield, Sussex.—New-rd., a plot of land, o a. 3 r. 4 p., f. 880

By Eastman Bros.

Forest Hill.—30 to 40 (even), Ewart-rd., f. 1,310
25 to 31 (odd), Dalmain-rd., f. 1,020
Beadnell-rd., f.g.r. 16*l.*, reversion in 79 yrs. 400

By Debenham, Tewson, & Co.

City of London.—Ironmonger-lane, f.g.r. 200*l.*, reversion in 92 yrs. 5,600
Hoxton.—Hoxton-st., freehold timber yard, saw mills, and other buildings thereon, area 20,000 ft. 16,500
Thakeham, Sussex.—An enclosure of meadow, 3 a. 1 r. 37 p., f. 200
West Chiltington, Sussex.—Cottage and enclosures of land, 61 a. o r. 12 p., f. 570

By Farebrother, Ellis, & Co.

Lincoln's-Inn-Fields.—No. 67, area 2,500 ft., f. .. 14,400
Tonbridge, Kent.—Waterloo-rd., Waterloo Villa and Five Elms, f., r. 40*l.* 840
Waterloo-rd., Brook House and 6½ acres, f., r. 154*l.* 4,000
Brook-st.-ln., freehold building land, 11 a. 1 r. 19 p. 900

By Wm. Hollis.

Finchley.—Regent's Park-rd., Bryn-y-Garn and Gayhurst, u.t. 90 yrs., g.r. 15*l.*, r. 105*l.* 1,330
Edgware, Middlesex.—1 to 4, Stone-gr., u.t. 35 yrs., g.r. 5*l.* 400
High-st., a copyhold house and shop, r. 30*l.*.... 615

By C. C. & T. Moore.

Victoria Park.—31, 33, and 35, Chisenhale-st., f... 1,240
Mile End.—48, King-st., f. 330
Bow.—2 and 4, Usher-rd., u.t. 62½ yrs., g.r. 8*l.* .. 500
St. George's East.—25 to 28, Upper Fenton-st., u.t. 11 yrs., g.r. 12*l.* 5s. 270
Stepney.—43, 45, and 47, Nelson-st., u.t. 64 yrs., g.r. 7*l.* 10s. 1,260
Mile End.—1 to 4, Hayfield-pas., and 1 to 12, Cottage-ct., u.t. 36 yrs., g.r. 85*l.* 1,250
Canning Town.—111 to 141 (odd), Argyle-rd., u.t. 74 yrs., g.r. 84*l.* 305
Kentish Town.—Truro-st., f.g.r. 12*l.*, reversion in 52½ yrs. 440
Limehouse.—17 and 27, Brenton-st., c. 1,330

By Newbon, Edwards, & Shephard.

Marylebone.—Weymouth-st., an improved rental of 90*l.* for 10 yrs. 400
Clapton.—9, Charnock-rd., u.t. 72 yrs., g.r. 5*l.* 5s. 500
Holloway.—32, Thane-villas, u.t. 51 yrs., g.r. 6*l.* 10s., r. 30*l.* 290
Camden Town.—38, St. Augustine's-rd., u.t. 50 yrs., g.r. 6*l.* 300
Kentish Town.—Truro-st., f.g.r. 12*l.*, reversion in 52½ yrs. 610
Limehouse.—17 and 27, Brenton-st., c. 235

By Norris, Son, & Hadley.

Tottenham.—52 and 52, Tewkesbury-rd., u.t. 75 yrs., g.r. 7*l.* 400

By Stimson & Sons.

Lee.—4, Weigall-rd., u.t. 81 yrs., g.r. 7*l.* 10s., r. 45*l.* 830
Kennington.—43 and 46, Sharstead-st., u.t. 65 yrs., g.r. 12*l.* 370
Yateley, Hants.—Sunnyside and ½ a., f., r. 25*l.* .. 355
Hastings, Sussex.—38, Elphinstone-rd., f., r. 25*l.* 775
Mitcham, Surrey.—12 and 13, Graham-rd., f., r. 65*l.* 340
Camberwell.—10, Vicarage-rd., u.t. 50 yrs., g.r. 7*l.* 525
58 and 60, Foreign-st., u.t. 64½ yrs., g.r. 9*l.*.... 125
Sydenham.—6, Acacia-rd., u.t. 53 yrs., g.r. 5*l.* .. 1,500
New Cross.—273 and 275, Queen's-rd., f., r. 75*l.*..

By J. A. & W. Tharp.

Spitalfields.—1 to 17 (odd), Spelman-st., u.t. 51 yrs., g.r. 50*l.* 3,860
18 and 20, Chicksand-st., u.t. 51 yrs., g.r. 20*l.*... 1,370
Loughton.—York Hill, Clovelly and Batchelor's Hall, f. 750
Queen's-rd., five plots of building land, f. 310
Forest-rd., five freehold cottages 805
Forest-rd., a plot of building land, f. 295

By Worsfold & Hayward (at Dover).

St. Margaret's, Kent.—Rockhill Farm, 59 a. 3 r. 4 p., f. 1,500
The Retreat, three cottages and workshop, f. .. 770
Claypit Meadow, 1 a. 3 r. 17 p., f. 225
Kearsney, Kent.—A plot of building land, f. 210
Adisham, Kent.—Adisham-st., two freehold cottages 100
Adisham-st., freehold building land, 3 a. 190

By Hepper & Sons (at Leeds).

Leeds.—North Hill-rd., Highfield House, area 4,828 yds., f. 2,400

By Debenham, Tewson, & Co. (at North Walsham).

Dilham, Norfolk.—The Manor Farm, 238 a. 1 r. 20 p., f. and c. 5,700
Dilham Hall and Farm, 231 a. o r. 24 p., f. and c. 6,000
The Church Farm, 119 a. 3 r. 34 p., f. and c. .. 3,300
Farm premises and 49 a. 2 r. 35 p., f. and c.... 1,400
Dilham House and 18 a. 1 r. 36 p., f. 1,060
Water corn mill, house, and 6 a. 2 r. 10 p., f. .. 440
The Mill Farm, 35 a. o r. 10 p., f. and c. 900
Two enclosures of meadow, 6 a. o r. 10 p., f. 130
Two cottages and 9 a. 2 r. 18 p., f. 300
Smallburgh, Norfolk.—Coldhams Enclosure, 5 a. 2 r. 21 p., f. 160
The Broad Farm, 156 a. o r. 33 p., f. and c. 1,500
Worstead, Norfolk.—Three enclosures, 11 a. 2 r., f. 230

July 27.—By Browett & Taylor.

Whitechapel.—23 and 24, William-st.; 2 and 3, Amber-pl., f. 1,485
Sydenham.—47, Cator-rd., u.t. 74 yrs., g.r. 14*l.* 11s. 6d., e.r. 85*l.* 440

By C. H. Brown.

Walworth.—196, South-st., u.t. 52 yrs., g.r. 6*l.* .. 375

By P. J. Dixon & Son.

Stratford—24 and 26, Edith-rd., l. 475
Old Ford.—75, Parnell-rd., f. 365
Finsbury Park.—45, Lennox-rd., u.t. 64 yrs., g.r. 7*l.*, r. 48*l.* 400

By Fortescue & Co.

Wandsworth-common.—96, North Side, f., e.r. 110*l.* 2,675
Battersea.—15, Garfield-rd., u.t. 73 yrs., g.r. 7*l.* 10s., e.r. 40*l.* £385

By G. Gouldsmith, Son & Co.

Belgravia.—Eaton-ter., i.g.r. 186*l.*, u.t. 20¾ yrs., g.r. 3*l.* 10s. 2,070
South Eaton-pl., i.g.r. 15*l.*, u.t. 23¾ yrs., g.r. 1*l.* 8s. 200
Eaton-ter., i.g.r. 24*l.*, u.t. 20¾ yrs., g.r. 2*l.*.... 240
Pimlico.—Westbourne-st., &c., i.g.r. 136*l.*, u.t. 20¾ yrs., g.r. 2*l.* 1,360
King's-rd., &c., i.g.r. 79*l.* 15s. 6d., u.t. 13¾ yrs., g.r. 8*l.* 10s. 125
Blenheim-st., &c., i.g.r. 537*l.* 5s., u.t. 8¾ yrs., g.r. 285*l.* 1,380
Walton-pl., i.g.r. 21*l.*, u.t. 22 yrs., g.r. 6*l.*..... 180
Markham-sq., i.g.r. 37*l.* 15s., u.t. 26¾ yrs., g.r. 15*l.* 15s. 280
Belgravia.—22, Motcomb-st., u.t. 28¾ yrs., g.r. 5*l.*, r. 130*l.* 2,100

By Percival Hodson.

Caledonian-rd.—52, Freeling-st., u.t. 44 yrs., g.r. 6*l.* 360
10, All Saints'-st., u.t. 45 yrs., g.r. 6*l.* 405

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

WOOD.*

Per Petersburg standard hundred.	£	s.	d.	£	s.	d.
White Sea: first yellow deals	18	0	0	23	0	0
Second do.	16	0	0	18	10	0
Third do.	13	0	0	15	0	0
Battens, 4os., 3os., and 25s. less respectively.						
Petersburg: first yellow deals	15	10	0	19	0	0
Second do.	13	0	0	14	0	0
Battens, 3os. and 2os. less respectively.						
Petersburg, white deals	12	0	0	15	0	0
Do. white battens	11	0	0	12	0	0
Riga, white deals	10	0	0	11	10	0
Swedish mixed yellow deals	16	10	0	21	0	0
,, Third do.	14	10	0	17	0	0
,, Fourth do.	13	0	0	14	10	0
,, Fifth do.	12	0	0	13	10	0
Battens, 3os., 2os., and 10s. less respectively.						
Whitewood, 10 to 20 per cent. less.						
Finnish unsorted yellow deals	11	10	0	12	10	0
Battens, 10s. and 5s. less respectively.						
Whitewood, 5 to 10 per cent. less.						
Norwegian second yellow battens	8	10	0	9	0	0
Third do.	8	0	0	9	0	0
Fourth do.	8	0	0	8	10	0
Whitewood, 10s. less.						
Danzig, Crown Deck deals, per 40 ft. 3 in.	0	15	0	1	5	0
Brack	0	12	0	1	0	0
St. Lawrence Pine deals, &c., per P.S.H.:—						
1st, Bright and Dry, regular sizes	22	0	0	29	0	0
,, ,, oddments	15	10	0	23	0	0
2nd ,, regular sizes	17	10	0	20	0	0
,, ,, oddments	12	0	0	16	10	0
3rd, ,, regular sizes	11	0	0	12	0	0
,, ,, oddments	9	10	0	10	10	0
4th ,, regular sizes	10	0	0	11	0	0
,, ,, oddments	9	0	0	10	0	0
St. Lawrence Spruce deals, &c.						
First, regular sizes	13	0	0	15	0	0
Second ,,	10	10	0	11	0	0
Third ,,	10	5	0	10	10	0
Fourth ,,	9	15	0	10	5	0
Oddments and battens at 2os., 10s., 7s. 6d., and 5s. less respectively.						
New Brunswick Spruce deals, &c.	10	0	0	12	0	0
Oddments, battens, and fourths	9	10	0	10	0	0
United States pitch pine planks and boards	11	10	0	15	0	0
Prepared Boards, per square						
1¼ by 6½ and 7 in. 1st yellow	11	6		16	6	
,, ,, 2nd ,,	11	0		13	6	
1 by 6½ and 7 in. 1st ,,	10	6		12	6	
,, ,, ,, white	9	6		10	6	
,, ,, 2nd yellow	9	6		11	6	
,, ,, ,, white	8	6		9	6	
⅞ by 6½ & 7 in. 1st & 2nd yellow	8	6		9	6	
,, ,, ,, white	8	0		9	0	
⅞ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)	9	0		10	0	
⅞ by 6½ and 7 in. 2nd yellow and white (ditto)	8	0		9	0	
⅞ by 6½ and 7 in. 1st yellow and white (ditto)	7	0		8	0	
⅞ by 6½ and 7 in. 2nd yellow and white (ditto)	6	6		7	6	
Narrower widths at 10 per cent. less.						
3rd quality at 15 per cent. less than 2nd.						
Danzig and Memel Fir Timber—per load						
Best middling	3	10	0	3	15	0
Good middling and Second	3	0	0	3	5	0
Common middling	2	15	0	3	0	0
Undersized	2	15	0	3	0	0
Swedish and Norwegian Balks	2	5	0	2	10	0
Baltic Oak Timber—						
Danzig and Stettin—Large	3	17	6	4	10	0
Small	3	2	6	3	15	0

* The prices named are for the wood as imported and landed in the docks. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

[*See also page 119.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Bridge	Southport Corporation	25*l.*, 10*l.*	Aug. 18

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Granite Kerb	Edmonton U.D.C.	Engineer, Town Hall, Edmonton	Aug. 7
Additions to Hospital, Cuddington	Epsom, &c., Hospital Board	H. D. Searles Wood, Architect, 157, Wool-exchange, E.C.	do.
Roads, Embankments, &c. Yeo Vale Estate, Barnstaple		W. C. Oliver, Architect, Barnstaple	do.
Road Works, near Stanley-road	Bootle (Lancs.) Corporation	Borough Engineer, Town Hall	do.
Road Works, Caerphilly-street, &c.	Cardiff Corporation	W. Harpur, Civil Engineer, Town Hall	do.
Quartzite Road Metal, Christchurch, Hants.		E. I. Legg, Borough Surveyor, Town Hall, Christchurch	do.
Bakery, Fittings, &c., Portrane Asylum, co. Dublin		G. C. Ashlin, Architect, 7, Dawson-street, Dublin	do.
Water Supply Works, Hedley	Hexham R.D.C.	A. S. Dinning, 25, Ellison-place, Newcastle	do.
Bridges, Pontnewydd and Plymouth	Great Western Railway Company	G. K. Mills, Paddington Station, W.	do.
Bridge over River Rhymney, near Cardiff	do.	do.	do.
Cottage, Easter Colfield, Elgin		C. C. Doig, Architect, Elgin	do.
House, near Elgin		do.	do.
Rebuilding Culvert, Foxstone Edge, Milnrow	Lancashire County Council	W. H. Schofield, County Surveyor, Preston	do.
Sewers, Frinton-on-Sea, Essex	Tendring R.D.C.	T. W. Golds, Surveyor, Thorpe-le-Soken	do.
Two Blocks of Houses, Craiglea, Perthshire	Earl of Mansfield	Johnstone & Rankine, C.E., 238, West George-street, Glasgow	do.
Post Office, Kirkcaldy, N.B.	H. M. Office of Works	Secretary, H. M. Office of Works, Edinburgh	do.
House, Shop, &c., Marine Drive, Bridlington Quay	Miss L. Daniel	J. Earnshaw, Architect, Bridlington Quay	do.
Paving Nettleton-road, Mirfield, Yorks		F. H. Hare, Civil Engineer, Town Hall	Aug. 8
Paving Goddard-avenue	Old Swindon U.D.C.	W. E. Morris, Surveyor, Council Offices	do.
Sewerage Works, Greenside	Ryton-on-Tyne U.D.C.	J. P. Dalton, Engineer, Council Offices	do.
Sewerage Works	Rawtenstall Corporation	A. W. Lawson, Civil Engineer, Municipal Offices	do.
Surveyor's Materials	Brierley Hill (Staffs.) U.D.C.	P. G. Beckley, Surveyor, Town Hall, Brierley Hill	do.
Club Premises, West Melton, Wath-upon-Dearne		H. L. Tacon, Architect, 11, Westgate, Rotherham	do.
Additions to R. C. Chapel, Maryborough, Ireland		J. V. Corcoran, Asylum Offices, Maryborough	do.
Hospital Laundry	Wath-upon-Dearne Hospital Bd.	W. T. Campsall, Architect, Fig Tree-lane, Sheffield	do.
Additions to Workhouse Infirmary	Larne (Ireland) Guardians	Mr. Pinkerton, Point-street, Larne	do.
Water Main, Loughlinstown, Ireland	Rathdown R.D.C.	P. Cunningham, Council Offices, Loughlinstown	do.
*Foundations, &c.	Midland Railway	See Advertisement	Aug. 9
Additions to School, Buckie, N.B.		D. & J. R. M'Millan, Architects, 211, Union-street, Aberdeen	do.
Additions to Chapel, Carr-road, Nelson, Lancs.		H. Whitaker, Architect, 21, Market-square, Nelson	do.
Building Work, Congregational Church, Hampton Hill		F. Hughes, Architect, Marling Park, Hampton-on-Thames	do.
Sewage Tanks	Crewe Corporation	G. E. Shore, Borough Engineer, Municipal Offices	do.
Road Works	Ashington U.D.C.	A. Wood, Surveyor, Market Place, Ashington	do.
Business Premises, Rosnakill, co. Donegal	Mr. J. Friel	J. P. M'Grath, Civil Engineer, 28, Carlisle-road, Londonderry	Aug. 10
Fire Brigade Station, Portland-place	Bridlington Corporation	Borough Surveyor, Town Hall	do.
Additions to Smith's Arms Inn, Bargoed		D. F. Pritchard, Western Valleys Brewery, Crumlin, Mon.	do.
Sewers, &c. (Contract 16)	Pudsey (Yorks.) U.D.C.	J. Jones, Surveyor, Council Offices	do.
Additions to Schools, Gunnislake, Cornwall	Calstock School Board	H. J. Snell, Architect, Plymouth	Aug. 11
Asylum Buildings, Sedgefield	Durham County Asylum Comte.	W. Crozier, Civil Engineer, Shire Hall, Durham	do.
Paving Chapel-lane, &c., Ibstock	Market Bosworth R.D.C.	W. Thorpe, Surveyor, Nailstone, Nuneaton	do.
Street Works, Cwmavon	Abersychan U.D.C.	E. Cooke, Council Offices, Abersychan	do.
Chapel, Llanbradach, Wales		C. T. Evans, Architect, 8, Queen-street, Cardiff	do.
Filter Beds, Little Eaton (Contract No. 5)	Derby Corporation	T. & C. Hawksley, Civil Engineer, 30 Great George-street, S.W.	Aug. 13
Sewerage Works, Richmond, Yorks		C. G. Croft, Town Hall, Richmond	do.
Chapel, Aberfan-road, Merthyr		T. Roberts, Belle Vue Cottage, Aberfau	do.
Workshops Extension, Dundalk	Great Northern Ry. Co. (Ireland)	T. Morrison, Amiens-street Terminus, Dublin	do.
Public Offices, &c., Heaton Moor	Heaton Norris U.D.C.	Woodhouse & Willoughby, Architects, 100, King-st., Manchester	do.
Alterations to Shop and Warehouse, Egremont		W. G. Scott & Co., Architects, Workington, Cumberland	do.
Additions to Wickeridge House, near Ashburton	Mr. G. E. Allen	Mr. Barrons, Weir View, Totnes, Devon	do.
Cottage, Ilsington, South Devon		Rendell & Symons, Architects, Newton Abbot	do.
Electric Lighting Works	Salford Corporation	Lacey & Co., Engineers, 2, Queen Anne's-gate, S.W.	do.
Cemetery Works, Calverton-road	Stony Stratford P.C.	Mr. Woollard, Church-street, Stony Stratford	Aug. 14
Sewerage Works, Tinsley	Rotherham R.D.C.	B. Godfrey, Civil Engineer, 298, High-street, Rotherham	Aug. 15
Additions to Onecliffe Mills, Halifax		C. F. L. Horsfall & Son, Architects, Lord-st. Chambers, Halifax	Aug. 18
*Bridges, &c.	Lexden and Winstree R.D.C.	See Advertisement	Aug. 21
*Refuge Dwelling	Shoreditch Vestry	Surveyor, Town Hall, Old-street, E.C.	do.
Pipes, Castings, &c.	Bury (Lancs.) Corporation	J. Cartwright, Civil Engineer, Market Place, Bury	do.
Footbridge, Congleton		Borough Surveyor, Town Hall, Congleton	do.
*Girls School	Fenny Stratford School Board	Clerk, School Board Offices, Fenny Stratford	do.
Asylum Works, Armagh		H. E. Fullerton, Tontine, Armagh	Aug. 25
*Storage Reservoir, &c.	Taunton T.C.	See Advertisement	Aug. 27
Cottage, Sea Mills	Barton Regis R.D.C.	A. P. J. Cotterell, Civil Engineer, 28, Baldwin-street, Bristol	do.
Cotton Mill, Firgrove	Lowfield Spinning Co., Ltd.	F. W. Dixon, Architect, Union-street, Oldham	No date
Wesleyan Church and Schools, near Wakefield		Garside & Pennington, Architects, Pontefract	do.
Alterations to "Carter's Rest" Inn, Rochdale		A. Hopkinson, Architect, Bury	do.
School Chapel, Hall Royd, Shipley, Yorks		G. F. Danby, Architect, 10, Park-row, Leeds	do.
House, Arnside, Kendal	Mr. F. Crossfield	J. Hutton, Architect, Kendal	do.
Business Premises, Well-street, Bradford		J. Young & Co., Architects, 62, Market-street, Bradford	do.
Baths	Burnley Corporation	G. H. Pickles, Civil Engineer, Borough Surveyor, Town Hall	do.
School, Rosegrove, Burnley		Hitchon & Pritchard, Architects, 46, Manchester-road, Burnley	do.
Reservoir, Carmarthen		Borough Surveyor, Carmarthen	do.
Six Houses, Canal-road, Stanley, near Wakefield		W. Wrigley, Architects, 6, Westgate, Wakefield	do.
Large Shed, &c., Alverthorpe Mills, Wakefield		C. S. Nelson, Architect, 15, Park-row, Leeds	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Buildings and Drains Inspector	Croydon County Council	60*s.* per week	Aug. 9
*Clerk of Works	Hackney Vestry	4*l.* per week	Aug. 24
*Engineer and Chief Surveyor	Tottenham U.D.C.	600*l.* per annum	Sept. 3

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. —. Contracts, pp. iv. vi. viii. x. & xx Public Appointments, pp. xviii. xix. & xx.

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PRICES CURRENT (*Continued*).

	£ s. d.	£ s. d.
Quebec Timber per load		
Yellow Pine	4 15 0	6 5 0
Oak	4 0 0	6 0 0
Elm	5 5 0	6 5 0
Ash	3 5 0	4 0 0
Birch	3 17 6	6 5 0
New Brunswick, &c., Birch	3 12 6	4 10 0
American Pitch Pine Timber	2 17 6	4 5 0
Wainscot, per log, 18 cubic ft.—		
Crown (Eng. & Dutch) nominal	3 0 0	4 0 0
Brack nominal	2 7 6	3 0 0
Lathwood, per cubic fathom—		
Petersburg	4 0 0	6 10 0
Riga and Danzig	4 10 0	5 10 0
Norway Poles, per ft. run	0 0 1	0 0 1½
Oak Staves, per mille full size pipe		
Memel, Crown	220 0 0	230 0 0
Brack	190 0 0	200 0 0
Dantzig	165 0 0	175 0 0
Bosnia, single Barrel (nominal)	28 0 0	30 0 0
United States, Pipe	37 10 0	45 0 0
Hogshead, extra heavy and double extra	30 0 0	35 0 0
Indian Teaks per load	10 10 0	16 0 0
British Guiana Greenheart	0 0 0	8 0 0
Mahogany, per foot superficial—		
Honduras, cargo average	0 0 4½	0 0 5½
Nicaragua, do.	0 0 4½	0 0 5½
Tabasco, do.	0 0 4½	0 0 6
Mexican, do.	0 0 4	0 0 4½
Panama, do.	0 0 3½	0 0 4
African, do.	0 0 3½	0 0 5
Cuba, do	0 0 6	0 0 8
St. Domingo, do.	0 0 5	0 0 7½
Do. Cuts (good to prime)	0 0 9	0 1 3
Walnut, American (logs)	0 2 9	0 4 9
Do. do. (planks and boards)	0 2 0	0 7 0
Italian, per foot superficial	0 0 3	0 0 7½
Black Sea, per ton	6 0 0	28 0 0
Satin Walnut (logs) per foot cube	0 1 0	0 1 6
(planks and boards)	0 1 9	0 3 0
Sequoia (Californian redwood), per foot cube	0 1 9	0 2 0
Whitewood, American (logs)	0 1 4	0 1 9
" " (planks and boards)	0 1 9	0 2 9
Quartered oak " " "	0 2 3	0 4 0
Kauri pine (logs)	0 1 9	0 2 0
" " (planks)	0 2 3	0 2 0
Jarrah (planks)	0 2 0	0 2 6
Lancewood spars each, fresh and large	0 5 0	0 7 0
Lancewood spars, ordinary to fair	0 3 0	0 4 0
Degama spars	0 8 0	0 10 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders " "	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Patch Plates	12 0 0	0 0 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
Iron.—		
Common Bars	10 5 0	10 15 0
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0
Staffordshire "Marked Bars"	13 5 0	- - -
Hoop Iron, basis price	11 5 0	11 15 0
" " galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—	£ s. d.	£ s. d.
Ordinary sizes to 20 g.	11 10 0	- - -
" " to 24 g.	12 15 0	- - -
" " to 26 g.	13 15 0	- - -
Lead—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
Zinc—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
Tin—English Ingots per lb.	0 1 6	- - -
Solder—Plumbers' "	0 0 7½	- - -
Tanner's "	0 0 10	- - -
Blowpipe "	0 0 11½	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3¼d. " "
" " fourths	3d. " "
26 oz. thirds	3¾d. " "
" " fourths	4d. " "
32 oz. thirds	4¼d. " "
" " fourths	5d. " "
Flatted sheet, 15 oz.	3½d. " "
" 21 "	4¼d. " "
Hartley's Rolled Plate	3d. " "
¼ " " "	3½d. " "
½ " " "	4d. " "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
" " " in barrels "	0 3 2
" " " in drums "	0 3 4
Boiled " " in pipes "	0 3 4
" " " in barrels "	0 3 5
" " " in drums "	0 3 7
Turpentine, in barrels "	0 2 11
" in drums "	0 3 2
Genuine Ground English White Lead per ton	27 10 0
Red Lead, Dry "	24 0 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6

PRICES CURRENT (*Continued*).

	per gallon. £ s. d.
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 6
Knotting	0 10 0
Best French and Brush Polish	0 10 0

BRICKS, &c.

	s. d.	
Hard Stocks	34 0	per thousand alongside, in river.
Rough Stocks and Grizzles	30 0	" " " "
Smooth Bright Facing Stocks	58 0	" " " "
Shippers	42 0	" " " "
Flettons	29 6	" " at railway depôt.
Red Wire Cuts	34 0	" " " "
Best Fareham Red	71 6	" " " "
Best Blue Pressed Staffordshire	87 0	" " " "
Best Stourbridge Fire Bricks	84 6	" " " "
Best White Glazed Stretchers	260 0	" " " "
Headers	240 0	" " " "
Quoins and Bull-nose	340 0	" " " "
Double Headers	320 0	" " " "
Best Dipped Salt Glazed Stretchers and Headers	240 0	" " " "
Quoins and Bull-nose	280 0	" " " "
Double Headers	280 0	per thousand at railway depôt.
Seconds Quality White and Dipped		
Salt Glazed	40 0	per thousand less than best.

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	" "
Best Portland Cement	34 0	per ton "
Best Ground Blue Lias Lime	23 6	" "

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.	

STONE.

	s. d.	
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt
Bath "	1 7	" "
Beer "	1 6½	" "
Grinshill "	1 10	" "
Brown Portland in blocks	2 2	" "
Darley Dale "	2 1½	" "
Red Corsehill "	2 5	" "
Red Mansfield "	2 4½	" "
Hard York "	2 10	" "
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super at rly. depôt.
" " 6 in. Rubbed Ditto	2 10½	" "
" " 3 in. sawn both sides slabs (random sizes)	1 3	" "
" " 3 in. self-faced Ditto	0 9	" "

SLATES.

	£ s. d.	
20×10 best blue Bangor	11 5 0	per 1000 of 1200 at ry. dep.
" best seconds	10 15 0	" "
16× 8 best "	6 2 6	" "
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16× 8 " "	6 0 0	" "
20×10 best Eureka unfading green	11 2 6	" "
16× 8 " "	6 15 0	" "
20×10 Permanent green and Sedan green	10 0 0	" "
16× 8 " "	5 12 6	" "

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Hip and valley tiles	4 0	per doz. " "
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BRIGHTON.—For alterations and additions to No. 74, The Drive, Hove, Brighton, for Mr. John Rose Auldjo. Mr. R. Owen Allsop, architect, 37, Norfolk-street, Strand, London:—

William Willett, Hove* £170 12

CHISLEHURST.—For alterations and additions to Cadlands, Chislehurst, for the Hon. Marsham Townshend. Mr. R. Owen Allsop, architect, 37, Norfolk-street, Strand, London:—

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DOWLAIS (S. Wales).—For the erection of a boiler house and for engineering work and water-fitting at baths now in course of construction at Dowlais, S. Wales, for the Right Hon. Lord Wimborne. Mr. R. Owen Allsop, architect and engineer, 37, Norfolk-street, Strand, London:—

John Linton, Newport, Mon.* £724

FARNHAM.—For additions to school buildings, Badshot Lea, for the School Board. Mr. H. Paxton Watson, architect, 4, Adam-street, Adelphi. Quantities by Messrs. John Leaning & Son:—

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Bateman ..... 975 |

FRINTON-ON-SEA.—For proposed making-up and sewering parts of Ashlyns-road and Third Avenue for Mr. R. P. Cooper. Messrs. Homer & Co., surveyors:—

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Pedrette & Co.	£1,223	H. J. Lingell	£629
F. W. Anderson	678	Moran & Sons	603
Burgoyne & Son	665	Mackenzie & Son	564
J. C. Trueman	662	Dupont & Co.	520

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H. J. Lingell	1,976	Dupont & Co.	1,832

FRINTON-ON-SEA.—For proposed slip-way and approach road for Mr. R. P. Cooper. Messrs. Homer & Co., surveyors, Estate Office, Frinton-on-Sea, Essex:—

Slip-way.

Pedrette & Co.	£2,054	J. C. Trueman	£1,141
H. J. Lingell	1,826	F. W. Anderson	1,095
Mackenzie & Son	1,730	Burgoyne & Sons	1,054
Dupont & Co.	1,629	Moran & Sons	955

Approach Road.

Pedrette & Co.	£825	Burgoyne & Sons	£271
H. J. Lingell	389	J. C. Trueman	250
Mackenzie & Son	350	Moran & Sons	279
Dupont & Co.	330	F. W. Anderson	201

FRINTON-ON-SEA.—For parts of works of sewering and making-up new road from Holland-road, Frinton, to Lower Barn, Great Holland, for Mr. R. P. Cooper. Messrs. Homer & Co., Frinton-on-Sea, and Messrs. Baker & May, Clacton-on-Sea, joint surveyors:—

Pedrette & Co.	£9,773	Mackenzie & Son	£4,976
H. J. Lingell	5,436	F. W. Anderson	4,394
Dupont & Co.	5,399	Moran & Sons	4,555
J. C. Trueman	5,165	Burgoyne & Sons	4,319

For the whole of the above works for Mr. R. P. Cooper, under the superintendence of the above surveyors:—

J. C. Trueman	£8,900	F. W. Anderson	£8,500
Burgoyne & Sons	8,563	Moran & Sons	8,130

HANLEY.—For additions to *Sentinel* office, Hanley. Messrs. R. Scrivener & Sons, architects, Hanley:—

Grant & Son	£4,500	F. Godwin	£4,199
Cornes & Son	4,498	W. Cooke	4,150
A. Ward	4,480	J. J. Longden, Burslem*	4,045
G. Ellis	4,430		
J. Gallimore	4,414		

KEIGHLEY.—For the erection of seven houses, off Lynum-street, West-lane, for Mr. John Brigg, M.P. Mr. Jno. Haggas, architect, North-street, Keighley. Quantities by architect:—

Masonry.—Waddington Bros., Oxenhope
Joinery.—Naylor & Lund, Laycock, Keighley } £2,087 13 4
Slating.—Wm. Thornton, Bingley
Plastering.—Chris. Hird, Keighley.
Plumbing.—Jos. Harrison, Keighley

LONDON.—For the erection of four houses, Marianroad, Streatham Common, for Mr. G. W. Fortescue. Mr. J. Wornell, jun., architect, 54, Cicada-road, Wandsworth, S.W.:—

J. Ward, Earlsfield* £1,400

LONDON.—For the erection of public baths and washhouses, Melmoth-place, for the Vestry of the Parish of Fulham. Mr. H. Dighton Pearson, architect, 27 Chancery-lane, W.C.:—

Kirk & Kirk	£55,490	C. Gray Hill	£49,497
F. G. Minter	54,413	Chessum & Co.	47,900
Leslie & Co.	52,357	B. E. Nightingale	46,985
W. Gibson	50,789	Patman & Fotheringham	46,871
Foster & Dicksee	49,894	Stimson & Co.	43,750
Martin Wells & Co.	49,513	Chas. Wall, Chelsea*	42,933

[*See also next page.*

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HANLEY (Staffs.).—For proposed additions, extensions, and alterations, Joint Infectious Diseases Hospital, Bucknall, Staffordshire. Mr. E. Jones, architect, Albion-street, Hanley :—

Previous Contracts for Hospital Extensions, viz., Eighteen-bed Pavilion and Additions to Administrative Block.

	18-Bed Pavilion.	Administrative Block.
Cornes & Sons	£3,550 0 0	£2,025 0 0
John Bagnall	3,363 0 0	2,158 0 0
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Thos. Godwin	3,586 0 0	1,886 0 0
Chas. Smith	3,360 0 0	2,100 0 0
Yorke & Goodwin	3,436 0 0	1,872 0 0
H. P. Embrey, Fenton*	3,502 3 6	1,793 0 0

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	Including for Contract No. 1	Galloway Boiler and Engine.
Drake & Gorham	£1,955 13 3	£506 1
E. J. Clarke & Co., Ltd.	1,640 14 0	427 10
Rooper & Robins	1,569 14 8	430 5
Gardner Bros. & Co., Ltd.	1,467 7 9	479 0
J. Worthington & Co.	1,412 1 1	406 0
Blackburn & Starling, Ltd., Hanley and Nottingham*	1,401 18 0	396 0

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Manlove & Alliott	£907 2 6
Tullis & Co., Ltd.	782 10 0
Williamson & Co., Ltd.	704 0 0
Worthington & Co.	690 0 0
Armstrong & Co., Ltd.	688 0 0
The Manchester Laundry and Engineering Co., Ltd.	633 12 9
Bradford & Co.	613 0 0
Summerscales & Sons, Ltd., Keighley*	591 0 0

Washington Lyons Steam Disinfector.

Manlove & Alliott, Nottingham* £295 10

Nos. 5 and 8.—Erection of a Boiler and Engine-house and Building for Electric Light Installation.

No. 6.—Erection of a Chimney Shaft.

No. 7.—Additions to Laundry Block and Disinfecting Chamber.

	Nos. 5 and 8.	No. 6.	No. 7.
Charles Cope	£242 8 6	£122 18 0	£579 0 0
Bennett Bros.	275 0 0	149 0 0	506 0 0
C. Cornes & Sons	255 0 0	150 0 0	480 0 0
John Bagnall	246 0 0	109 5 0	528 0 0
Thos. Godwin	279 0 0	106 0 0	483 0 0
H. P. Embrey, Fenton*	235 12 8	107 8 3	501 12 4

The Furnishing of 18-Bed Pavilion and Administrative Block Additions.

L. Taylor	£487 10 11	E. Malkin, Hanley*	£383 14 5
E. Amies	469 1 8		

Ironmongery.

Holdgate & Small, Stoke* £107 16 8

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No. 14.—Painting Interior Walls of New Additions.

	No. 13.	No. 14.
Colclough & Waite	£149 0	£72 10
J. E. Baddeley	125 5	75 15
Birchall & Son	95 0	87 0
Theophilus Hughes	95 10	75 12
Edwin Peake	99 0	57 0
S. B. Smith, Hanley*	97 0	52 10

LONDON.—Additions, Amersham-grove School, Ludwick-road, New Cross, S.E. —

R. Soper	£970 0 0	J. Bullers	£783 0 0
W. Pearce	968 0 0	W. Panstone	783 0 0
E. Coates	915 5 0	J. F. Gorham	778 8 11
J. O. Richardson	860 0 0	H. L. Holloway	775 0 0
Hibberd Bros., Ltd.	856 0 0	Castle Bros.	773 0 0
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Balaam Bros.	815 0 0	Barlow & Robert	753 0 0
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Parry & Co.	35,000 0 0	G. Bell	29,391 0 0
S. Saunders	34,000 0 0	J. Jackson	28,854 13 2
E. Powell	32,900 0 0	Wilkinson Bros.	27,915 0 0
W. Manders	32,231 14 10	Moran & Sons	26,808 0 0
J. & E. T. Bloomfield	31,921 6 0	Johnson Bros.	26,795 0 0
J. & T. Binns	31,750 0 0	J. Smart	26,644 0 0
G. Osenton	31,345 0 0	Burgoyne & Sons	26,150 0 0
G. R. Mann	31,177 0 0	H. J. Linzell, Newmarket*	25,950 18 3
Underwood Bros.	30,126 0 0		

SMITHAM BOTTOM (Surrey).—For the erection of two houses, one shop, office, stabling, &c., Brighton-road, Smitham Bottom, for Mr. T. H. Ebbutt. Mr. C. H. Ridge, architect, 17, Park-street, Croydon :—

J. Burton & Son	£3,425
E. P. & C. Balled, Croydon*	£3,29

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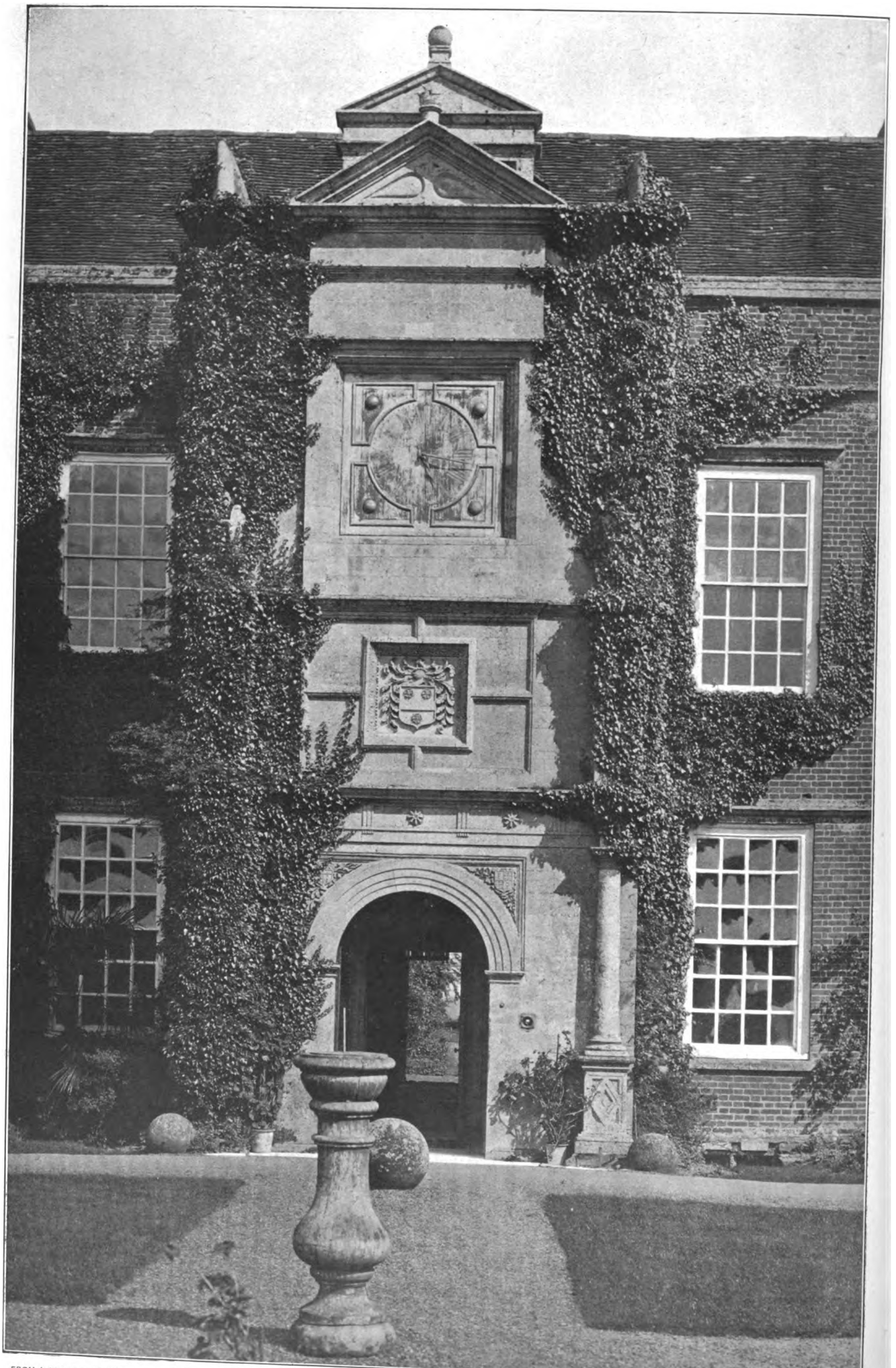

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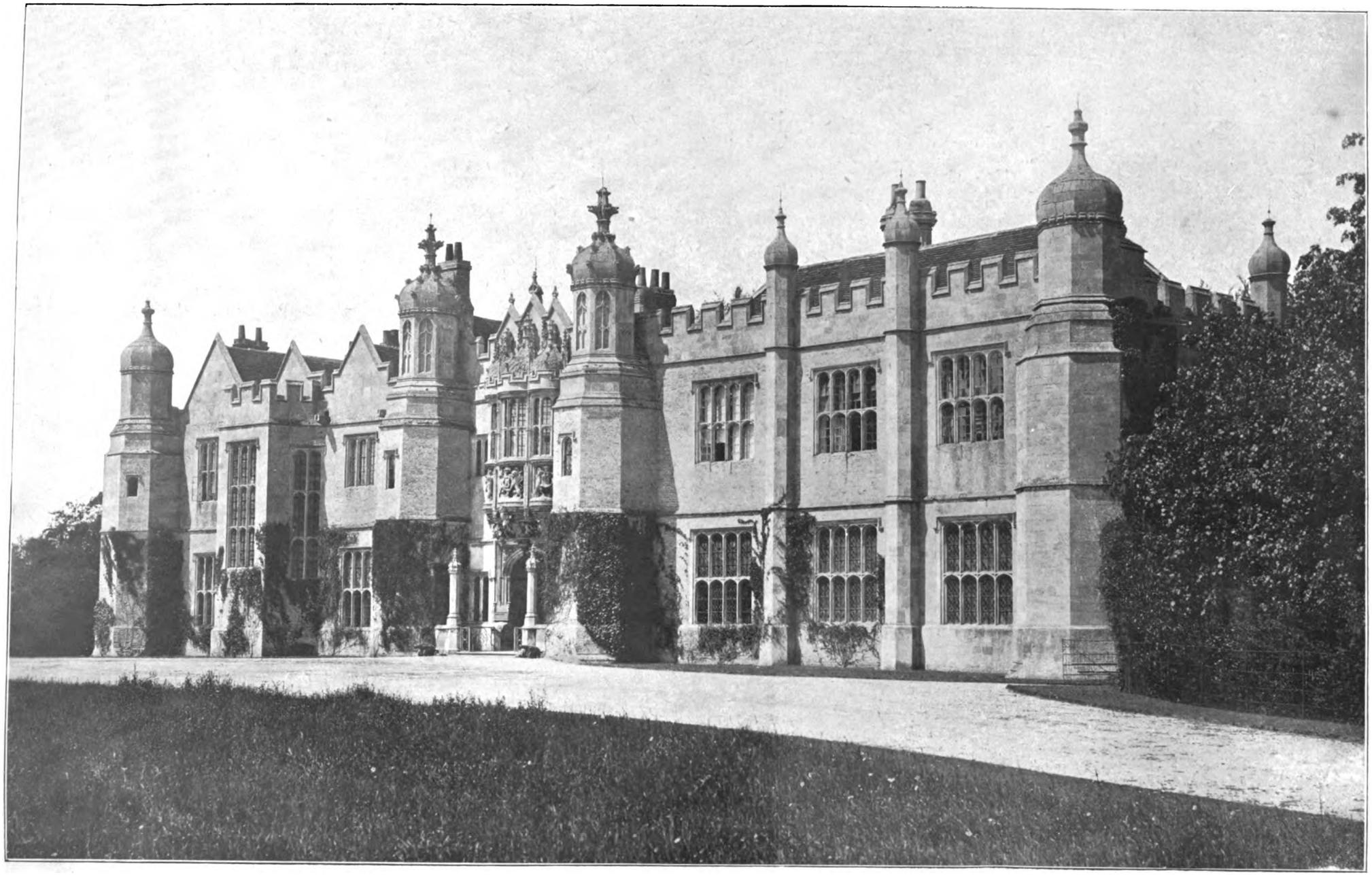

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The Builder.

VOL. LXXIX., No. 3001 AUGUST 11, 1900.

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Structural Features of the Paris Exhibition.

In previous articles we have given expression to our opinion of the main architectural features of the Paris Exhibition, and we now propose to discuss in a general way some structural details of the principal buildings. As a preliminary it may be remarked that the only permanent erections included in the Exhibition are the two Art Palaces, the Horticultural buildings, the Trocadéro, the old Galerie des Machines (now somewhat altered and used for other purposes), and (unhappily) the Eiffel Tower, now chiefly useful as the groundwork of illuminations, and as exemplifying the operation of some new hydraulic lifts by the Compagnie de Fives-Lille. All the other palaces and pavilions are merely temporary, and will be swept away after the close of the Exhibition.

The method of construction most generally adopted consists in the erection of a light steel skeleton cased with wood, which itself is covered with decorative and other details composed of *staff*. This material is a combination of plaster and canvas formed and moulded in the following manner. A mould is first made of the detail to be produced, and into this liquid plaster is poured to form the external surface of the casting. Pieces of canvas previously steeped in plaster and water are then introduced and pressed into the moist plaster contained in the mould. In this way a strong crust about $\frac{3}{8}$ in. thick is formed, which is strengthened by wooden rods forming the interior framework of the finished casting. Expanded metal, wire network, and sometimes nets of strong cord have been employed as the bases for large plane surfaces of plaster and cement. Although several large pavilions are constructed almost entirely of timber, and others are of the lightest possible description, more than 38,000 tons of steel and 2,000 tons of iron have been used in the construction of the Exhibition buildings.

The "Entrée Monumentale," at the Place de la Concorde, has a framework of steel covered with wood and finished in staff as before described. It opens upon a pleasing approach to the two Fine-Art Palaces, the larger of which covers a site nearly ten acres in extent. As the subsoil is of sedimentary nature, and was at one time covered by the river, the employment of piles became necessary in the foundations. The materials used in the construction of this building are principally stone, brick, and rubble, and in some parts béton. Stone is employed exclusively for the front which faces the central avenue, but the outer walls generally are of rubble faced with stone, and the inner walls of rubble and brick, also faced with stone. A large quantity of steel is incorporated in the building, chiefly in the roof and in the balcony flooring. Cement work, armed with steel wire of large gauge, has also been applied to a considerable extent for roofing and other purposes. Altogether the roof includes some 6,000 tons of steel, and comprises a central dome about 230 ft. in diameter supporting a cupola of 23 ft. diameter, above which is a campanile, the highest point of which is 246 ft. from the ground level. The great dome, which was constructed by the firm of Daydé & Pillé, of Creil, is supported by four columns each consisting of two pairs of box-girders, between which spiral staircases rise to the balcony floor, where the plates divide, one pair springing out askew to form arches over the side bays, and the other pair continuing to the centre of the dome. At the point where the side plates of each column curve out towards the roof they are worked in scrolls, and these are replaced later by vertical and cross-ties. The roof trusses are so constructed that the resultants of all the lines of stress pass through the points of support to the ground, without subjecting the walls of the palace to strain of any kind.

The Petit Palais, whose architectural features we have discussed on a previous occasion, occupies an area of nearly $1\frac{3}{4}$ acres, and is representative of steel construction only to a very limited degree. We therefore pass on to the Exhibition buildings on the Esplanade des Invalides. The principal palaces on the left and right hand, devoted to French and foreign industries respectively, are of the lightest possible construction consistent with safety. Each palace has one main and two side bays, the main columns from the ground floor to the first floor being composed of three plates, one of which is bolted with angle-bars to the other two. Angles are also bolted to the edges of the plates and connected at intervals by stays. Transverse plate beams are provided for the floors in conjunction with lighter girders diagonally and vertically braced. From the first floor level one plate of each column continues up to the roof; another plate secured to the column by a gusset curves up to the centre of the roof, where it meets and is braced to another plate from the vertically extended plate of the column. The upper floors are formed almost exclusively of steel I-beams, with a filling of armed cement, and a covering of wood.

The buildings extending along the river-side on the right bank from the Pont des Invalides to the Quai de Passy, and on the left bank from the Pont des Invalides to the Gare du Champ de Mars, are lightly constructed, and only those constituting the horticultural section will escape demolition at the termination of the Exhibition. Owing to the fact that the soil bordering the river is of alluvial origin some care was necessary in the foundations. In some instances the framework of the buildings is supported on cylindrical piers of stone sunk in the earth. The holes necessary for the formation of these piers were not excavated in the ordinary manner, but were sunk with the aid of an ingenious arrangement by which a cast-iron cone, weighing some 30 cwts., was alternately raised and allowed to fall upon the yielding soil. When a hole had been made to the depth of 8 ft. or 9 ft. it was filled with fragments of stone and covered by a heavy casting of circular form. Some of the foreign

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pavilions in what is at present called the Rue des Nations are built partly over the underground railway connecting the Invalides with the Champ de Mars. A notable building on the left bank of the Seine is the Palais des Armées de Terre et de Mer, having a façade of more than 370 yds. in extent. The framework is of wood connected by iron bolts and tie-rods, and the cement clothing of the skeleton was laid on in slabs, prepared with a backing of straw. These slabs were nailed to the timber frame, and the usual decorative coating of plaster was then applied.

Adjacent to this building is the pavilion of the Creusot Iron Works, in the form of a dome, about 165 ft. internal height and 140 ft. in diameter. The foundations nearest the river consist of rubble walls, and on the other side of the building of masonry piers. Inside the dome the centre portion of the floor is supported by a massive pier of rubble. The skeleton framework of the dome is built up of twenty-four ribs, which are heavy curved plate girders, the lower ends resting on steel rollers, each placed between two triangular steel beds attached to the top of a pier. At the height of 12 ft. the ribs are connected by horizontal box girders, and at similar intervals to the top by horizontal plate girders with diagonal bracing. A timber framework covers the outside of the dome, and upon this slabs of cement are laid and coated with a final layer of cement, which is painted red.

The palace of Navigation de Commerce, near the Pont d'Iéna, has a façade of about 480 ft., and is built with a timber framing on a system resembling that of the palaces in which steel forms the chief material of construction. The next building, devoted to forestry, hunting, and fishing, with a façade of over 600 ft. in length, has a family likeness to its neighbour, being due to the same architects, MM. Tronchet & Rey. On the right bank of the Seine, the conservatories, designed by M. Charles A. Gautier, are worthy of notice. The framework is of extremely light girders and angle bars, nearly all the metal being hidden by trellis-work. Each of these buildings measures about 270 ft. long, 100 ft. wide, and 69 ft. high, and comprises a central nave with galleries and loggias at each side. Close to the Pont de l'Alma is the large Palais de l'Economie Sociale, approximately 330 ft. long by 100 ft. wide, very appropriately erected by eight co-operative industrial associations. The structure is almost entirely of timber, and it is said that steel framework was not adopted because there was no trade association for metal workers. We believe the frame of the Congress Hall is of steel with a filling of cement. Encroaching on the river front, the platform carrying the structure is supported on piles driven into the river bed.

Although usually described as if they were separate palaces, the principal buildings on the Champ de Mars really form one huge structure, enclosing within its walls a U-shaped area of more than sixty acres. Neither an external view nor a consideration of written measurements serves to convey any adequate impression of this phenomenal aggregation. Of the countless throngs who wander through and lose themselves in the labyrinthian halls and galleries into which the interior is divided, very few have any idea of the task performed by the architects and engineers responsible for these monumental works. Those to whom it is permitted to look behind the veil see more than they can possibly carry away, and find it difficult to convey to others any adequate impression of such fragments as they have been able to grasp. With regard to the two lines of palaces at either side of the Champ de Mars, it may be remarked that they are symmetrical in respect of area covered, of height, and the direction of their axes, although the architectural treatment is entirely different. The Palais des Mines et de la Métallurgie, on the left hand, which finds a counterpart in the Palais des Lettres, on the opposite side, has a façade of about 315 ft. on the central avenue, and one of about 250 ft. parallel with the river. The grand entrance at the junction of the two façades is surmounted by a lofty dome, and is flanked by pavilions, each containing a circular staircase giving access to the upper floor, and in addition there is a great staircase facing the entrance. A campanile surmounting the porch contains a carillon of thirty-two bells operated by means of a keyboard. This palace includes four galleries and a quadrilateral hall surmounted by a lantern of similar shape. The steel framework of the building is sheathed in wood, over which is metal network and plaster, whilst the upper floors are formed of light steel girders, filled with cement on network and covered with wooden flooring. Adjoining the Palais des Mines is the Palais des Fils, Tissus et Vêtements, measuring in round figures 923 ft. long, 424 ft. wide, and 55 ft. high to the top of the lantern. Running throughout the length of the building are three main halls 88 ft. 6 in. wide, separated by two galleries 29 ft. 6 in. wide, and the two outer halls are bordered by other galleries and an arcade facing the Champ de Mars. In this way the palace is divided into nine longitudinal sections, each covered by a span of the roof supported by a series of trusses. In common with all the other palaces on the Champ de Mars upper floors are built in the galleries at the height of about 23 ft. There are no features of special novelty in connexion with the structural details of this building. Generally, it may be said that the stiff members are of I-section built up of angle-bars and plates. The columns are like plate-girders disposed with the webs in the planes of the trusses and extended at the upper part where the roof trusses commence, whilst the long struts and purlins are lattice-girders formed of light steel sections. Curved knee braces are attached to the columns for the support of the plate-built floor beams. For the erection of the steel framework a travelling tower was employed having a cantilever derrick and an upper working platform of ample size. This was first set up on the site of the arcade next the Champ de Mars, and by its aid the columns, connecting trusses, girders, and struts were erected seriatim from one end of the building to the other. The tower was then moved across the width of three spans and returned to a point parallel with the starting point, erecting another gallery on its way. A large travelling falsework was afterwards built in one of the wide spans, and followed on a track of 59 ft. gauge behind the travelling tower.

By the aid of this falsework the roof trusses, 88 ft. 6 in. wide, were assembled and erected. The traveller proper was mounted on four trucks running on rails 24 ft. apart between the gallery columns. Above the upper ends of the columns the top of the traveller was extended to the width of about 40 ft. After assisting in erecting the columns and trusses the tower was moved back longitudinally, when the overhanging derrick was utilised for fixing the purlins, whilst other connexions were made from the platform. In all, four platforms were provided for this traveller; the lowest, about 4 ft. above the ground level, carried the engine; the two next were supported by brackets; and the highest was 70 ft. above the ground, having two concentric arcs of rails for the derrick. When changing the movement of the tower and falsework from a longitudinal to a transverse direction the structure was raised by jacks, and the trucks were then turned through an arc of 90 deg., so that they could run on transverse lines to the desired position. The architect for this palace was M. Blavette, and the contractors were MM. Morsant, Laurent, Savey, et Cie., and the Société des Ponts et Travaux en Fer.

Crossing the Champ de Mars the visitor approaches the Palais du Génie Civil and the Palais de l'Education, forming one building, whose collective dimensions are very similar to those of the palace devoted to textiles. The decorative plaster work at the entrance pavilion, instead of being applied to metallic netting in the usual way, is fixed by sheets of thin metal cut so as to form projecting tongues. Another feature of this palace and of the adjoining Palais de l'Education is the extreme lightness of the steel sections of which the skeleton is formed. The architect, M. Jacques Hermant, has relied for strength less upon bulk of metal than upon efficiency of bracing. All the members are built of tee-bars, angle-bars, and plates, and no rolled girders appear to be used. This method of procedure certainly tended to reduce the labour of erection, as the small sections employed could be very readily dealt with by the workmen. The main frame of the joint building is formed by "bents" of steel columns and roof trusses, each bent having eight columns about 38 ft. high up to the roof trusses. Each column comprises two intersecting web plates and twelve angles. In appearance, the roof trusses consist of long and short spans occurring alternately; but, as a matter of fact, they are simply balanced cantilevers with independent connecting trusses. Rigidity is afforded by placing the columns in pairs braced by diagonal ties. All the trusses have inclined top chords and curved bottom chords with stiff vertical and diagonal web members of angles and plates. The top chords of T section include 2¾-in. angle-bars, flange cover-plates, and 6-in. web plates; whilst the bottom chords of I section are built of 2¾-in. angle-bars, flange plates, and 8½-in. web plates. Between the ends of the cantilever arms light lantern trusses are attached. The transverse bents are braced at the level of and above the balcony platforms by longitudinal lattice girders, as well as by purlins and portal-shaped braces between the columns. For the purpose of calculation, a load of 102 lbs. per square foot was assumed as the maximum for the floors, and 24½ lbs. per square foot for wind and snow pressure.

Three travellers were employed in the erection of the framework, and two of these,

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precisely similar in construction, were used for erecting pairs of intermediate columns, their connecting spans, and the balancing cantilever arms. These travellers were mounted on rails of 23 ft. gauge, and by their aid one complete section of the skeleton was completed at a time from end to end of the building; the middle section was then set up, and finally the columns and trusses of the side galleries or aisles. The third traveller was used for the lantern trusses. During the erection of the first two sections the travellers were coupled by temporary transverse struts. Each traveller consisted of a timber-built tower of rectangular form with a working platform measuring 47 ft. 6 in. by 34 ft. 9 in., at the height of about 54 ft. above the ground level. Above this platform the lines, of 30 ft. 6 in. gauge, for a transverse girder crane were supported, at the height of 83 ft. 6 in. above the ground, by extensions of the tower posts. On the combined travellers the two cranes served all the space on the front and at one side, and were extremely useful in collecting together all the columns and truss members; and the operation of rivetting was facilitated by working platforms provided at various heights. All sections of the framework were started from the same end of the building, and when the traveller had arrived at the end of its course it was moved to the next line of rails and run back to a position parallel with the starting point. On the completion of the main halls the travellers were disconnected for separate use in the galleries. The lantern traveller, moving on lines of 29 ft. 6 in. gauge, had an extended base and a working platform 69 ft. above ground level. It was also provided with a derrick for raising truss members from the ground. M. J. Hermant was the architect and the contract was executed by Daydé et Pillé, of Creil, and the Société des Ponts et Travaux en Fer.

Adjoining the Palais du Génie Civil on one side of the Champ de Mars, and the Palais des Fils, Tissus et Vétements on the other, are the Palais des Industries Chimiques, and the Palais des Industries Mécaniques, the architect being M. Paulin. Each of these buildings is about 456 ft. long by 453 ft. wide, and their internal arrangements include two wide transverse galleries and three large halls 88 ft. 6 in. wide, separated by two galleries 29 ft. 6 in. wide. Beyond the outer halls are other galleries, and there is an arcade on the Champ de Mars front. In section these two structures very much resemble the Palais du Génie Civil, although the details of construction are not the same, and moreover the methods of erection followed and the plant used for this purpose were entirely distinctive. The Palais des Industries Mécaniques was built by duplicate travellers working together and raising three connected trusses by the aid of derricks. Most of the collecting of the parts and the rivetting was performed at ground level, where also the machinery was placed in order to avoid as much as possible the employment of men in elevated positions. At each stage of the erection one gallery and one or two sets of the cantilever arms and lantern trusses were finished. Two different travellers were used in connexion with the building of the Palais des Industries Chimiques. One of these was used as a falsework for assembling the truss members, which were hoisted separately by travelling gantries, and rivetted together on the upper platform. The longitudinal galleries were first completed, then the roofs covering the main halls and the transverse galleries were finished in one operation by the traveller and falsework.

It will be noted that the general order of erection and the direction pursued by the travellers were not alike in the case of the two palaces, but without reproducing plans and sections it would be impossible to make clear the exact details of procedure. Generally, it may be said of the Palais des Industries Chimiques that the traveller was followed by the moving falsework at a distance of one panel; and of the Palais des Industries Mécaniques, that sections of the framework, 118 ft. wide, were erected at one operation by the pair of travellers previously mentioned. MM. Daubet, Donon, et Cie were contractors for the Palais des Industries Chimiques, and M. J. Roussel was the contractor for the Palais des Industries Mécaniques.

The Château d'Eau, at the head of the central avenue in the Champ de Mars, is also the work of M. Paulin, and is built on piers of rubble to the height of the immense artificial slope, in the centre of which the fountains are situated. The upper floor is of cement, strengthened by the addition of iron rods. Immediately behind the Château d'Eau is the Palais de l'Electricité, the two buildings being separated by a broad gallery, and in the tower at each end of this a novel example of floor construction is to be seen. The piers are of pentagonal form, and from each angle a girder extends towards the opposite angle, which it does not reach because it is intercepted by a similar member springing from the adjoining angle. The Palais de l'Electricité measures nearly 230 ft. in height, and is one of the most remarkable buildings in the Exhibition. It is built almost entirely of steel and glass; its stupendous framework includes girders, each consisting of two box girders 2 ft. 6 in. wide, connected by horizontal sections and diagonals, forming altogether a girder whose section measures 10 ft. by 4 ft. Foundations several yards wide, above which are plates bedded in béton, serve to support the metalwork. Other plate-built girders are bolted to those first mentioned and curve towards the top, being joined at their upper ends by an arc supporting the roof. The sides of the palace are large windows with framework of light steel sections.

Beyond the Salon d'Honneur and the two Batiments de Chaudière is the structure forming the Galerie des Machines in the Exhibition of 1889. At the present time this building is divided into three parts, two being halls devoted to Agriculture et Aliments, and the third is the Salle des Fêtes, built inside the old Galerie des Machines. This hall will accommodate from 20,000 to 25,000 persons, and measures about 535 ft. by 460 ft. The dome, nearly 300 ft. in diameter, and 147 ft. high, is supported by eight columns in couples, each weighing 10 tons, and by eight others of smaller dimensions. Some difficulty occurred in connexion with the column foundations, in consequence of the loose nature of the soil and the presence of foundations left after the demolition of previous exhibitions. Excavations to the depth of from 10 ft. to 23 ft. were necessary, and piles were used in some cases. The excavations were filled with béton and iron rods. This fine hall is built almost entirely of steel, the skeleton being concealed by plaster-work in the usual manner.

To sum up the impressions conveyed by examination of the temporary structures in the Exhibition, it may be said that there is very little new to be learnt from a constructional point of view There is, nevertheless, ample evidence of the versatile genius possessed by French architects and engineers, and of their capacity for appreciating the adaptability of iron and steel for structural work of various kinds. Moreover, the lesson may be taken to heart that, although we may have been pioneers in the application of iron and steel, we have now on our very borders a nation capable of conceiving and carrying to a successful issue constructional works of this type of the greatest importance, and probably of unparalleled magnitude.

NOTES.

The Decoration of St. Paul's. THE following letter, addressed to the Dean of St. Paul's, appeared in the *Times* and other daily papers on the 3rd inst.:—

"DEAR SIR,—Interest in the progress of the works at St. Paul's remains unabated, and it will be a source of satisfaction to all admirers of Wren to find that some portions of the stencilling and some of the wooden rosettes which are attached to the stonework have been removed from beneath the dome. We venture to express the hope that the experiments now in hand will result in the cessation of work which, in our opinion, is out of sympathy with the character of the building and injurious to its dignity. We would specially direct attention to the panels which have been introduced, without reference to Sir C. Wren's intentions, into the spandrels upon each side of the diagonal arches of the octagon.

A new and prominent feature is also being added to the building which is open to grave question—namely, the red and gilded iron railing now being placed upon the main cornice. If a railing be necessary in this position to enable the mosaic and painted decorations to be seen, we respectfully submit that it should be something extremely light, after the manner of many good examples in Italy, and that it should be devised so as to carefully abstain from affecting the proportions of the building or interfering with the design of the attic. The railing in question seems to us to have both these defects, and in this regard differs from the old railing at the west end, which not only avoids any interference with the architecture, but is a thing of beauty in itself.

We trust that this new railing may be reconsidered in greater sympathy with the architectural demands and qualities of our metropolitan cathedral and, if possible, abandoned.

In the interests involved we are giving publicity to this letter, and remain,

Dear sir, yours very faithfully,

J. M. BRYDON.	ERNEST NEWTON.
JOHN BELCHER, A.R.A.	J. OLDRID SCOTT.
JOHN F. BENTLEY.	LEONARD STOKES.
W. D. CARÖE.	A. SUGELOW.
EDWARD W. MOUNTFORD.	JAMES BROOKS.
THOS. E. COLLCUTT.	E. R. ROBSON.
MERVYN MACARTNEY.	ALEXANDER GRAHAM.
ERNEST GEORGE.	BASIL CHAMPNEYS.
EDWARD S. PRIOR.	J. J. STEVENSON."

We presume that the unknown name of Mr. "A. Sugelow" represents in reality Mr. B. Ingelow. To this letter the Dean of St. Paul's gave, on the 6th, what he evidently thinks a very piquant and telling reply, as follows:—

"West Hoathley Vicarage, August 3, 1900.

Dear Sir,—I have received this morning an address signed by yourself and a number of your friends relative to 'the decoration of St. Paul's,' which appears also in the *Times* of this morning. I will place it before my colleagues of the Chapter,

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when I have the pleasure of meeting them after the vacation.

I regret to notice that so far as I can remember not one of those who sign the address has shown his interest in the decoration of St. Paul's by subscribing to the fund raised for that purpose.

Yours truly, ROBERT GREGORY.

J. M. Brydon, Esq."

It does not seem to have occurred to the Dean that people who take a keen and an enlightened interest in the architectural and decorative treatment of the interior of St. Paul's are not very likely to subscribe, and could not be expected to do so, when they have no confidence as to what use will be made of their money. To our thinking the fixing of a metal railing along the edge or nearly the edge of the cornice is a most pernicious proceeding, seriously injuring the monumental effect of the architecture, and the fact of its being supposed to be necessary in order that people may see the decorations properly is in itself a condemnation of that portion at least of the decorative scheme. The decoration of a large interior should be a scheme to be visible and effective, as a whole, from the spectator's ordinary standpoint on the floor of the building. If it is not, and you have to go along cornices and other points of vantage to see its details, the scheme is obviously not what it ought to be.

Malmesbury Abbey.

A GOOD deal of attention has lately been drawn to the restoration of the fine old fragment of Malmesbury Abbey Church. The scheme, according to a recent article in the *Western Daily Press*, includes a good deal of necessary repair to the pinnacles and roofs of the nave aisles, and also to the remains of the "crossing" and piers which formerly supported the central tower. The west front, of which the southern half remains to a considerable height, has also become dangerous and it is proposed to rebuild the column of the south arcade between the present west wall and the old west front, and also the clearstory above it, so as to form an adequate support for the ruined part of the church. The estimated cost of the restoration is 10,000*l*. In the *Builder* of March 2, 1895, will be found a general view of the Abbey from the south, and a large ground-plan which clearly illustrates the parts of the building now undergoing repair. It is, we understand, proposed, if funds permit, to restore the nave to its old proportions by rebuilding the destroyed north-west angle and the three bays of the north arcade, but for this further funds would be necessary, and the most important matter at present is to preserve the valuable remains of Norman date that exist.

Mortgagees' Law of Light.

AN interesting and important addition to the judicial decisions on the law of light is made in the recent case of Born *v.* Turner, which will be found at length in Law Reports [1900], 2 Chancery Division, 211. As every one knows, there is a cardinal principle that a grant by a man of a portion of property carries with it the right to the easement of light over that portion which is not granted, so that if the, so to say, reserved part is subsequently sold, it is a servient tenement. In the recent decision of Mr. Justice Byrne this same principle is shown to apply to a grant by a mortgagee of part of a mortgaged property. This is the long-and-short of the decision, but it will be seen that it is a distinct amplification of the legal principle. There can be no doubt that this decision is sound, but, like most judicial judgments on the law of light, it is one enlarging and improving the position of the owner of the dominant tenement. There is also in this case to be noted a point which bears on recent discussions on this subject. The building of which the light was said to be obstructed was a vinery, and in the official reports we find this statement:—"His lordship considered the plaintiff had proved some obstruction, and he therefore granted an injunction with costs." In a recent article we asserted that damages should always be given in place of an injunction, and can any one in this case doubt that substantial justice would have been done by the granting of damages? It may be annoying to be deprived of one's vinery, but if one is, the person who renders it useless may well pay damages, which would consist in the money produced by the sale of it, less what the materials would realise on the sale, and a further sum for diminished amenities. To prevent the adjoining owner from building because a vinery is darkened appears to reduce the right to light to an absurdity and an injustice.

"Profitable Sanitation."

IN a long letter to the *Times* last week Dr. G. V. Poore drew attention to an example in "profitable sanitation" which has been set by the Manchester Corporation. He referred to the utilisation of Carrington Moss for the reception of the refuse from the city of Manchester. The results are certainly striking. In thirteen years the estate of 1,100 acres has absorbed more than half-a-million tons of refuse — "ordure and muck for fertilising, clinker and hard material for road-making" — and the rentals have increased during the period from about one shilling to two pounds an acre. The success of this experiment has induced the Corporation to purchase about 2,500 acres of the adjacent Chat Moss, with a view to treating this estate in a similar manner. But as Dr. Poore gives no figures as to the cost of collection and carriage of the refuse, it cannot be said that he has proved that the method of disposal is really "profitable"; it may be merely the least unprofitable method which the Corporation can discover. And when he goes on to ask, "Is there no possibility of bringing about a profitable interchange of produce between the great cities [of England] and the unreclaimed bog-land of Ireland?" we fear that the answer must be that the possibility is of the smallest. The cost of transport and handling would be too great. That the Manchester Corporation is not as enamoured of its system of refuse-disposal as Dr. Poore appears to be is shown by the fact that privies and midden-closets are now being abolished in favour of water-closets. Undoubtedly it is a great pity that so much valuable manure should be annually lost to the country, but as long as farmers find it cheaper and better to use imported and manufactured manures, there is little hope of any radical change being made.

The Reno Inclined Elevator.

FROM the point of view of shopkeepers much can be said in favour of moving "stairways." Two or three years ago we gave a description of one of these installed in a large retail shop in New York, and mentioned some of its advantages. Since that time the "Reno Inclined Elevator" Company has made great progress, and has installed numerous moving stairways, not only in shops, but at railway stations. The New York elevated railways use these stairways; there are five at the Paris Exhibition; and one was opened to the public on Monday at the Crystal Palace. We had the opportunity of making a thorough inspection of the latter last Friday, and found it in every way satisfactory. The motion was almost absolutely steady; there was none of that wavy motion which is sometimes complained of in similar appliances. The moving incline consists of a series of hardwood boards, each about 4 in. wide and 2 ft. long, and each has its own rollers, which run along angle iron rails. On the boards are fastened a series of rubber covered longitudinal ridges, on which the passenger stands. The feet of the passenger are slid off at the landing by means of a comb of cast-iron prongs, which fit between the rubber ridges. The stairway at the Crystal Palace has a capacity of 3,000 passengers per hour, and it is intended to put up six or seven more to the various galleries. When it is fully loaded with passengers about seven horse power is required, but when no one is on it the horse power the motor needs to exert is only one. The working is economical, as an electric motor only consumes current in proportion to its load. It may be started or stopped at either end by simply pulling a handle. An essential part of the stairway is the moving handrail which is worked off the same shaft, so that they both travel together. In this particular case belt-driving is used, but of course the motor could be geared directly on to the driving shaft if desired. Its price is greater than that of an ordinary electric lift, but its capacity is five or six times as large, and in the case of a lift the fire insurance companies oblige people to have a staircase as well, so that to use a lift is much more expensive. Taking electricity at 4d. per unit, the cost of carrying a thousand passengers per hour up a moving stairway 20 ft. high would be about sevenpence.

Prize Designs at South Kensington.

THE selected works in the National Competition of Schools of Science and Art and Art Classes are open to the public to view in one of the Iron houses of the South Kensington Education Department. There is nothing encouraging in the work done by the architectural students, among either the measured drawings or the designs. The scarcity of exhibits in the measured drawings class is to be regretted; country schools of art should have exceptional opportunities for outside measuring work, which, combined with evening classes in building construction and drawing from life, make a good basis for an architectural education. That these opportunities are neglected, and that the subjects students are set to work upon are ill-chosen and devoid of such qualities as would be likely to inspire the student to do his best, is only too plainly evident in the poor examples hung at South Kensington. With the measured drawings at such a low ebb it is natural to find no high standard among the architectural designs, for design is not an accomplishment to be procured at art schools or from text books, but is the

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outcome of previous experience among materials and among the buildings of the best periods of English architecture. For example, the three designs from Glasgow for a bachelor's country mansion that gain the distinction of bronze medals are commendable for dignified and monumental planning, but we question the utility of setting students to design in the Neo-Greek style. Young students can have only a text-book knowledge of Greek architecture, and, moreover, they should work in a style more appropriate to their own country. A silver medal is deservedly won by Mr. Shirley Harrison with his design for a market hall in a country town; but the materials should have been more clearly indicated on the drawings, and the detailing is far too meagre. A design for a village hall by Mr. F. J. Horth, with photos of carefully-prepared models, would have been better placed but for the absurd battening of walls and chimneys — a new and preposterous fashion with some of the younger school of English architects.

Decorative Designs at South Kensington.

By far the best design for internal decoration, among the students' work, is that by Miss Winifred L. Stamp, of the Regent-street Polytechnic School of Art, in her design for the decoration of the entrance hall of the Polytechnic. It is excellently drawn, and shows the essential qualities of decorative design in conception, arrangement, and in the charm of the colour scheme. The furniture and wood-carving exhibits show a tendency to smallness and overcrowding, a fault it is to be feared very common in work of this class. Mr. W. A. Martin, of Liverpool School, takes a gold medal with his design for a printed silk hanging; many other of the designs for silk fabrics show considerable taste and skill in the choice of colours. It is noticeable that the best work in this class comes from schools where textile design is done in association with the materials and the method of its production. The embroidery and needlework maintain a high standard. The designs for white embroidery accompanied by worked specimens, from Belfast, are good in design and well adapted for the materials in which they are thoroughly well carried out. The most encouraging work in this section is from the Royal College of Art, by Mr. Robert A. Dawson, consisting of a design for a fire-screen accompanied by the executed work. The design is for appliqué work, well arranged and good in colour. In working it out, the head and neck of the figure would have been better in appliqué than in long stitches.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT LEICESTER.

THE Mayor of Leicester having invited the British Archæological Association to hold its annual congress this year in that town, a large party of the members assembled in the Museum Buildings on Monday, July 30, at 2.30 p.m. The proceedings commenced by the Mayor and Mayoress, Alderman and Mrs. Windley, formally welcoming the visitors to Leicester. The Marquis of Granby, the President of the Association, being unable to attend the meeting, the High Sheriff of Leicestershire, Mr. R. Smith-Carington, F.S.A., opened the fifty-seventh congress, and delivered a very able inaugural address. Dealing with the mythical history of Leicester and the tradition which ascribes its foundation to King Lear, and his burial in a vault beneath the river Soar by his daughter Cordelia, he said the place was known from the very earliest ages as a place of importance. Leicestershire was comprehended in the territory of the Coritani, but after the Roman subjugation it formed a part of the province of Flavia Cæsariensis. By the Romans Leicester was named Ratæ or Rhatæ Coritanorum, derived from the ancient British Rath Coranied, meaning a fortress or stronghold of the Coranians. The Roman roads Watling-street, Fosseway, Via Devana, and Saltway crossed portions of the county, and two of these—the Via Devana and the Fosseway—passed through the town itself, but their course cannot now be accurately identified. Roman remains in considerable abundance and of great importance have been discovered in Leicester, many of which are now preserved in the Museum. Under the Saxons, Leicestershire formed part of the kingdom of Mercia, and Leicester was its chief city and the seat of a Bishopric, and so remained until Ceolred, the seventh and last Bishop, removed the see to Dorchester. A mint was established at Leicester in the reign of Athelstan and continued to issue coinage until the time of Henry II. When the Danes invaded and overran England in the ninth century, Leicester fell into their possession and became one of five great Danish burghs. It was recovered from their rule by the renowned Princess Ethelfleda, the warlike daughter of Alfred the Great, in 920, together with Chester, Derby, Northampton, and other towns. This wise, patriotic, and enlightened princess did much for the security and advancement of Leicester. She was the great fortress-builder of the tenth century, and is said to have rebuilt the walls of the town and added largely to the fortifications. She also reintroduced Christianity into the county and restored the churches which the Danes had destroyed. She died at her Castle of Tamworth in 922. Mr. Carington then passed in review the history and archæology of Leicester under the Normans, down through the succeeding centuries until the period of the great Civil War, in which struggle the county and town of Leicester took the Parliamentary side. With some comments upon the various places to be visited during the week a very excellent address was brought to a close with a cordial vote of thanks to the author, proposed by Dr. W. de Gray Birch, F.S.A., who said the Mayor in his opening remarks in welcoming the Association had referred to the loss of the title of "city" which Leicester for many centuries possessed. He, Dr. Birch, did not think there would be much difficulty in recovering the ancient designation if Leicester were to proceed upon the same lines adopted by Westminster within recent years. Although it was thought there could not be a city without there being an Episcopal See and a Bishop, yet Westminster was an example to the contrary, and he thought if the Corporation of Leicester sought out the way by which Westminster had attained its dignity, and adopted the same course, they would meet with the same treatment. The opening proceedings then terminated, and the party were conducted to the Museum to inspect the large collection of Roman and other antiquities preserved there. Mr. Montagu Browne, the Curator, gave a lucid description of many of the objects of interest under his charge. The Museum possesses one of the most perfect examples of a Roman milliare known in this country. It has suffered considerably from its former exposure, but the inscription can still in great part be deciphered, and reads as follows:—

IMP CA S
DV TRAMN PARTH FD ..... EP
AMN HADRIANI ..... B
POT IV COS III A RATIS
H

The date of the erection of the stone is A.D. 120-121. The examples of pottery found in Leicester and the suburbs, together with the large number of architectural remains, tiles, and tesselated pavements all carefully labelled with the exact localities in which they were found, render a visit to this Museum most instructive and interesting. Anglo-Saxon and Mediæval relics are also very numerous. The prehistoric age is well represented by many fine specimens of flint and stone implements. At the conclusion of the visit the members separated to meet again later in the evening, when they were entertained by the Mayor and Mayoress at a conversazione given in the Museum Buildings and Art Galleries, which contain some celebrated pictures by modern painters purchased by aid of a special bequest of 5,000*l*.

Tuesday, July 31.

A special tramcar, provided by the tramway company, conveyed a large number of the members from the hotel to the Great Northern station, over a mile distant, whence they took train, at 9.55, for Hardy Stathern station. On arrival there waggonettes and other carriages were waiting, and the party, which had been augmented by other arrivals, enjoyed a lovely drive through the woods to Belvoir Castle. There is little to be said of the present castle from an archæological standpoint, as it is mostly a modern erection by James Wyatt. In 1816 the old castle was destroyed by fire. There are some remains here and there of the old walls, and in the basement are several large groined and vaulted apartments, now used as wine cellars. The art treasures, the fine collection of pictures, and the magnificent gold and silver plate were inspected and admired. The party then took luncheon, subsequently examining the ruins of the foundations of the Priory of St. Mary Belvoir, which was a Benedictine establishment and a cell of four monks of St. Albans, in Hertfordshire. The foundations only remain of parts of the buildings, and they have been greatly disturbed by the works of the light estate railway which has been carelessly permitted to cut through the site. Although there is scarcely anything archæological now remaining at Belvoir, yet the history and records of Belvoir Castle go back to Norman times. The old castle passed through many vicissitudes during the turbulent reigns of Stephen and Henry II., and in the Parliamentary war it was lost and won and won and lost again by both parties several times over. Mr. W. A. Carrington, who has been for a long time engaged upon the Rutland archives furnished a valuable and lengthy paper upon "Belvoir Castle, the Priory and Monuments," considerable extracts from which were read by the Rev. A. J. D. Astley. The evening meeting was held in the large Committee-room at the Town Hall under the presidency of the High Sheriff, Mr. R. Smith-Carington, when Dr. W. de Gray Birch gave a description of some of the charters and other records of the Borough of Leicester. In the course of his remarks Dr. Birch said a charter in itself was simply a writing. The word charter was connected with the word character, and so the charter meant a document covered with characters. A charter could only be given by someone who had something to give, and the charters they would consider that evening were grants by the Sovereigns of England, giving away something they were entitled to receive or possess—giving it away to someone else, to a corporation or individual who was desirous of acquiring that possession. Had it not been for the charters granted to the burgesses of Leicester the town would simply be a parish or a conglomeration of parishes. It would be governed by the lord of the manor. But the moment the king had granted to his faithful subjects in Leicester certain privileges the city or borough or town sprang into being. They knew nothing of the local management of Leicester until the twelfth century. At the end of that century King John —whom he, the speaker, regarded as being by no means so black as he had been painted—recognised the value of more closely knitting together the interests of the sovereign and the people, and he granted the first charter to Leicester, so far as they knew. It was he who first called the inhabitants of Leicester burgesses. This was a very valuable charter indeed, because in those days no man might go out of his parish without permission.

Leicester was very fortunate in the number of its charters. Three were granted by Henry III., and twelve or fifteen by Edward III. Every succeeding king was approached by the Corporation of Leicester to confirm the charters granted by his predecessors. That was a very important thing, and ought to be done even at this present day. A charter was a very valuable possession indeed. They could do nothing without it, and could do everything with it. A charter was above the law, for if an Act of Parliament was passed contrary to any clause of the charter they had only to produce the document in a court of law and say, "Here is our privilege which was granted in perpetuity; until that is altered by the sovereign at our surrender you can do nothing." The charters were worth the whole

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existence of the borough as a borough, and if they were lost or damaged the people of Leicester would be liable to be deprived of some of their privileges. A large number of the charters were suspended on the walls for examination. Many of them, however, are at Cambridge University at the present time, where they are being edited by Miss Bateson. Dr. Birch advised that every charter should be copied in its Latin and translated, so that every inhabitant from burgess to youngest man should know what it meant and contained. The long series of charters ends with Charles II.

Wednesday, August 1.

The weather to-day was dull with heavy rain at times, nevertheless a goodly number of the members set out from the hotel in carriages for a driving day. The first place visited was Kirby Muxloe, where the remains of the old moated manor house known as Kirby Castle were described by Mr. Alfred Gotch, F.S.A. The house must have been very extensive, but only the gatehouse and some portions of towers now remain. Mr. Gotch had prepared plans of the existing buildings and an outline plan of the foundations of the entire residence. The exact date of the building is not known, but it is believed to have been erected by Lord Hastings about the year 1476. The "maunch," the heraldic form of a sleeve, the cognisance of the Hastings family, is perceptible on the canted angle of the right hand turret in the diaper of blue bricks which is worked in a diamond pattern over most of the walling, and the initials "W. H." are carved over the archway of the entrance. It is of red brick, with stone windows and doorways and other dressings, but the stone has been used sparingly and only in the central block. It was fortified and surrounded with a moat which is still wet. The lower stories of the octagonal towers flanking the entrance gateway are pierced for the cannon of the period, and are elsewhere loopholed for archery. The grooves for the portcullis are very perfect, and the circular turret staircase of brick is in good preservation, otherwise the remains are much neglected and are going to decay. Leaving Kirby the party proceeded to Groby, where Mr. I. C. Gould gave a short paper upon the history of Groby Hall and Castle, from which it seems that the oldest part of the Hall was built by one of the Ferrars family, who possessed the property for some 200 years, most probably out of the materials of the ruined castle close by; the windows, however, in that case must be later insertions. Edward Grey, who became Lord Ferrars of Groby, was the next possessor, and from him descended Thomas, first Marquis of Dorset, who, in the latter part of the fifteenth century, built the brick portion of the present patchwork mansion. He died in 1501. Leland visited the place in 1540, and in his "Itinerary" has left a description of the buildings as he saw them. Much that Leland saw has disappeared, but this part remains as described by him. Perhaps the most interesting of the associations of Groby is that connected with Elizabeth, the Queen of Edward IV., who passed much time in this old hall. Passing to the back of the hall, under Mr. Gould's guidance, the members were shown the keep mound and a few adjoining earthworks, all that now remain of the once important castle of Groby. The castle was destroyed by Henry II. at that critical period when he reduced the power of the lords so effectually after the feudal revolt of 1173-4, and never from that day was any attempt made to rebuild the castle. No one can say when the earthen mound was first raised. It may be that this fort, like that at Bakewell in Derbyshire, owes its first existence to the troublous times of the Saxons and Danes when, early in the tenth century, the neighbouring town of Leicester was so hotly contested. In the absence of any evidence to the contrary, it may also be that the mound was thrown up by the Norman lord in the eleventh century. Whether its existence is due to Saxon, Dane, or Norman, it is tolerably certain that its defences at first must have been of wooden stockades or palisades, and that many years must have elapsed before the stone keep appeared upon its summit, the remains of which in solid masonry still exist. From Groby the archæologists proceeded to Ulvescroft Priory, where Mr. Patrick, hon. sec., read a paper upon the history of the house and described the remains of the buildings. Situated within the borders of what was anciently known as the "wast" or forest of Charnwood, described by Burton in 1622 as a "dearne and solitary place," Ulvescroft Priory was originally founded by Robert Earl of Leicester, nicknamed "le bossu," the hunchback, for eremite friars about the year 1134. These friars most probably belonged to one of the very many independent brotherhoods which existed without any distinctive denomination, for the order of Austin friars had no existence at that early date, and the older order of Austin canons, although well known, was not fully established until 1139. All that is known concerning these early friars of Ulvescroft is that they "professed a regular life," and that none could assume the office of priors, "except elected by common consent of the brethren according to the rule of the blessed Augustin." The great preaching orders of friars were not established by Papal Bull until 1215-16. Mr. Patrick illustrated his remarks by a ground plan of the priory, enlarged from one drawn by the late Mr. Gordon Hills in 1862, no alteration in the remaining buildings having taken place since that date. Some parts of the ruins are of the Early English period, consisting of a portion of the western end of the south wall of the nave, with the triangular head of a buttress partly built into the later tower wall, and two doorways in the south wall, one of which opened into the north walk of the cloister, the other into a sacristy. There are also the remains of a window of this period, situated sufficiently high up to enable the cloister roof on this side to pass beneath it. With the above exceptions the ruins of the church as we see them to-day belong to the fourteenth and fifteenth centuries. The Early English Church probably consisted only of a nave and chancel. Toward the middle of the fifteenth century the west end of the nave was taken down to allow of the erection within its length of the present tower. The weathering of the steep roof of the nave may be seen on the eastern face of the tower wall, and also traces of the flatter roof which succeeded it on the erection of the upper story towards the end of the fifteenth or early in the sixteenth century. No traces remain above ground of the north aisle except a little part of the north-west wall, with a doorway of late date, which opened into a turret at its north-west angle. Remains of the large windows which lighted the chancel show them to have been of very elaborate work, and there are remains in the south wall of the chancel of what must have been a very beautiful canopied sedilia of three seats, with a piscina adjoining. Some of the corbels which carried the principal timbers of the late flat roof remain, and a good deal of the early plaster still adheres to the masonry. Of the domestic buildings of the priory there are more remains than of the church, although they are but fragmentary. The west wall of the guest house has remains of two Early English windows now built up, and some roof timbers of the sixteenth century. It is now used as a barn. Of the refectory, which occupied the south side of the cloister, only portions of the south wall remain, with indications of the pulpit which was corbelled out from the wall. The parlour, situated at the south end of the east walk of the cloister, remains and is now part of the farmhouse. The ground between the north wall of this house and the south wall of the church is now quite open, and one can only conjecture that next to the parlour was the slype and beyond it the square chapter-house, and then the sacristies close to the church. The walls are of Early English date, but the windows are insertions of the Tudor period. In the floor of this apartment, which is of square red tiles, at about the centre, is a circular stone 19 in. in diameter. From this stone the tiles are laid in curved form, north and south, the whole length of the room, radiating outwards east and west in the shape of the arms of a cross, the tiles being cut to suit the curves. There is no clue to the meaning of this curious arrangement, but the stone has a deep dark red stain upon it, which local tradition says is blood. The whole of the buildings were surrounded by a wall, which in parts remains, and beyond the wall a moat, which also can be traced; the moat terminated at the north and south ends in a series of fishponds, which extended along the entire west front. Pouring rain coming on again a hasty retreat to the carriages was made, and the party departed for Newtown Linford for luncheon. Afterwards the drive was resumed, and a visit made to the ruins in Bradgate Park, the birthplace of the unfortunate Lady Jane Grey. The chapel contains a fine altar tomb, with recumbent effigies of a knight and lady; but who they represent is not known. Passing through Thurcaston, the birthplace of Latimer, Leicester was reached about six o'clock. The evening meeting was held in the large room of the Grand Hotel, and was well attended, under the chairmanship of Mr. Perkins Pick, the President of the Leicestershire Architectural and Archæological Society. A paper was read by Mr. C. H. Compton, V.P., on "The Abbey of St. Mary de Pratis," which was founded in 1143 by Robert Earl of Leicester, the same who founded the Priory of Ulvescroft. The chief historical event connected with the Abbey is the reception by the Abbot of the fallen Cardinal Wolsey and his death there in 1529. A paper on the "Roman Roads of Leicestershire" was also read by Col. Bellairs.

The report of the proceedings of the remaining three days will be given in our next issue.

MUSICAL INSTRUMENTS AT THE CRYSTAL PALACE.

WITH musical instruments in their main function as producers of musical sounds we are not directly concerned in these columns. But they form a very interesting class of objects even when merely studied by the eye in their dumb state, and we recommend our readers, even those who are not specially musical, to take an opportunity of inspecting the collection of musical instruments, from the most ancient to the modern period, now on view at the Crystal Palace. Many of the ancient ones are exceedingly interesting as examples of what may be called the naive ingenuity of half-civilised people in fashioning something which will produce such musical or quasi-musical sounds as they desire to produce; and modern instruments show a great deal of ingenious and highly-finished make and mechanism. Few of those, for instance, who hear an orchestra from time to time, and know that bassoons are among the instruments (for they see the word down in the list of the band appended to the programme), have any idea of the peculiar and ingenious construction of a bassoon, and the manner in which, to bring it to a convenient length, the lower part of the tube is returned on itself, the whole tube being worked, we believe, in one piece of wood at first, and then cut and joined the reverse way, the lower part having a kind of boot form; a very neat achievement in woodwork, to say the least. It is interesting to trace the gradual development of the different wind instruments,—flute, oboe, and clarinet, from the simpler forms to the more highly finished and elaborated instruments of the present day. Among the curiosities of the collection is a glass flute, date 1812; we believe a good many were made at one time. The tone would probably have been poor. Then there are the exceptional instruments, of exceptional shapes; the krummhorn ("crooked horn"), a wood instrument with an angle in the middle which gives it rather the shape of a prawn; and the basset-horn, a wood wind instrument, the use of which was dropped for some time and has been revived; it is something like a clarinet with the mouthpiece end, for two or three inches, bent at an angle, and the bell end bent in the opposite direction; if we are not mistaken, this has also sometimes been known as "krumm-horn," in consequence of its bent ends. Another special shape is seen in the Cor Anglais, with the tube expanded into a round bulb close to the open end.

It is an interesting point in connexion with musical instruments that their precise make, shape, and finish seems to have been much due, in all times, to a certain instinct and acquired faculty rather than to any scientific principle. No one, probably, who was asked to argue out, on scientific principles, the best shape for a resounding body to stretch strings on for a bow instrument, would evolve the form of the violin, nor do we know that any reason has ever been given or can be given for the adoption of the shape gradually worked out by the great Italian violin makers, and followed ever since. They seem to have arrived at it by a combined instinct and experience, and no one has been able to improve upon it, or even to make instruments equal in effect to the old ones. The effect of time in mellowing the material has no doubt much to do with the superior

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tone of the old Italian violins; but we may suspect that there is more than this; that there was a kind of acquired instinct among the old makers which could not be defined or handed down. Similarly, a well-known modern pianoforte-maker told us that it was impossible for a modern workman to reproduce the ancient spinet with the same effect, even with the action of an old one before him as a model, or to repair or re-instate the notes that were gone in an old one; that was some sleight of hand or trick of craft in the making which was lost to us. The visitor to the Crystal Palace collection will probably come to the conclusion that the same was the case with some of the very ancient and semi-barbarous instruments of which examples are to be seen. Some of these are very singular in shape and contrivance, evidently evolved from practical experiment in finding out the right shape. There is a reed flute for instance, of ancient Egyptian make, consisting of a long reed and a short one bound together parallel: it is difficult to understand the precise object of this arrangement, but no doubt it answered to some special feature in the popular tune-making of the day. The instruments of barbarous tribes, of which there are a considerable variety in the collection, afford a curious study of idiosyncracy in the shaping and putting together of materials for producing noises of different kinds. A pair of kettle drums from Egypt (date not given) are curiously like models of the modern orchestral instrument under that name; hemispherical metal cups with a skin stretched across them, only quite diminutive—about 6 in. dianeter.

As has been often observed, the artistic design and treatment of musical instruments seems to be almost in inverse ratio to their musical value. Early violins of undeveloped form are often richly carved and ornamented, while the perfected manufacture of an Amati or Straduarius has only the beauty arising from its finely-finished curves and the simple and severe ornament of the line of ebony inlay round the margin known as the "purfling." There is in this collection, certainly, one remarkable Straduarius, elaborately inlaid with mother-of-pearl and ebony on the sides, and also round the margin, in place of the usual plain purfling. This is a curiosity, as only about a dozen examples with this kind of inlay are known to exist; it is said to be an early production of the maker, and there is a tradition that it belonged to the royal family of Spain. That is the kind of history one would have expected; it was a show instrument, made for some great personage who thought more of appearances than of musical tone. There can hardly be a doubt that the inlay must be detrimental to the tone, and that the renowned maker knew this, and only produced a few of these over-ornamented instruments to gratify the individual tastes of wealthy patrons. But the violin, in an artistic sense, is something like an oar or a boat; the mere perfecting of its shape for the required object gives it a beauty of its own. This is hardly the case with the wind instruments. The older and more simple instruments, the early clarinet, and the flute *à bec*, a flute played through a mouthpiece at the end, are more pleasing in outline and appearance than the modern wind instruments of the same types, covered with metal keys which facilitate execution, but spoil the simplicity of the form. Some one has had the fancy to reproduce a type of trumpet seen in one of the Pompeian paintings of gladiators—a tube which makes almost a complete circle, mouthpiece at one end and bell at the other, and is strengthened by a kind of tie or stay across the diameter of the circle. It is an admirable object in a picture, but its musical capabilities are probably very restricted. The collection contains several examples of that extinct instrument the serpent, the function of which is now supplied by the double-bassoon (*contra-fagotto*) or the bass-tuba, but which we believe was in occasional use within the memory of living man. Its manufacture must have been rather a delicate operation; it is a wooden tube of thin wood, increasing conically from a bore of about ⅝ in. at the metal mouthpiece to about 3½ in. or 4 in. wide at the open end; it is 8 ft. in total length, but made in convolutions something like a serpent in movement—whence the name. The peculiar shape, like the bend backward in the bassoon, is merely to reduce it to manageable length, and has no effect on the sound. Of those exhibited at the Palace the tubes are all black, but whether they are of black wood or the surface is coloured is not easy to see when they are under glass. Their tone must have been coarse and rough; and indeed there is a story of Handel, on first hearing the instrument and its name, venting a sarcasm to the effect that "it was not the kind of serpent that tempted Eve, at all events."

The pianoforte is an instrument which gives little lead or suggestion to the designer for its exterior appearance; it has not, like instruments of the violin family, a form arising out of and governed by musical requirements; it is rather a case containing a sound-producing mechanism, and might be of twenty different shapes without the sound being in any way affected. Hence the pianoforte has always been, so to speak, a piece of furniture, and its design has partaken of the good or evil qualities of the furniture taste of the day. There is a square pianoforte here, made by the house of Erard for Napoléon, as a gift to Marie Louise, which is an admirable design in perfect taste; and many of the small square instruments of the early days of Broadwood and Erard are far superior, as regards taste in design, to most of the grands turned out by the same firms in the present day. In fact, it would seem that in these latter days the pianoforte alone has lingered behind the recent improved taste in furniture, and the reason probably is this, that (in this country especially) the great modern development in musical education and knowledge, which led to so many people desiring to have a good pianoforte, occurred in the earlier Victorian days; and the pianofortes being cased according to the furniture taste of that desolate period, this form, with the decanter-stopper legs, became fixed as the accepted form for a pianoforte, and has maintained itself ever since. There is an occasional effort to produce something better; but generally speaking, while the purchaser of other kinds of furniture can find things that are in good taste ready-made and on sale, he can seldom find a good piano with any design about it; and if he cannot afford to have one made to order he must take the conventionally-accepted form which the pianoforte-maker offers him.

The organ also is a case with music-machinery inside it, and may be treated in all kinds of different ways without interfering with its musical effect; but the design of the organ has never sunk so low as that of the pianoforte, because the ranks of pipes, which are the sound-producing medium, have a character and a grandeur of their own, and can be freely used as an element in design, while the pianoforte-strings cannot; there is nothing effective in their appearance, and they would be liable to injury if exposed. There are of course no large organs at the exhibition; one might as well attempt an exhibition of houses as of organs. There are, however, two interesting examples of ancient organs on a small scale. One of these indeed may be rather called an organ cupboard than an organ; this is the Flemish instrument said to have been the property of Elizabeth daughter of Charles I.; as it appears here it is simply a specimen of fine and elaborate carved wood open-work, for no indication of an organ appears. The other is the very pretty little instrument, with a front of small pipes, a German example of the seventeenth century, and called in the catalogue—wrongly we think—a "Positive." In the language of older organ-building days in Germany a "Positif" was an organ which was built into its place, as distinguished from a "Portatif," which could be carried about. This little instrument is self-contained and not too large to be moved about, and we should say that it was properly a "Portatif." The original meaning of "Positif" is illustrated by the meaning which it came to have in the days of large organ-building in Germany. In most of the great organs of the seventeenth and eighteenth centuries the pipes belonging to the lighter portion of the organ, represented by the lower row of keys—what is called in England the "choir organ"—were built separately, for decorative reasons, as a small organ in front of the main edifice. As this small or "choir" organ was about the size of the built-organs, the "Positifs," of earlier days, it got to be called the "Positif," and the word is used in German organ-music to this day. Thus, while the "Positif" originally meant the largest kind of organ, it came ultimately to mean the smaller or light part of the organ; and we may take it that the "Positif" of the late period represented an instrument of the same size and type as the original "Positif," when the word signified the largest organ made; otherwise the expression would not have been used. But these "Positifs" could never have been moved about; they were built organs, only on a small scale.

The keyboard instrument department includes two small examples of modern organs of special type; a "Hope-Jones" organ, the peculiar system of which is well known, and a "Caslon" organ, which, as we learn from a pamphlet that has been sent to us, is an organ contrived to combine in a very small instrument a variety of effects which generally require separate stops and keyboards to realise them; *e.g.* a 16 ft. stop on the manual of which only the lowest key that is struck sounds, thus supplying a pedal bass without the pedal keyboard, and a "melodic stop" in which only the highest note of the chord struck is sounded. One object of this is to meet the cry which is being raised by architects and others for smaller organs. We have not much sympathy with this; but there are cases, as in a small chapel, where only a very small organ is possible, and the Caslon organ seems worth attention for such cases. The specimen at the Crystal Palace, however, was not available for hearing, and we should prefer to hear one before expressing any decided opinion as to its value.

MAGAZINES AND REVIEWS.

The *Quarterly* has a forcible article on "The Ethics of Cremation," one point of which is to argue that the general adoption of cremation would be a serious danger to the community in destroying all traces of foul play in the case of poisoning, and thereby opening a door of safety to the poisoner. This argument has been brought forward before, and we think, here as elsewhere, is somewhat exaggerated. In regard to the hygiene question, the article reasserts Seymour Haden's views as to the advantages of what he called the "earth-to-earth" system of burial, and the argument on this aspect of the subject is forcibly put. There is one hygienic consideration in regard to cremation which is not mentioned here, and which we have rarely if ever seen alluded to in any polemical writing on the subject, but which is surely a very important one: viz., suppose cremation universally established by law, what is to be the effect of the immense amount of burning of bodies which will take place in crowded districts, and of the escape of all the products of the combustion of bodies into the air? We hardly think the advocates of cremation have realised this. The same number of the *Quarterly* contains an article on "A British School in Rome," in support of the proposal to establish such an institution. It is pointed out that in Italy, and above all in Rome, "classical, mediæval, and modern interests are indissolubly united, frequently in the same building or on the same site; while the materials for study are as rich for the historian and artist as for the archæologist."

The *Architectural Review* (Boston) devotes its illustration plates entirely to a house "on" (as they say in America) Locust-street, Philadelphia, by Messrs. Frank Miles Day & Brother. The house is worth this special illustration, however; it has a fine and rather unusual plan, and the interior detail, founded on Elizabethan and Jacobean types, is very well considered. "The Characteristic Architecture of the Nineteenth Century" is the subject of a long article by Mr. J. R. Coolidge, Junr., with a number of small illustrations from photographs of modern buildings. The English buildings included among the illustrations are St. George's Hall, the Reform Club, and Mr. Webb's Grain Silo at Greenwich; rather a curious selection, ignoring entirely the English Gothic revival.

The most interesting subject illustrated in the *Berliner Architekturwelt* is "Moderne Luster-fayencen"; at least, the illustrations under this head show really pretty and artistic design, which cannot be said of anything else in the number.

In the *Art Journal* Mr. S. Fisher concludes his article on "The History of a Tower"—the Jewel tower at Westminster. The title of another article, "An Illustrator of Blake," at once attracts attention, seeing that we had been accustomed to regard Blake as his own illustrator. However, Miss Celia Levetus, the illustrator in question, appears to be only work-

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ing where Blake has not worked. The larger illustrations reproduced, though very charming in themselves, are hardly in the spirit of Blake, but the small drawing of "The Little Boy Found" might have been done by Blake himself, as far as feeling goes. If there are more like this, Miss Levetus is doing a good work.

The *Studio* (July 16) publishes a rhapsody on Rodin's collection of curiosities in the pavilion outside the Paris Exhibition. No words in the vocabulary of modern so-called criticism seem sufficiently exuberant to characterise this collection of half-finished and contorted sketches, in which genius contends with waywardness and eccentricity. When M. Rodin produced the "Age d'Airain" he was, or was on the way to be, a great sculptor, and we may recall that we recognised the remarkable character of that work, exhibited at the Academy many years ago, when it was passed over by other critics as far as we noticed. But the collection of works in the gallery at Paris, with the ghoul-like Balzac thing in the centre, suggests the words of Lear—"Oh! that way madness lies." A short article on the subject of "The Royal Academy and Architecture" suggests, quite truly, that the Academy does not give to architecture the attention which is rightly its due; but any weight such a protest might have had is discounted by the weak selection of drawings for comment and illustration, which consist only of things of minor interest, picturesque sketches of small houses, &c.

The *Engineering Magazine* includes articles on "Electricity in the British Collieries" and on "Commercial Organisation of the Machine-shop." This latter is a very practical and sensible article. Among the suggestions made we may quote the following:—

"If the factory occupies several floors it will be decidedly an economy to have, so far as possible, all supplies needed on any one floor in a storeroom on that floor. I have in mind a factory where the elevator was kept going all day long carrying goods to, and distributing material from, the storeroom, which was on the top floor. Every workman who needed material was compelled to go up the elevator, and if he wanted 2 in. of steel, he was given a long bar, which he took down to the first floor, and after cutting off his 2 in., he had to take the remainder of the bar up to the top floor again. At the same time, this concern was spending liberal amounts for the purchase of modern machine tools."

Feilden's Magazine contains an article on "Stone-working Machinery" by Mr. M. Powis Bale.

The *Antiquary* contains an article on "St. Katharine in Art, Legend, and Ritual," by Mr. J. Lewis André; and a note on "A French Type of Bronze Axe" found at Hull in 1884, and which passed into the possession of Mr. T. Sheppard, who writes the communication. The axe-head, as figured, is of peculiar character, but we are not sure that the argument that it is of French origin is quite made out.

The *Genealogical Magazine* includes an illustration of the arms of Cape Town, and an article on "Unheraldic Charges," illustrated by the arms of some eminent men of science—Herschell, Sir W. Crookes, as well as others; although we observe that the writer of the article rather opposes the argument that "charges" illustrating some achievement or invention are unheraldic, maintaining that on the contrary "they are very much in the spirit of true heraldry, which, in the wording of ancient grants, seeks to perpetuate the memory of worthy deeds." This appears to be an attempt to import common sense into heraldry; and the writer (Mr. Fox-Davies) observes that "however unheraldic a charge may appear by reason of its modernity, in the generations to come it attaches to itself a certain honour as a hereditary commemoration of the peculiar reason which led to its original choice." In fact, it appears that "unheraldic" only means novel, and Mr. Fox-Davies argues that what is modern now will be ancient some day. We will go so far, however, in opposition to "unheraldic" charges, that we think heraldic charges should be symbolical rather than realistic. In this respect the Crookes shield, figured in the article, is quite heraldic; those of Herschell and Vavasseur, bearing more or less realistic representations, respectively, of a telescope and a cannon with a shield, are hardly heraldic; they are too pictorial. The motto of the Vavasseur shield, which bears this gun and two bombshells with flames proceeding from them, is rather amusing in its incongruity—"Tout par faveur Divine."

The *Fortnightly Review* contains an article by Mr. Arthur Symons on "The Art of Watts,"—writing which is meant to be eloquent, but which is to our apprehension over-wrought and exaggerated in style and expression, and rather of the nature of rhapsody than of true criticism. Mr. Symons seems rather to aim at being a second Ruskin, making fine writing about art, more for the sake of the fine writing than for criticism in the true sense.

Scribner contains an article on "Loches," by Mr. Ernest C. Peixotto, with the author's illustrations, which, neither large nor numerous, are very good as far as they go. Under the heading, "The Field of Art," Mr. La Farge contributes some remarks as to "The American Academy at Rome." He thinks there is a special chance for the Americans to get the best advantages from such an institution while escaping its disadvantages, because Americans are not, like the art students of other nations, fettered by any associations of a past art history; in which there may be truth.

The *Pall Mall Magazine* contains an interesting and picturesque article by Mr. Wedmore on the country of Constable, under the title "With Constable"; the description of a walk through the country where Constable most lived and painted. The article is written with special reference to Lucas's set of mezzotint prints of Constable's landscapes.

The *English Illustrated Magazine* contains a popular article on "Pompeii Up to Date" by Mr. Frederick Dolman, which is well done and appears to be the result of personal observation.

The *Gentleman's Magazine* contains an interesting article on "Village Life in Mediæval Arcadia," an attempt to sketch the conditions of life in a mediæval village.

The *Essex Review* (quarterly) contains an article on "Old Chelmsford and Some of its Surroundings," with some illustrations, and also a notice of "A Relic of Richard II. at Pleshey," in the shape of an inscribed stone, of which an illustration is given. It bears the words *Ricardus Rex ij.* in fourteenth century lettering, and is now built into a garden wall at Pleshey, near the spot where it was dug up. For the suggestion as to its real meaning and history we must refer the reader to the *Essex Review*.

Knowledge continues Mr. Davison's article on "The Indian Earthquake of 1897;" and an article by Mr. de Tunzelmann, under the general heading "Wireless Telegraphy," gives some "mechanical representations of electric action."

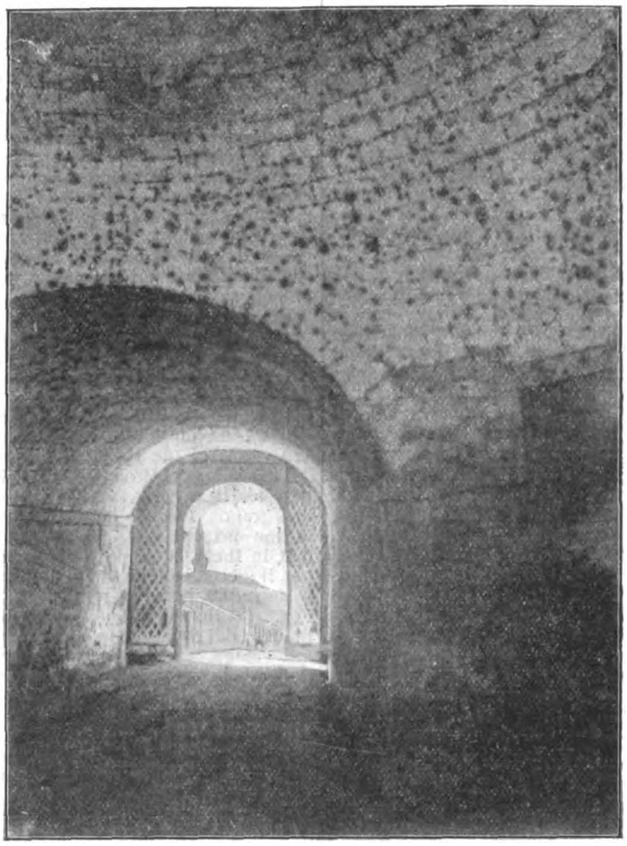

Fig. 1.—Domed Apartment in the Porta Giuliana, Nicosia.

The *Quarry* contains an article on a proposed scheme for water supply for Reigate and Redhill, under the title "Upward Boring for Water," the system being to bore in the lower portion of the hill near Reigate so as to procure by direct gravitation the water in the upper chalk stratum. A section of the ground is given. The article is of considerable interest.

We have received also the *Revue Générale* and *Harper's Magazine*, which this month contain nothing for comment on our part.

FURTHER ILLUSTRATIONS OF NICOSIA, CYPRUS.

IN our issue of July 21 we published the plan, by Mr. G. Jeffery, of the ancient Venetian fortification of Nicosia, Cyprus. We give here some photographic illustrations of some of the remains in their actual state. Their position will be seen on referring to Mr. Jeffery's plan in our issue of July 21.

Fig. 1 shows the interior of the domed apartment in the outer portion of the Porta Giuliana, looking towards the city. Fig. 2 shows the actual state of the inner face of this gate, masked, as noticed in our article, by a Turkish aqueduct; a restored elevation of it was given on page 48 *ante*. Fig 3 is the Caraffa Bastion adjoining the Porta Giuliana. Fig. 4 shows the Porta del Proveditore, on the opposite side of the town.

We are indebted for the photographs to Mr. Jeffery, who has placed all his illustrations and plans of the two Venetian fortresses freely at our disposal, with the sole object of creating a public interest in these two ancient monuments of Venetian work in Cyprus.

COMPETITIONS.

HOSPITAL, WEST HARTLEPOOL.—In the competition for the Cameron Memorial Accident and General Hospital, West Hartlepool, the first premium has been awarded to Messrs. H. W. Pye and R. F. Bacon, 1, Verulam-buildings, Gray's-inn, W.C., and they have been appointed to carry out the work. The assessor was Mr. Gordon Smith, architect to the Local Government Board.

PUBLIC HALL, TULLIBODY, CLACKMANNANSHIRE.—It is proposed to erect a public hall, library, &c., at Tullibody. The cost is estimated at over 1,400*l*. Mr. Geo. A. Kerr, of Alloa, is the architect.

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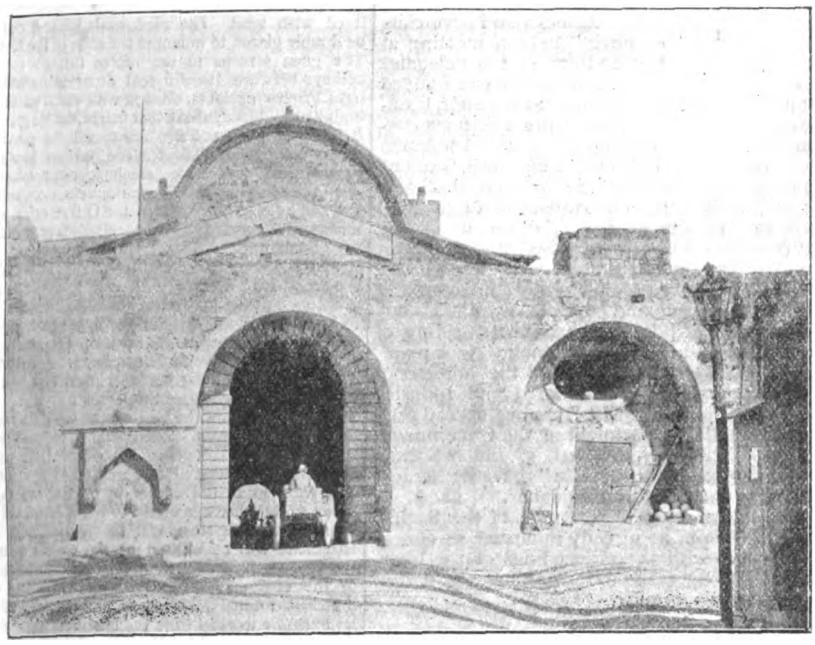

Fig. 2.—Porta Giuliana, Nicosia, in its present state.

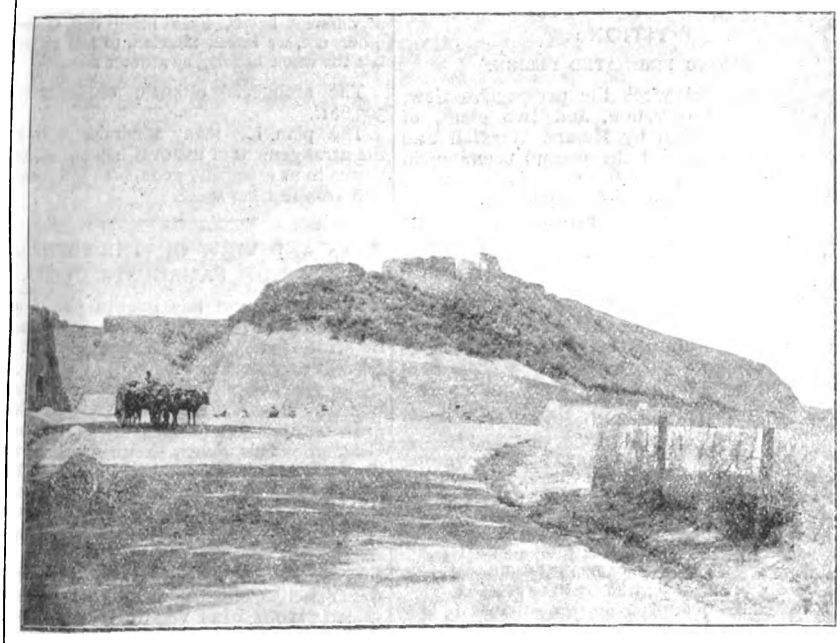

Fig. 3.—Caraffa Bastion, adjoining the Porta Giuliana.

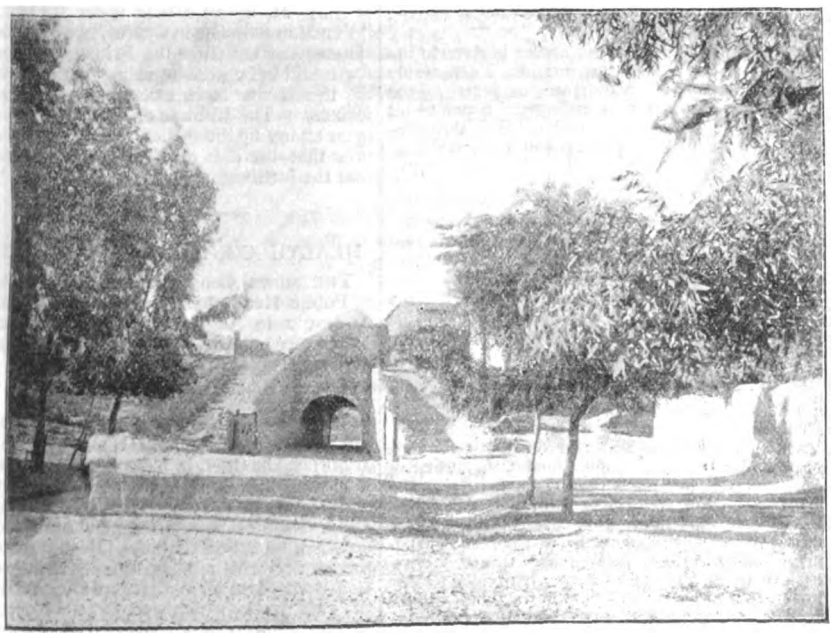

Fig. 4.—Porta del Provveditore, Nicosia.

PARIS INTERNATIONAL CONGRESS OF ARCHITECTS.

THE Fifth International Congress of Architects was opened at Paris on July 30, at 10 a.m., in the theatre of the Ecole des Beaux-Arts, under the presidency of M. Alfred Normand, supported by MM. Blondel, Ch. Lucas, and Courtois-Suffit as vice-presidents, M. Poupinel as general secretary, M. Bartaumiaux as treasurer, and M. Trélat as senior member of the Committee of Organisation.

The first proceedings were the distribution of the badge of the Congress—a compass and a flower interlaced on a silver and enamel ground; the welcome of the visitors by the President; the reading by the Secretary of the report of proceedings of the Committee and its adoption by the meeting, and the formal constitution of the "Bureau du Congrès."

The meeting being thus officially constituted, short speeches in reply to the President's welcome were made by MM. Suzor and Stübben, of Cologne; Dr. Cuypers, of Amsterdam; M. Dumortier, of Brussels; Professor Baldwin Brown, representing the Institute of British Architects; and Señor Vergas, of Madrid.

An interesting exhibition of architectural drawings had been arranged in the museum of casts and in the vestibule of the theatre, mostly French, but including some foreign drawings also. These represented the work of eminent architects from 1726 to the present day.

The afternoon meeting of the same day was devoted to the discussion and finally to the adoption of a resolution in regard to the question of property or copyright in architectural designs ("Proprieté artistique des œuvres d'architecture"), moved by M. M. G. Harmand, *avocat* in the Paris Law Courts, and seconded by M. Chas: Lucas. It would be best to give the resolution in the original language, so as to give the exact detail of the wording:—

"S'inspirant des vœux émis par le premier Congrès International de la Propriété Artistique tenu à Paris en 1878, par les trois derniers Congrès Internationaux des Architects tenus à Paris, 1878 et 1889, et à Bruxelles, 1897, et par les divers Congrès de l'Association Littéraire Artistique Internationale, tenus à Madrid, 1887; Neuchatel, 1891; Milan, 1892; Barcelone, 1893; Anvers, 1894; Dresde, 1895; Berne, 1896; Monaco, 1897; Turin, 1898, et Paris, 1900; lesquels tendent à accorder aux œuvres d'architecture la même protection qu'aux œuvres de peinture, de sculpture et des autres arts du dessin:

"Considérant que les dessins d'Architecture, comprenant les plans, coupes, élévations, détails des façades extérieures et intérieures, détails décoratifs et autres en général, constituent l'original de l'œuvre de l'Architecte, et que l'édifice construit n'en est que la reproduction:

"Considérant que l'œuvre d'Architecture, comme celle de peinture et de sculpture, a droit à la protection de la loi, quelque soit l'auteur, quel que soit son mérite, lorsqu'elle présente des caractères d'originalité, qui lui constituent une individualité:

Renouvelle le vœu que, dans toutes les législations et dans toutes les conventions internationales, les Architectes jouissent, pour leurs œuvres, de tous les droits de propriété artistique reconnus aux peintres, aux sculpteurs, et aux autres artistes: Regrette que l'acte de Paris de 1896, n'ait pu, en raison de la législation de deux des pays (l'Allemagne et la Grande Bretagne) adhérents à la Convention de Berne, accorder aux architectes une protection complète et uniforme, dans toute l'étendu de l'Union: Et souhaite que cette protection soit complètement réalisée dans la prochaine révision de la Convention de Berne."

To this resolution was added another, moved by M. Maukels, of Brussels, to the effect that the delegates were recommended to use every effort, in their respective countries, to bring this principle into practical operation, and more especially to press it on the Government authorities of each country.

This well-filled business day was terminated by a soirée at the new railway hotel of the Gare d'Orléans, to which ladies were invited, and which ended in a dance.

Tuesday, July 31, was reserved for an excursion to Chantilly, under the direction of M. Daumet, the architect tor the new buildings and the restoration.

On Wednesday, August 1, the morning and afternoon meetings were devoted to the question of architectural education, on which subject papers were read by M. Pillet, of Paris; Professor Otzen, of Berlin (who has sent us an English translation of his paper); and by Mr. Frank Fuller, of Chicago; and communications were read from MM. Chaine and Benouville, of Paris; M. A. Gosset, of Rheims;

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and M. G. Sterian, of Bucharest. After some discussion, a resolution, moved by M. Lucas, was carried, to the effect that "the Congress is of opinion that in every country the higher study of architecture ("Hautes Etudes d'Architecture") should receive the greatest possible development." The expression "Hautes Etudes" is rather vague, but we are reminded that the late M. César Daly read a paper, or rather delivered a lecture, at the Congress of 1889, to the same effect, and making use of the same expression. It is easy to see generally what is intended, but the resolution does not present anything very tangible to go upon in trying to influence the Education Department of a Government.

Following this meeting was a visit to the new Sorbonne, under the guidance of its architect, M. Nénot.

At the morning meeting on Thursday, August 2, a communication was read from M. Bohnstedt, of Berlin, on the subject of preservation of the monuments of past times, and followed by some suggestions on the same subject from Baron de Geymüller, of Baden. After an eloquent speech from Dr. Cuypers, and some contributions to the discussion of the subject by other members present, the Congress formally ratified the views previously expressed on this subject at the Congress of Paris in 1889 and of Brussels in 1897, especially in regard to the desirability of having a complete inventory of existing remains and of securing a uniform legislation in regard to their protection. Subsequently the Congress listened to a learned paper by M. Bissuel, President of the Société Académique d'Architecture of Lyons, on the subject of "Le Titre d'Architecte," followed by another on the same subject by M. Couran; after which a resolution was carried to the following effect:—

"That all Governments should take measures to protect and render respected the title of architect, in reserving it in the future for those who could present a *brevet* of capacity, and interdicting its use by others."

Mr. W. J. Locke (Secretary of the Institute of British Architects) communicated an interesting *resumé* of the work of the Architectural Congress held in London in June under the auspices of the Institute; after which the subject of "Habitations à bon marché" was successively treated by MM. Lucas (Paris), Lecœur (Rouen), Locke (London), Maukels (Brussels), Morsier (Geneva) and others, the subject being considered both from the point of view of construction and hygiene, and in regard also to the advisability of large blocks of tenements or of smaller separate dwellings. A subsequent visit to the "Palais des Illusions" in the centre of the great Exhibition proved very attractive, and M. Hénard, the architect, received the congratulations of the members on his portion of the Paris Exhibition work.

On Friday, August 3, a paper was read by M. Pillet, in the name of Mr. Jenney, of Chicago, and Mr. Totten, of New York, on the subject of "L'Ossature Métallique des Constructions à Etages," and on the varied architectural treatment of this class of structures in Chicago and New York; to which some observations were added by Mr. H. L. Florence and Professor Baldwin Brown. A paper was also read on "Les Fondations en Sol Comprimé," by M. Dulac.

In the afternoon, at the usual distribution of "Récompenses" of the Société Centrale, M. Lucien Etienne read a memoir on the life and work of M. Paul Sédille.

The closing meeting on Saturday morning, August 4, held in the Palais des Congrès, within the Exhibition enclosure, was preceded by a meeting for the consideration of International questions; and before separating the Congress had decided, on the application of the delegates from Spain, that the sixth International Congress should be held at Madrid, Seville, or Grenada, in the spring of 1903.

At the Hôtel Continental, on Saturday evening, a dinner was given by the Société Centrale to 200 members of and visitors to the Congress, when the principal toasts were successively proposed by the President, M. Normand, and by the delegates from Amsterdam, St. Petersburg, Cologne, New York, London, Madrid, &c.; the Congress being thus wound up in a manner alike harmonious and International.

Several minor architectural meetings have been held in Paris, either more or less connected with the Congress, or taking the opportunity to secure an extra attendance of the profession. Thus the "Association Provinciale des Architectes Français" held a meeting at Versailles from July 26 to 28, of the delegates from its allied societies, to whom were added some members of societies having their headquarters in Paris. Among the questions considered at this meeting were "L'Admission des Syndicats ouvriers aux adjudications publiques," the formation of provincial schools of architecture (an old subject of discussion), and one of the subjects put down for the International Congress—"The Title of Architect." The meeting also gave awards in a competition of architectural students, and visited the palace and park of Versailles.

On Sunday, July 29, the annual meeting of the "Caisse de Défense Mutuelle" took place, followed by a dinner at which the Minister of the Department of Commerce and Industry was present, the "Caisse" having special relations with that department of the Government.

On Wednesday, August 1, the "Société d'Assistance Confraternelle" held its annual meeting, preceded by a déjeuner.

The usual annual meetings of the Société Centrale were, as already indicated, so closely connected with the proceedings of the International Congress as to form practically part of the same programme.

Illustrations.

LIVERPOOL DOCK OFFICES COMPETITION:

SECOND PREMIATED DESIGN.

WE give this week the perspective view, detail elevation, and two plans, of the design by Messrs. Woolfall and Eccles, which gained the second premium in the recent competition for new offices for the Mersey Docks and Harbour Board.

The disposition of the principal rooms and departments is sufficiently shown on the plan. The following quotations from the architects' report sent in with the drawings serve to further explain the intention of the design:—

"All people having business transactions with the various departments on all floors enter into a large oval hall, which has its approaches both from James-street and Brunswick-street.

The oval hall, above referred to, we propose to make one of the architectural features of the interior design, using in its construction stone and faience, with marble columns to support the gallery corridor on the two upper floors. In the centre, the hall is widened out in an elliptical form, in which, on one side, are very wide and handsome double staircases; on the opposite side, five passenger elevators, arranged with different speeds, to communicate with all floors. This widening allows of additional crush space where the public traffic will be greatest.

Our aim in thus planning this entrance is, first, to concentrate the public having business with the various departments; to bring all the entrances to these various departments in close communication with the staircases and lifts, and also to make it unnecessary for the public to traverse long corridors in order to arrive at their various departments.

It will be seen that direct access is given to the rates and dues, harbour master, chief traffic manager, and chief warehouse manager on the ground-floor; on the first and upper floors to all departments; the only exception being the treasurer's department on the ground floor, which is approached from a corridor leading off the centre of this hall.

We have also arranged in connexion with this hall a public telephone call office and postal department, which, we feel sure, would be a great convenience to many having business to transact and wishing to communicate with their offices.

An entrance to the building is also arranged in the centre of the south front under the tower; to distinguish it from the public entrance we call it the 'Official Entrance,' and suggest that it be for the use of the heads of the various departments, female clerks, deputations, and persons having business with the Board. . . . .

The materials proposed to be used in the construction are, viz.:—For the outside elevations fronting the streets, stone from Cefn, Talacre, Bridgend, or other hard-wearing stone; the inside elevations, Aston Hall bricks; the roofs slated; the floors throughout of fireproof construction, covered with wood blocks; the public corridors and landings, mosaic and tiles; the staircases, stone. Joiners' work to ground and first floors, hardwood; other floors, pine. The construction throughout will be steel stanchions and girders to carry all floors, safes, &c., and cased with fire-clay slabs or other uninflammable material. The roof will be of steel filled in with breeze concrete, with slating bedded and nailed to same. The strong rooms will be of two thicknesses of fire bricks with air spaces between, ventilated and lined with steel. The windows in lower floors to be double glazed to minimise the noise of the traffic. The glass screens in the offices that go to the ceilings between the different departments will be light bronze uprights, filled in with metal panels as high as the desks; above that height, double glazing. Electric lighting and fire mains will be provided throughout the building. The various heads of departments will have telephone communication with their assistants. The various elevators will be worked by electric power of the Otis or other well-known kind; space for the machinery is provided on top of building.

The board-room, committee-rooms, and dining-rooms will be finished with marble columns and pilasters having hardwood panelling between, and to be of handsome design; the upper part of walls covered with frescoes. The principal staircases and corridors will be of stone and faience. The sanitary fittings will be of the best and latest type, and the water-closet blocks tiled throughout.

We propose that the heating and ventilation be of the Baird-Thompson system, which, reduced to its primary parts, comprises inlets for fresh air at different points filtered and moistened in summer, and warmed in the winter by passing over steam pipes, and thence conducted to the different outlets. The warming system will be by steam, and the basement will be utilised for the control cocks to the various departments, and under the supervision of the engineer, without having to go into the different rooms. The fresh air admission valves will also be worked from the basement floor. Fireplaces are provided to all private rooms and shown on plans.

We find it would be next to impossible to have the windows to open, as the noise of the traffic in the street is so great, and further, the clerks being of different habits, some liking open windows, others not, we intend therefore to heat and ventilate the whole building by artificial means."

The architects' estimate of the cost is 305,661*l.*

The plan has many admirable points, and the arrangement of the oval hall and staircase seems to us especially good, both in a practical and architectural sense.

PLAN AND VIEW OF THE FORTIFICATIONS OF FAMAGUSTA, CYPRUS.

WE publish in this issue a plan of the Venetian town of Famagusta in Cyprus, made by Mr. G. Jeffery, who also made the plan of Nicosia published in our issue of July 21.

We give also a view of a part of the fortifications, as now existing, from a water-colour drawing made on the spot by Mr. Alexander Graham. This sketch shows the citadel and the inside of the curtain wall; Famagusta Bay lies beyond. The nearest tower, with a panel bearing the Lion of St. Mark, was the residence of the Venetian governor. Tradition has it that it was occupied for some time late in the sixteenth century by one "Cristoforo Moro the Venetian," whose name may have suggested "the Moor of Venice" to Shakespeare.

The sketch was made within the city from the parapet of the wall of the fosse. It looks in a westerly direction across the bay.

Our readers will remember that in our issue of July 21, in an article under the heading "Venetian Remains in Cyprus," we drew attention to the fact that the British Government were said to be contemplating the destruction of this remarkable example of an ancient fortress. The Institute of Architects have also been taking up the matter, and it is understood now that there is at all events some chance that the fortifications will be preserved.

HEALTH CONGRESS AT ABERDEEN.

THE annual Congress of the Royal Institute of Public Health took place at Aberdeen from August 2 to August 7. There was a large attendance of delegates from sanitary and municipal authorities.

Architectural and Engineering Section.

In the Architecture and Engineering Section the President, Mr. John Honeyman, R.S.A., architect, Glasgow, in his opening address said that they were only to deal with architecture and engineering so far as they affected health, and this subject was so large that it was ample for the time at their disposal. He then spoke of the strides which the science of building construction had made. With regard to engineering, the chief works which were directly connected with health were those connected with the water supplies and the disposal of sewage and refuse of cities. Dealing with the construction of dwelling-houses he said that a point which was very much overlooked was the necessity of

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proper ventilation. The importance of this subject was becoming more and more apparent. He had no doubt that this subject would receive increased attention in the future. The dwelling-houses now being built were in many respects perfect so far as being water-tight, beautiful, &c., were concerned, but as compared with the ancient structures of our forefathers they were deficient in one important thing, viz., airiness. A crofter's house which he used to visit was one of the most perfectly ventilated houses he had seen, this being due to the fact that the walls of the house were built dry and the air was diffused into the house in well-regulated quantities. The only other house which he could remember as having been so well ventilated was that of Lord Kelvin. In this case the ventilation was devised by Professor James Thomson, Lord Kelvin's brother. The principle on which the ventilation was carried out was that air should be admitted in abundance, so as amply to supply all the rooms and in such a way as to cause no discomfort. The method of applying this was that air was admitted into the central part of the house and conveyed into the various rooms by means of openings at the top of the doors. The openings were fitted with shutters, which served to direct the air towards the ceiling. The idea of this was that as the air went on its course it lost its velocity and gained in heat. A large number of the houses built at the present day were built by speculative builders, and they were only constructed so that they should look well and hold together until they were sold. Mr. Honeyman then spoke of the importance of the question of dwelling houses for the poor in large cities. The reason for the large death rate amongst the poor in certain cities was incomprehensible, unless one understood the nature of the dwelling-houses in which the poor lived. There was a lack of cheap houses for the poor to live in. The President concluded his address by referring to the buildings in Aberdeen. He thought that when they looked at some of the stately buildings in Aberdeen, they would congratulate the citizens of the Granite City that they had still amongst them worthy successors of the Gibbs, the Simpsons, and of the Smiths of bygone days.

Architecture and Hygiene.

Mr. James Souttar, F.R.I.B.A., architect, Aberdeen, then read a paper on "Architecture and Hygiene." In the course of his paper Mr. Souttar indicated some of the ways in which architecture affected the health of our cities. He dealt with his subject under two heads—architecture applied to the hygiene of the house, and architecture applied to the hygiene of the city. Dealing with the first head, he said that frequently in the erection of a house there was no choice of soil, but if there were architectural skill it might be possible to build a healthy house in the mud of the Adriatic, &c., while without architectural skill it might be possible to build an unhealthy house on a site that had absolutely everything in its favour. Where a choice of site could be got it was, as far as possible, desirable that the site should be of such a nature as to allow sunshine at one time or other during the day to enter the rooms of the house. The subsoil was also a very important consideration, and in nothing more than in dealing with this matter was the skill of the architect more required. The lecturer then dealt with the various details necessary to be taken into account in the construction of a house. Passing on to architecture applied to the hygiene of the city, Mr. Souttar said that a general scheme or plan for the beautifying and the laying out of cities in a manner as conducive to the health of the inhabitants as possible should be in the hands of every council. In such a plan long streets should be broken up by squares, &c., railways should be so constructed as not to require the yielding up of beautiful valleys, and the streets should be laid out in a tasteful and at the same time useful manner.

At the conclusion of the paper, discussion was taken part in by Mr. J. Forbes Robertson, London; Dr. Ogston, New Zealand; Mr. G. W. Lacey, Oswestry; Mr. H. C. Parkinson, Armagh; and the President.

Architecture of the Twentieth Century.

Mr. Banister F. Fletcher, A.R.I.B.A., London, read a paper on "The Architecture of the Twentieth Century." Public health, he said, would be the watchword of the new century, and architecture was public health in its best and broadest sense. Architecture had to deal with the healthy arrangement of buildings, while there was no doubt that living amongst beautiful buildings promoted a healthy condition of mind. How could they expect children brought up in the slums of London to develop into good citizens? Something was being done in the extermination of the slums, but as yet only a beginning had been made. The houses should be constructed so that plentiful sunshine should find its way as far as possible into all quarters of the cities. The appointment of a Minister of Public Health was, he thought, an absolute necessity. Speaking of the architecture of the future, he said the spaces provided by architects at dwelling-houses for the reception of refuse would probably be abolished. In public buildings nothing that could be called mechanical ventilation would be adopted on account of the great expense. In theatres, &c., great improvements would be effected in the provision of pure air. People, on account of the rapid means of travelling, would probably live to a great extent in the country, while factories would be constructed in the country with cottages for the workers.

On the 3rd inst. Mr. R. Morham, City Architect, Edinburgh, read a paper entitled "Suggestions on Fever Hospital Construction," exhibiting a block plan of the hospital now in course of erection for the city of Edinburgh. Town Councillor Cooper, Aberdeen, read a paper on "An Ideal Workman's Cottage." A discussion took place as to the difficulties of providing cheap dwellings for workmen. A paper on the design and testing of house drainage, considered in relation to each other, was given by Mr. Gilbert Thomson, C.E., Glasgow, and another on the dangers to public health from railway carriages and stations by Mr. E. Durant Cecil, C.E., London, on which subject the Section recommended the Congress to communicate with the various railway companies.

The Housing Question.

Mr. H. Mansfield Robinson, LL.D., Vestry Clerk of the Parish of St. Leonard, Shoreditch, London, read a paper on "Legal Stumbling-Blocks in the Housing Question." He said the housing problem was probably the most pressing social problem of the day, for overcrowding and improper conditions of living amongst the bulk of British workers was as certainly interfering with their physique and power of resisting disease as it was degrading their morals and power of resisting temptation to crime. In their efforts to combat this growing evil of overcrowding, Local Authorities were bound to move within the limits specified by statute law, since it was an axiom that a municipal authority could do nothing that was not sanctioned by express legal enactment. It was of cardinal importance that the law as to the housing of the workers should be free from doubt, and clear, and calculated rather to encourage than to hamper the laudable object endorsed by every Parliamentarian of providing better accommodation for the workers of this country than the jerry-builder and the slum property-monger had. But the experience of the Housing Acts proved the opposite to be the case; for, as an example of law drafting, the Housing Act of 1890 would be hard to beat. That it was outrageously expensive in its operation might be gathered from the fact that it cost both the London County Council and the Shoreditch Vestry over 20,000*l.* an acre to acquire the most abominably insanitary and squalid slums in London, whilst the shopkeepers got full compensation for the goodwill of their businesses from the municipal authority, and then by bidding a shade higher than other tenderers were able to obtain tenancies of shops erected on the very site of those pulled down, and so get back all the benefit of the goodwill they had sold to the Local Authority. The system of working under the Act was financially unsound. The mischief began in the provision that re-housing should be carried out without imposing a charge on the ratepayer. That by itself was reasonable enough, but when combined with the system that had to be adopted by municipal bodies of repaying borrowed capital by yearly instalments, together with interest spread over 54 years, it necessitated the fixing of rents at a height sufficient to repay such capital instalments as well as interest. This masterpiece of municipal jugglery thus robbed Peter—the toiling tenant—in order to pay Paul—the ratepayer. The system was financially unsound, being the payment of a capital charge out of revenue. It was also of doubtful legality. In an exactly similar set of circumstances—the provision of small agricultural holdings under the Small Holdings Act, 1892—the law officers of the Crown had given their opinion that the rent charged by the County Council should not be such as to cover annual instalments of principal borrowed, but it was sufficient for rents to cover the interest on all expenditure, as the County Council would have the property itself as owner as a set-off against the purchase money paid out of the rates. It also defrauded the tenant, who was paying an improper charge as rent to the ultimate enrichment of the ratepayer—whose property he was gradually freeing from debt. The argument of the tenant freely entering into a voluntary contract was inapplicable since the tenants displaced were bound to be rehoused by the council at a fair rent, and the awful over-crowding and house famine in the east-end offered no chance of tenants choosing rooms elsewhere. So far as London was concerned, the conclusion of the matter was that, if the London ratepayer wanted to own freehold artisans' dwellings, he should pay for them by instalments out of the rates, and a better investment he could not find in London. If he did not want to invest his money in them, he should not seek to become the owner of them at the expense of the working-class tenant, whom he thus swindled out of the scanty earnings of his toil. He should rather enable the tenant to become the legal owner of what he paid for by his rent, either under the Small Dwellings Acquisition Act, 1899, or by some simple scheme, such as that adopted by building societies for the purchase of houses by instalments. At present, London's Council was one of the severest rack-renting landlords in London. Dr. Mansfield Robinson moved: "That this Congress urges the President of the Local Government Board to introduce legislation forthwith to enable Local Authorities executing schemes under Part III. of the Housing Act, 1890, to borrow the necessary money for reconstructing artisan dwellings for all the persons displaced by such schemes, seeing that the charge of raising such capital moneys out of current rates is prohibitive and discourages Local Authorities from dealing with insanitary areas." He also moved: "That the Local Government Board be requested to obtain the opinion of the law officers of the Crown whether it is legal for Municipal Authorities erecting artisans' dwellings under the Housing of the Working Classes Act, 1890, to charge upon the rates the sums necessary for repaying by instalments the capital cost of erecting the dwellings.

Dr. Beveridge, Aberdeen, thought Dr. Robinson had been too critical both of the Act and of the Local Authorities. The proposal to throw the whole cost of erection on the rates would block all housing schemes. The terms of compensation under the Act seemed to be as low as could reasonably be expected. The experience of Aberdeen under the Act was favourable. Two schemes had been carried out under the first part of the Act, and no hitch had occurred from beginning to end. The Council had also erected artisans' dwellings and a Corporation lodging-house under the third part of the Act. The time specified in the Act for repaying capital was thirty years, but by the local Act the Town Council had obtained an extension of that time.

Mr. Hoddart, chairman of the Health Committee, Salford; Alderman Coe, Halifax; and others continued the discussion.

Mr. W. Malcolm Ormiston, architect, Edinburgh, read a paper on the housing of the working classes. Speaking of the schemes promoted for the housing of the working classes, Mr. Ormiston said he often heard it stated that the majority of the occupiers of small houses would not take advantage of such privileges, but would prefer to remain in the crowded areas, and as a class they did not wish to be disturbed and removed out of their dirt and filth. This brought them to the fact that the new houses they were providing were not intended for such a class of tenants. In his opinion for this, the lowest class, a specially strong and cheap house should be erected, simply housing them from the elements, having no timber furnishings that could be converted into firewood or harbour vermin, no plaster

Continued on page 134.

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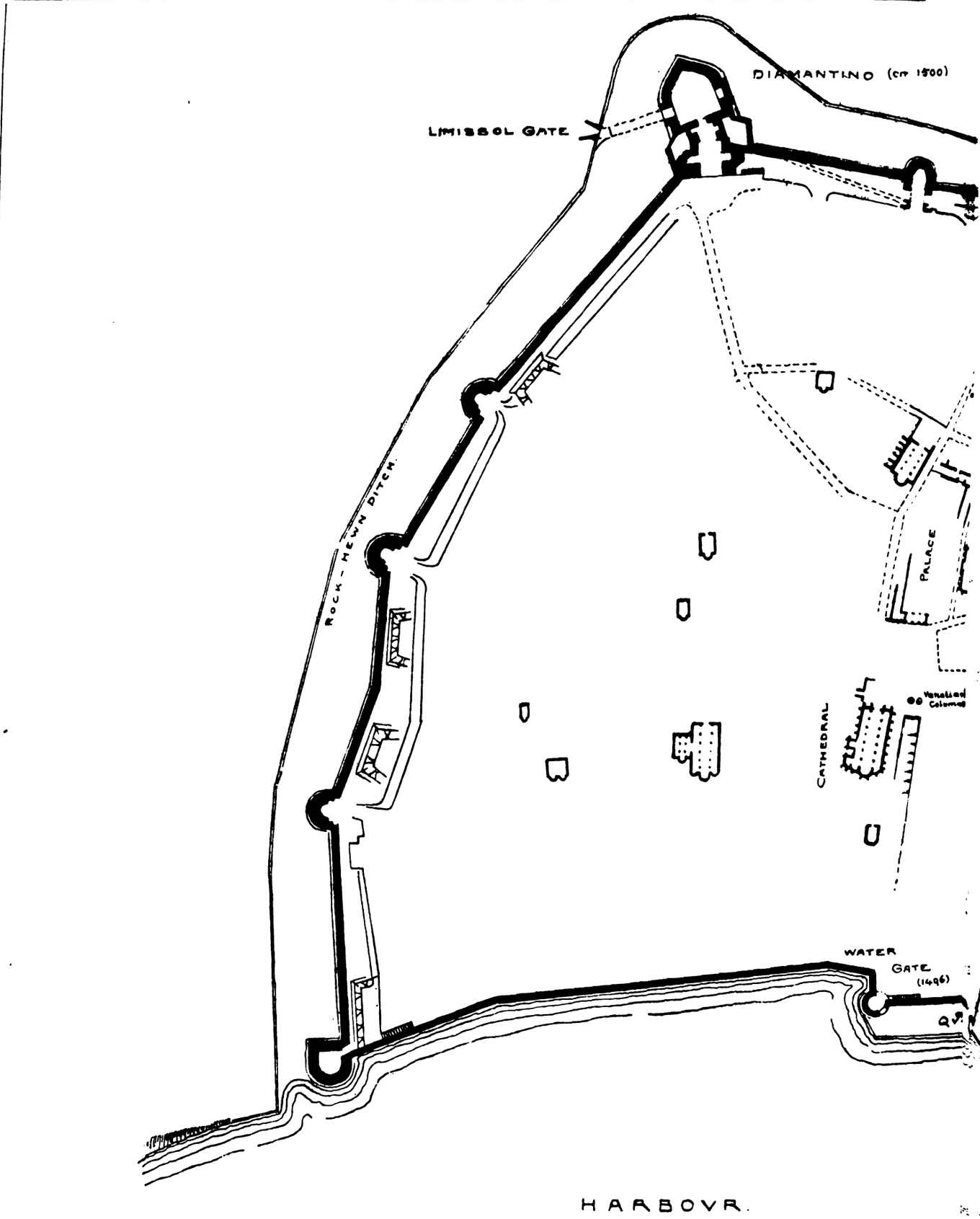

Plan of the Venetian Fortifications a

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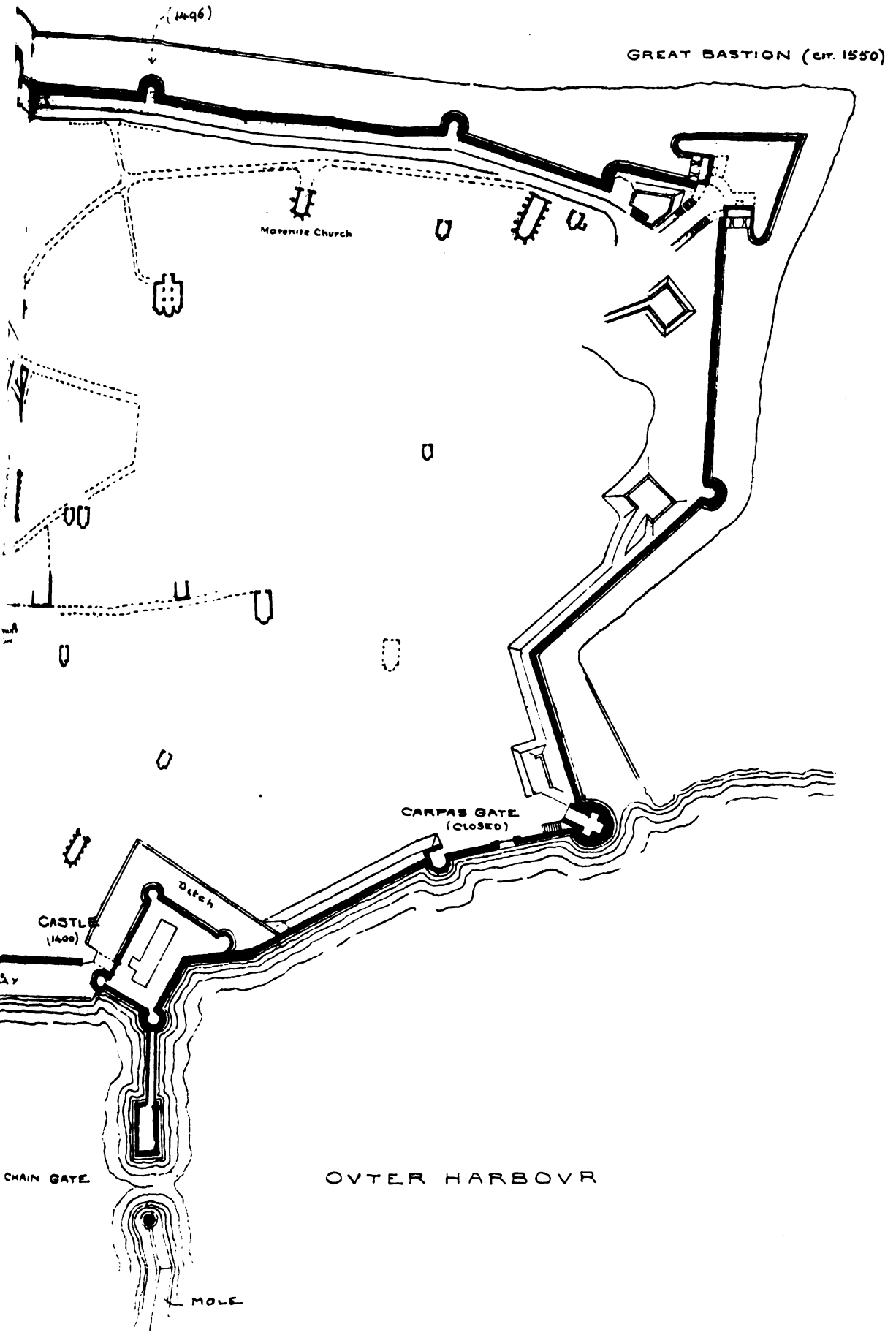

AMAGVSTA.

500 1000 Feet

Remains at Famagusta, Cyprus. By Mr. G. Jeffery.

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that could be broken, with iron-hinged windows and small panes, a good supply of water, water-closets and cleansing arrangements of simple construction, and with a fixed means of direct ventilation, so that fresh air would be freely circulated throughout their dwellings in spite of them, for the majority of this fallen race had sunk beyond recovery, and in this life fresh air was the greatest blessing that could be bestowed upon them.

Mr. Peter Fyfe, Chief Sanitary Inspector of Glasgow, presided over the Conference of Sanitary Inspectors, and delivered an address on "Sanitary Inspectors and the Housing of the Poor." Those who dwelt in towns, he said, were confronted with two great social facts—first, that very many of the people under their charge were ignorant, and dying because of their ignorance; and, secondly, that their poverty was permitted to assist in their destruction. In the city which he served six female inspectors were appointed and sent down into the wretchedness of the thirty thousand whose residences were branded for night inspection for fear of typhus and plague. Poverty was seen in numerous cases to be the cause of black walls and soot-laden cellars, and the inspectors were authorised to pass orders to poor persons securing them grates, as much whitening and colouring powder as were needful, and the loan of a brush, to cover up the dinginess of their apartments. It was difficult now to find in Glasgow a house that could be certified as being a danger to the public health. In all cases the sanitary inspectors of the country should be empowered by Parliament to make an official representation in respect of the unhealthiness of the hovels they were so well acquainted with. Every city and town in any extensive part of which death was reaping yearly thirty per thousand of the population should be compelled by law to take action in that particular. No urban local authority ought to lose money by acquiring ground and building for the labouring classes. A modern and comfortable house, containing 2,000 ft. of free space, with the use of sufficient land for a back green, could be rented to a labourer for 3s. per week.

Mr. Cowderoy, of Kidderminster, moved that the Conference should petition the Government to appoint a Public Health Department, with a Minister of Public Health, having a seat in the Cabinet. The motion was carried unanimously.

In the section devoted to Municipal and Parliamentary Hygiene,

Councillor Dick (Glasgow) moved, and Mr. Boyd (Glasgow) seconded, the adoption of the following motion, which was agreed to :—

"In view of the difficulties experienced in the acquisition of slum areas for the purpose of reconstruction and providing houses for the humbler classes, this Congress resolves that it is expedient that powers be obtained that on the representation of the medical officer of health, the sanitary inspector, the local authority may approach the Secretary of State, who shall remit to an arbiter who shall be named by the sheriff to hold a local inquiry and report to the Secretary of State, and on his approval the powers sought shall be granted."

Professor Hamilton (Aberdeen), President of the Section of Bacteriology and Comparative Pathology, spoke, before that section, on recent developments in bacteriology. This country, he said, had not yet awakened to the tremendous danger of disseminating contagion through dust impurities. It was impossible to say to what extent the spread of influenza, diphtheria, tuberculosis, &c., was to be accounted for by the use of insanitary vehicles of transport. He confessed to a feeling of horror on entering a railway carriage, or school, or place of public resort. He had made observations on dust taken from the floors of two first-class smoking compartments, and the samples had proved to be contaminated by the bacillus of tubercle. Every one with any sense of cleanliness and decency felt that the present state of filth permitted to exist in vehicles of all kinds used in travelling was nothing short of a scandal. He maintained that the flooring of railway carriages should be removable, the cushions detachable, and the carriages so constructed that they could be periodically cleansed and disinfected.

In the Chemical Section two papers on the treatment of sewage were read. In the Municipal and Parliamentary Hygiene Section (presided over by Dr. R. Farquharson, M.P.), a resolution in favour of the national registration of plumbers was adopted, and it was agreed to memorialise the First Lord of the Treasury on the subject. There was also read a paper by Councillor Dunlop, Glasgow, entitled "A Plea for More Air Space In and Around Town Dwellings," and the following resolution was adopted :—"That this Conference approves that the standard of air space for dwellers in cities and large towns be raised to 500 cubic ft. for every adult and to 250 cubic ft. for each child under ten years of age."

Sewage Treatment.

On the 6th inst. an address was delivered to all the members of the Congress by Professor Percy F. Frankland (Birmingham) on recent developments in the purification of sewage.

Professor Frankland described the methods of purification employed at Birmingham, and gave a detailed account of his experiments in connexion with the disposal of Manchester sewage. These latter, he said, had altogether exceeded their expectations as to the possibility of purifying manufacturers' sewage, particularly by the use of a system of multiple contact. He deplored the apathy of Corporations who built libraries and undertook public works, but refused to consider the advisability of clearing away pollution because science could not make the sewage profitable. To expect science to show how money could at all times of the year be made out of town sewage was, in our climate, as unreasonable as to ask her to devise a means of lighting a town with electricity by utilising the waste heat which escaped from the bodies of the inhabitants. All the great developments in the purification of sewage, chemical precipitation, irrigation, intermittent filtration, and the bacterial treatment, including septic solution, were essentially British, although we were deeply indebted to America for the extraordinary diligence with which some of its men of science had conducted a truly monumental series of experiments demonstrating the great possibilities of intermittent filtration. Whilst, therefore, we might be justly proud of the great fertility of resource which had been exhibited in this country in dealing with the sewage problem, it was a matter for humiliation that there was in the whole British Empire no organisation whose duty it was to carry out extended experimental inquiries on sanitary subjects on the scale, and with the thoroughness, adopted by the Massachusetts Board of Health. All scientific investigation in this country was carried on under extraordinary difficulties, and with little or no encouragement of any kind; frequently at the private expense, and even on the private premises of the investigators, in hours or even odd moments, snatched from a life of arduous duties of a routine character by means of which the daily bread was earned. They all knew how much was gained in efficiency through combination, which was the watchword of the hour in the commercial world, and there could be no doubt that a similar increase in efficiency and in unexampled advance would result from combination in scientific inquiry. We were beginning to realise in a number of directions by bitter experience that our methods were too casual, and that we were losing ground through the tenacity with which we adhered to insular traditions and prejudices, which placed us at a disadvantage in the competition with the concentrated and organised efforts of neighbours who displayed greater elasticity and power of adaptation to the kaledioscope of circumstances. In no department of life was this more true than with regard to our position in the world of science, for, high as it was, undoubtedly, the quality of some of the scientific discoveries which were made amongst us in point of quantity of output we were lamentably deficient through the absence of organisation, the lack of adequate encouragement, and of the provision of opportunity. He considered that the Government ought to give to science in this country the position of influence and authority which it already occupied in almost every other civilised land, and that the objects of that section of science which that Congress represented should be furthered by the creation of a great Imperial Board of Health, under the auspices of which scientific inquiries of the highest value should be systematically prosecuted in all directions.

Dr. Farquharson, in moving a vote of thanks to Professor Frankland, supported the idea of the establishment of a Government Board of Health.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

AT the meeting of the Building Act Committee of the London County Council, held on the 30th ult., being the day before the Council adjourned for the Summer recess, the proceedings were governed by the clause in the order of reference which empowers the Committee at certain seasons to act on behalf of the Council in relation to matters included in the order of reference. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated :—

Lines of Frontage.

Kensington, South.—A building on the forecourt of Messrs. Barker's furniture depository on the south side of Pembroke-road, Kensington (Mr. P. E. Pilditch for Messrs. Barker & Co., Limited).—Consent.

Lewisham.—A porch to St. Andrew's Hall, Sandhurst-road, Hither Green (Mr. P. A. Robson for the Rev. E. C. B. Philpott).—Consent.

Chelsea.—One-story shop additions to No. 490, King's-road, Chelsea, to abut upon Langton-street (Messrs. J. T. Wimperis and Arber for Mr. Hoye).—Refused.

Hammersmith.—Buildings on a site on the south side of Askew-road, Shepherd's-bush, eastward of Ashchurch-road (Mr. S. Newcombe for Messrs. E. Collins & Co.).—Refused.

Lewisham.—Five houses with one-story shops in front, on the site of Nos. 176 to 182 (even numbers) inclusive, High-street, Lewisham, abutting upon Whitburn-road (Messrs. Sills and Leeds for Messrs. W. G. Larke & Sons).—Refused.

Projections.

City of London.—An enlarged oriel window to No. 52, Cornhill, City, fronting on St. Peter's-alley (Mr. T. B. Whinney for the London, City, and Midland Bank).—Consent.

Paddington, South.—An oriel window at No. 18, Connaught-square, Paddington (Mr. F. E. Jones for Mrs. M. L. B. Marshall).—Consent.

St. George, Hanover-square.—Iron and glass shelter to the Bath Club, No. 16, Berkeley-street, Piccadilly (Mr. J. Johnson for the directors of the Bath Club Company).—Refused.

Strand.—An iron and glass illuminated sign over the entrance to the Adelphi Hotel, Nos. 1 to 4, John-street, Adelphi (Messrs. Vaughan & Brown, Limited, for Mr. F. Evans).—Refused.

Lines of Frontage and Projections.

Chelsea.—A porch in place of an existing bay-window on the ground floor at No. 15, Tedworth-square, Chelsea, abutting upon Ralston-street (Mr. F. T. Verity for Mrs. De Bathe).—Consent.

Hammersmith.—Buildings, with oriel windows, upon a site on the west side of Queen-street and south side of Sussex-place, Hammersmith (Mr. A. Blackford for Mr. W. Moss).—Consent.

St. George, Hanover-square.—An addition to the existing porch in front of No. 27, St. George's-road, South Belgravia (Mr. A. E. Taylor for Mr. P. R. Waller).—Consent.

St. George, Hanover-square.—An open porch in front of No. 14, Grosvenor-square, St. George, Hanover-square (Mr. J. M. Anderson for Mr. G. D. Faber, M.P.).—Consent.

Westminster.—An iron and glass shelter to the main entrance of the extension of the Army and Navy Co-operative Society's premises, No. 107, Victoria-street, Westminster, and the erection of a roof over the area on either side of such entrance (Mr. R. D. Falkiner for the Army and Navy Co-operative Society, Limited).—Consent.

Clapham.—Four houses with bay windows in Ravenslea-road, Battersea, and two houses with projecting porches and bay windows in Mayford-road, flanking upon Ravenslea-road (Mr. A. Boon).—Refused.

Marylebone, West.—An iron covered-way in front of the Hermitage, No. 12, Abbey-road, St. John's Wood (Messrs. J. Mitchell & Co. for Mr. R. B. Bentley).—Refused.

Width of Way.

Hackney, Central.—A one-story stable building at the rear of No. 1, Bohemia-place, Mare-street, Hackney, at less than the prescribed distance from the centre of a roadway next the North London Railway (Messrs. Newbon & Co. for Messrs. Burch, Whitehead, and Davidsons).—Refused.

Kensington, South.—A five-story addition at the flank of No. 36, The Grove, South Kensington, within the prescribed distance from the centre of Bolton-gardens-mews (Mr. F. E. Williams for Mr. E. Gordon).—Refused.

Width of Way and Projections.

Strand.—A stone balcony in front of a new theatre abutting upon Shaftesbury-avenue, St. James's, and two iron and concrete balconies, with escape ladders at the rear of the theatre, abutting upon Archer-street (Mr. L. Sharp for Mr. H. Lowenfeld).—Consent.

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Holborn.—Two blocks of buildings on the east side of Shaftesbury-avenue, abutting also upon Vine-street, with projecting oriel windows, and a portion of the buildings at less than the prescribed distance from the centre of Vine-street (Mr. R. J. Worley for the Shaftesbury-avenue Freehold Land Syndicate).—Consent.

Lines of Frontage and Width of Way.

Deptford.—Buildings on the south side of New Cross-road, Deptford, and west side of Laurie-grove (Mr. C. H. Court).—Consent.

Islington, South.—A block of dwellings on the eastern side of Thornhill-road, Barnsbury, between Offord-road and Barnsbury-park (Messrs. Davis & Emanuel for the East End Dwellings Company, Limited, and Mr. E. Harrison for Mr. D. Weinhausen)—Consent.

Wandsworth.—A two-story addition in front of Highfield, No. 2, St. Nicholas-road, Upper Tooting (Mr. E. J. Munt for the Rev. J. H. Potter).—Consent.

Width of Way and Space at Rear.

Kensington, South.—That the application of Mr. R. Cotton for Mr. J. Robinson, for an extension of the period within which the erection of an addition to stable premises on the eastern side of King-street, Kensington, was required to be commenced, be granted.—Agreed.

City of London.—Fourteen shops, with rooms over, on a portion of the yard on the west side of Ludgate-hill Railway Station, and of a kiosk at the north end of such yard, abutting upon New Bridge-street and Pilgrim-street, City (Mr. W. Wallace for the South-Eastern and Chatham Railway Company).—Refused.

Width of Way and Temporary Buildings.

Battersea.—A temporary wood and iron mission-room at the rear of Nos. 85 and 87, Bridge-road West, Battersea, at less than the prescribed distance from the centre of a narrow roadway leading out of Surrey-lane (Mr. W. Harbrow for Mr. B. W. G. Brown).—Consent.

Width of Way and Height of Building.

Bow and Bromley.—A building, to be used as a bakery, on the east side of Fawe-street, Morris-road, Bromley-by-Bow, to exceed in height the width of the street (Mr. Max Clarke for Spratt's Patent, Limited)—Refused.

Means of Escape from Top of High Buildings.

Westminster (detached).—Means of escape in case of fire proposed to be provided in pursuance of Section 63 of the Act on the upper stories of Park-mansions, abutting on Brompton-road, High-road, Knightsbridge, and Knightsbridge-green, for the persons dwelling or employed therein (Mr. G. D. Martin for Messrs. A. Kellett & Sons, Limited).—Refused.

Uniting of Buildings.

Hampstead.—An opening in the party-wall on the ground floor between Nos. 122 and 124, High-road, Kilburn, without the part used as a dwelling-house being separated from the part used for the purposes of trade and manufacture with fire-resisting materials (Mr. S. Barrett for Mr. I. Alexander).—Refused.

Formation of Streets.

Greenwich.—That an order be issued to Messrs. Farebrother, Ellis, & Co., sanctioning the formation or laying-out of a new street for carriage traffic to lead from Little Heath to Upper Woodland-terrace, Charlton (for Sir S. P. M. Maryon Wilson, Bart.). That the name Kinveachy-gardens be approved for the new street.—Agreed.

Wandsworth.—That an order be issued to Mr. W. Rivett-Carnac, refusing to sanction the formation or laying-out for carriage traffic of new streets to lead out of Gwendolen-avenue and Howard's-lane, Upper Richmond-road, Putney (for Mr. J. Temple Leader).—Agreed.

Cubical Extent.

Lambeth, North.—The conversion of the Lambeth Swimming Bath, Lower Marsh, Lambeth, into a store for wood mouldings and doors, such building exceeding in extent 250,000 but not 450,000 cubic feet (Messrs. J. A. J. Woodward & Sons for Messrs Joseph Sandell & Co., Limited).—Refused.

BOOKS RECEIVED.

ACETYLENE: A HANDBOOK FOR THE STUDENT AND MANUFACTURER.—By Vivian B. Lewes, F.I.C., &c. (Archibald Constable & Co.)

LIFE OF SIR JAMES N. DOUGLASS, F.R.S. By Thomas Williams. (Longmans, Green, & Co.)

FOOTPATHS: THEIR MAINTENANCE, CONSTRUCTION AND COST. By A. Taylor Allen, C.E. (The Sanitary Publishing Company.)

RESTORATION OF BISHOP'S CLEEVE CHURCH, GLOUCESTERSHIRE.—The Church of St. Michael and All Angels, Bishop's Cleeve, was reopened on the 31st ult. after restoration. The work was carried out by Messrs. Collins & Godfrey, of Tewkesbury and Cheltenham, under the superintendence of Messrs. Prothero & Phillott, of Cheltenham.

Correspondence.

To the Editor of THE BUILDER.

ROYAL ARCHITECTURAL MUSEUM.

SIR,—Owing to absence from town I have only now seen Mr. Musto's letter in your issue of July 28.

In the first place, Mr. Musto writes as if he only had to indicate which casts he would have copied for his art class at Leeds, and forthwith copies would be supplied. The Council of this museum has allowed copies to be taken under certain conditions of certain casts where the ornament is not deeply undercut, and in this way a great many copies have been supplied to various institutions at home and abroad, where they have been highly valued. I doubt if ever the Council will permit the casts to be cleaned up and "restored" as Mr. Musto says is so desirable. Half their interest and art value would at once be removed by such a mistaken process. I also believe that in future permission will be given less readily than heretofore for copies of casts and examples to be made, for the good reason that every time a duplicate is made some harm, more or less, is done to the original. As to the arrangement of the examples in the museum which Mr. Musto calls "a deplorable condition of muddle," I would remark that the collection remains exactly as it did when Sir Gilbert Scott and other founders of the collection, at great labour and infinite trouble, had the examples displayed as now seen on the walls. For years it has been the endeavour of the Council to rewire and rehang the specimens, when the walls, of course, would be recoloured. The cost, however, has alone prevented this. When Mr. Musto states that the museum is neglected and uncared for he is asserting that which is manifestly not true. Has he done anything to lend a hand or contribute anything to aid the funds?

The Architectural Association conferred with the Council some few years ago as to any chance of their being able to house the collection in connexion with their studio, but the capabilities of the Architectural Association were not equal to such a task.

We hope that the Royal Institute of British Architects will, by a closer union with the Royal Architectural Museum, be enabled to help forward its development. It will, however, be rather by individual effort, I presume, than by corporate action.

There are so many who, without giving a hand's turn, readily rush into print to find fault. If Mr. Musto and others like him will rise above the easy effort of fault-finding, their substantial assistance will be welcomed.

MAURICE B. ADAMS, Hon. Sec.

HESSETT CHURCH.

SIR,—In your interesting account of the visit of the members of the Architectural Association, during their excursion, to the Church of St. Ethelbert, at Hessett, near Bury-St-Edmund's, mention is made of a "lace chalice veil" (?) preserved in the sacristy of the church.

This veil is not a chalice veil at all, but a Sindon or Pyx veil, which was used to cover the Pyx, wherein, according to the ancient custom of the English Church, the sacrament was reserved, suspended before the high altar. This was the method of reservation prior to the introduction of a "tabernacle."

The Sindon is a square of drawn flaxwork, bordered with a silken fringe of red and green, now much faded, and gilded balls hang from the four corners. It is, I believe, the only perfect specimen to be seen, though I am told there is a fragment of one in the South Kensington Museum.

It was John *Hoo*, not John Hog, who, with his wife, built the Chantry Chapel at Hessett, and repaired "ye hile,' as recorded by the inscription carved below the parapet.

CYRIL E. POWER.

TENDERING AT FRINTON-ON-SEA.

SIR,—Surely there must be something rotten in the system of tendering, or else the bracing air of this rising place must exert a wonderfully different influence on expectant contractors.

The following extracts from your last week's "Tenders" column are worth re-recording, if not too ludicrous:—

	Pedrette & Co.	Dupont & Co.
Making and sewering Ashlyns-road	£1,223	£520
Making up Third-avenue	4,385	1,832
Slipway	2,954	955*
Approach-road	825	201†
Various sewering and making-up	9,773	4,319‡
	£18,260	£7,827

* Moran & Son. † Anderson. ‡ Burgoyne.

This shows *highest* £18,260
and *lowest* 7,827

Difference £10,433

This is close tendering with a vengeance!

M.INST.C.E.

*** The results are certainly extraordinary. We branded one of them, on publication, with a (!), but we observe that the discrepancy is even greater in another example.—ED.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

5. DYNAMOS. MOTORS. MOTOR-GENERATORS. BOOSTERS. DYNAMOTORS.

THE dynamo is the machine that converts the mechanical power of the engine into electrical power. It consists esentially of two parts—the armature which generates the electric currents, and the magnets which produce the necessary magnetic field. This is true, whether we are considering the small magneto-generators used for ringing electric bells, or the large dynamos for traction work, which often weigh more than a hundred tons. If the copper conductors which form the armature do not make a closed circuit, then although there is an electric pressure at the ends of the circuit, that is, at the brushes, yet no current flows, as the resistance of a broken circuit is infinite, and hence the electric power generated, which is the product of the volts and amperes, is zero. In this case the armature can be easily rotated, the only work done being that required to overcome the mechanical friction and the magnetic friction or hysteresis of the iron in the armature core. If, however, the external circuit be closed, then the electric pressure will generate a current, and it will need considerable power to rotate the armature. The larger the current in the armature the greater is the power required to turn it. In practice the electric power we can obtain from a given dynamo is limited, owing to the resistance of the armature and the sparking at the brushes. The former causes excessive heating of the armature coils, and consequent destruction of the insulation when the load is too heavy. The latter is very likely to damage the brushes and the commutator.

The dynamos most commonly used can be divided into three classes:—(1) Series; (2) Shunt; and (3) Compound. In a series dynamo (fig. 1) the field magnet windings are in series with the armature. If the armature of this dynamo be rotated and the switch closed, then the small remanent magnetism always left in iron field magnets will generate an electro motive force (E.M.F.), which will cause a current to flow round the circuit. This current will magnetise the field magnets still more, and the armature now rotating in a stronger field a higher E.M.F. will be generated, and hence the current will be increased. Both the pressure and the current go on increasing until the magnetic field is only strong enough to produce the E.M.F. required for the necessary magnetising current.

Suppose now we put an ammeter in the external circuit to measure the current, and a voltmeter across the terminals of the dynamo to measure the pressure and vary the resistance in the external circuit, the following phenomena are noted. When the resistance is great there is only a very small reading on both the voltmeter and the ammeter. When we diminish the resistance down to what is known as the critical resistance, then the volts and amperes begin to increase rapidly. As we diminish the resistance still farther the amperes go on increasing, but the volts begin to diminish at a very heavy load. If the armature will stand short circuiting without being burnt out, then we should obtain a very large current in the external circuit and practically no pressure. All the electrical power generated would be expended in heating the armature.

Let E be the E.M.F. generated in the armature, r the joint resistance of the armature and field magnet windings, and x the resistance of the external circuit. Then if C be the current generated we have by Ohm's law

$$E = C(r + x) = V + Cr$$

where V is the difference of pressure between the dynamo terminals. We see, then, that the E.M.F. generated can be divided into two parts, one of which (V) is the pressure required for the external circuit; the other (Cr) is the pressure required to drive the current C through the internal resistance of the dynamo. Cr is sometimes referred to as the "lost volts" in the armature.

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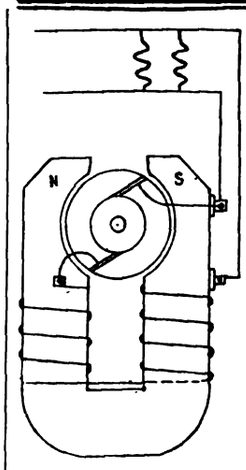

Fig. 1.

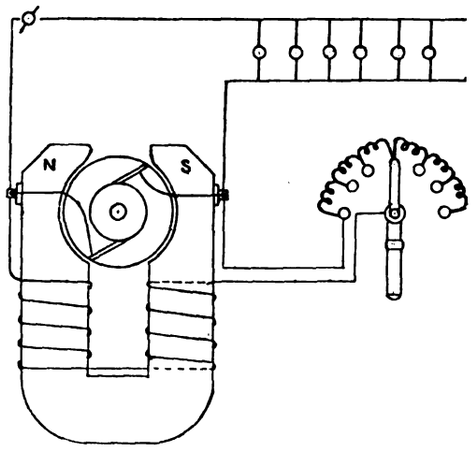

Fig. 2.

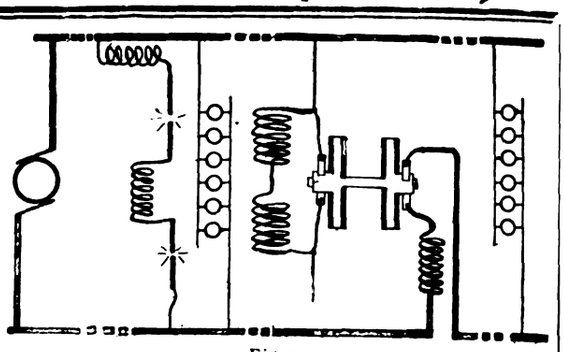

Fig. 3

The commercial efficiency of a dynamo is the ratio of the useful electrical work got from the machine to the total mechanical work given to it. In our notation,

$$\text{efficiency} = \frac{C^2 x}{C^2(r+x)+H}$$

$C^2 x$ being the watts in the external circuit is the useful electrical power. $C^2 r$ is the watts wasted in heating the armature, and H represents the watts required to overcome friction, the resistance of the air, hysteresis and expended in eddy currents. It is easy to see that the larger the external resistence x is, and, consequently the smaller the current, the greater is the efficiency.

Suppose that the readings on the voltmeter and ammeter were each 100, that the internal resistance of the dynamo was 0·1 ohm, and that H was equal to 500 watts. Then the "lost volts" in the dynamo would be $100 \times 0{\cdot}1$, *i.e.*, 10 volts, and hence the total E.M.F. generated would be 110 volts. The total electrical power generated would be 110×100 watts, *i.e.*, 11 kilowatts or 14·7 h.p. Also the external resistance (x) is by Ohm's law, the voltmeter reading divided by the ammeter reading, and hence it is one ohm. Substituting $C=100$, $x=1$, $r=0{\cdot}1$, and $H=500$ in the above formula we find that the commercial efficiency is 87 per cent.

The electrical connexions of a shunt dynamo are shown in fig. 2. The main difference between it and a series dynamo is that none of the external current is used to magnetise the field magnets. If we run it at constant speed, then since the armature and the field magnet windings forming a closed circuit, we get the maximum pressure at the terminals when the external circuit is open. If we close the external switch the current leaving the positive pole of the armature has now two paths to get back to the negative pole. Both the external current and the magnetising current pass through the armature. There will thus be more "lost volts" in the armature when the switch is closed, and the pressure at the terminals, and consequently also the magnetising current, will be slightly less. Hence the greater the load on a shunt dynamo the less the pressure at the terminals. To remedy this a resistance (see fig. 2) which can be varied by hand is introduced in the shunt winding. By diminishing this resistance as the load increases, and thus increasing the magnetising current, and consequently the E. M. F. generated, it is easy to keep the volts at the terminals practically constant at all loads.

In a compound dynamo we have a double set of windings on the field magnets. One is a shunt to the armature, and is quite distinct from the external circuit; the other is in series with it. By properly proportioning these windings, it can be arranged that the pressure at the terminals remains nearly constant at all loads.

Series dynamos are mainly used for lighting arc lamps in series. For charging accumulators and for electro-plating shunt dynamos are now almost exclusively used. The main use of compound wound dynamos is for traction work. For electric lighting purposes both compound-wound and shunt machines can be used. For central station work, however, shunt machines are more extensively used.

The theory of motors is very similar to the theory of dynamos. Just as an armature when rotated by a belt round a pulley in a stroug magnetic field generates electrical energy, so when electrical energy is applied to the armature a strong turning force is developed in it which enables it to supply mechanical energy to other machines. Every dynamo can thus act as a motor, and conversely nearly every motor, when suitably driven, can act like a dynamo. The turning force, or torque as it is called, developed in the armature of a motor when a current passes through it is one of the factors which measures the power of the motor. It is measured in foot-pounds. If the armature be not rotating it can be measured by means of a lever attached to the pulley and a spring balance. Suppose that the perpendicular pull on the spring balance is p lbs., and that the distance of the point from which it is attached to the centre of the shaft is q ft., then the starting torque will be $p\,q$ foot-pounds.

If P be the resultant force on the rim of the pulley as it rotates, and r the radius of the pulley which we suppose to make n revolutions per second, then the torque, *i.e.*, the measure of the power of P to rotate the pulley is Pr. The mechanical work done per second is the force on the pulley rim multiplied by the distance through which that force has been overcome in a second, *i.e.*, $P \times 2\pi r \times n = 2\pi n T$ where T is the torque.

Now consider a series motor (fig. 1) :—

Let E = the E.M.F. applied to its terminals.
e = the back E.M.F. generated by the armature as it revolves in the magnetic field.
R = the resistance of the armature and field magnet windings.
C = the current through the armature.

By Ohm's law $E - e = C R$..... (1)

Also the work done by the current C flowing against the back E M F e is Ce watts, and, remembering that one foot pound per second equals 1·356 watts, we get that

$$2\pi n T \times 1{\cdot}356 = C e$$
$$\therefore \quad n T = 0{\cdot}1174\ C e \text{ ..... (2)}$$

Equations (1) and (2) are well worth studying.

Suppose that we have a series motor whose internal resistance is 0·1 ohm and that it is taking 12 amperes at 100 volts and is making 600 revolutions per minute,

$$\text{Then by (1)} \quad e = 100 - 12 \times 0{\cdot}1 = 98{\cdot}8$$

Hence the work done in turning the armature is $12 \times 98{\cdot}8$, *i.e.*, 1,186 watts and

$$10\,T = 0{\cdot}1174 \times 1{,}186$$
$$\therefore\ T = 13{\cdot}9 \text{ foot pounds.}$$

The back E.M.F. "e" developed in the armature of the motor as it revolves is proportional to the strength of the magnetic field and the speed of the armature, hence $\frac{e}{n}$ is proportional to the strength of the field, and therefore depends only on the magnetising current. In a shunt motor (fig. 2) the magnetising current is constant, and so also to a first approximation is the speed, and hence the torque developed is proportional to the current.

When we switch on the current to a series motor there is a rush of current through the field magnet windings which strongly magnetises the field magnets. This current also passes through the armature, which being in a strongly magnetic field is forced to rotate. Now this rotation sets up a counter E.M.F. which chokes back the current, and the quicker this rotates the less would be the current, provided the magnetic field remained constant. The diminution of the current, however, weakens the field, and *à fortiori* weakens the torque on the armature. When the armature ceases to accelerate and rotates with constant velocity, then the electrical energy given to the armature ($C e$) is the exact equivalent of the mechanical work done.

It will thus be seen that series motors produce a powerful torque at starting but that their speed is variable. Shunt motors run at practically constant speed, but they need to be started on a loose pulley. The speed of a motor can be controlled by weakening or strengthening the magnetic field in which the armature revolves. It will rotate slowly in a strong magnetic field and very rapidly in a weak magnetic field. Hence with a shunt motor the more resistance we have in circuit with the magnetising coils the more rapidly will the armature rotate. In order to prevent the great rush of current that takes place on switching a motor directly on to the mains, starting resistances are always provided. Some of the resistance boxes provided with motors are very ingenious, resistances being gradually cut out of the circuit as the motor speeds up, and permitting the regulation of the speed by the insertion of resistance in series with the armature or with the shunt windings, or with both.

A motor-generator is practically a motor coupled up so as to drive a dynamo. The armatures of the motor and generator are on one shaft, so that they run at the same speed. They are used when it is required to change the pressure of supply. For example, for electrolytic work a very low pressure and a very large current are desirable. Hence, if we use one of these machines the motor may be taking 5 amperes at 200 volts and the dynamo giving 70 amperes at 10 volts. The efficiency of the conversion is thus 70 per cent., 1,000 watts being supplied and 700 being utilised. This would correspond to an efficiency of about 84 per cent. for both the motor and the dynamo. Motor-generators are often used for charging secondary cells. They are largely used for telegraphic and telephone work, being in many cases far more economical than primary batteries.

A booster is a motor-generator connected up in a particular way (fig. 3). Suppose we have a dynamo supplying mains for lighting purposes (see figure), then the farther we get away from the dynamo the less is the voltage between the mains, owing to the volts expended in driving current through their resistance. In order to keep up the pressure at the far end of the mains a booster can be used. One end of it is a shunt motor connected across the mains, and the other is a series dynamo in circuit with one of the mains. As the shunt motor is connected across the mains it will always be turning. If there is no load at the far end of the mains there will be no current through the series dynamo. When there is a load, current flows through the series coils and the magnetic field in which the armature rotates is strengthened, and hence volts are added to the line. By various regulating devices the voltage can be kept constant or even made to increase as the load is increased. Boosters are much used in connexion with electric traction work either singly or in conjunction with storage cells.

In a motor-generator we have two armatures and two magnetic fields. In a dynamotor we have only one magnetic field and one armature with two separate windings on it. These two

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windings are connected to commutators at opposite ends of the shaft. Hence we can drive either end as a motor and take current from the other. It is very analogous to an alternating current transformer. As both windings rotate in the same magnetic field, the ratio of the pressures at each end would be invariable if the armature windings had no resistance. In practice, however, the pressure got from it diminishes as the load increases, and we cannot compensate for this in any way by altering the magnetic field, as both windings are in the same field. A dynamotor runs very smoothly with practically no sparking at all loads, and there is no necessity to shift the position of the brushes as the load increases. It is cheaper than a motor-generator, and can be used for charging battering or electro-plating.

GENERAL BUILDING NEWS.

CHURCH, BLACKBURN.—The foundation stone of St. Gabriel's School Church, Blackburn, was laid recently. The building will cost about 1,500*l.* The architect is Mr. A. J. Casey, Blackburn. Mr. James Parker, Blackburn, is the contractor.

CONGREGATIONAL CHURCH, IPSWICH.—Alterations and additions are being made at the Tacket-street Congregational Church, Ipswich. The principal addition is the Langston Hall. At the rear of the church a church parlour will be erected of Kentish rag facings and Bath stone dressings. The architects are Messrs. Eade & Johns, and the builder is Mr. Fred. Bennett, of Ipswich.

MISSION CHURCH, LEEDS.—The foundation stone of a mission church at the foot of Cardigan-terrace, Leeds, was laid on the 1st inst. The building will be in brick, and will seat 500 persons. Mr. Percy Robinson is the architect. The contractors are as follows:—Mr. J. T. Wright, Leeds, bricklaying; Messrs. J. Ledgard & Son, Leeds, joiner work; Messrs. Mountain & Son, plastering; Mr. A. Ackroyd, painting; and Messrs. Teal & Somers, heating apparatus.

FREE CHURCH, EDZELL, FORFARSHIRE.—On the 2nd inst. the foundation stone of a Free church in course of erection at the south end of Dalhousie-street, Edzell, was laid. The building will seat 350 persons, and attached will be a hall to seat 100. Mr. P. H. Thoms, of Dundee, is the architect.

WESLEYAN CHAPEL, TANFIELD, YORKSHIRE.—The foundation stones of a new Wesleyan chapel at Tanfield, in the Masham Circuit, were laid on the 3rd inst. The chapel will seat 180 persons, and the cost will be about 1,900*l.* The architect is Mr. W. J. Morley, Bradford and Harrogate.

THEATRE, BRADFORD.—Extensive alterations are being carried out at the Prince's Theatre, Bradford. The proscenium has been widened and the circle and gallery reconstructed. The alterations will provide accommodation for 1,000 more persons; the total will be 3,400. The electric light is being installed. The architect is Mr. Longley, the architect of the theatre. The clerk of works is Mr. T. Bruff.

PALACE THEATRE OF VARIETIES, MANCHESTER.—The Manchester Palace Theatre of Varieties was reopened on the 4th inst. after redecoration. The work, which included various structural alterations, was carried out under the supervision of Mr. Frank Matcham.

PUBLIC LIBRARY, WEST HAMPSTEAD.—On the 2nd inst. the foundation stone was laid of a branch library for West Hampstead. The site of the library is at the corner of Westbere-road and Sarre-road. The building is being erected by Messrs. F. Gough & Co., from the design and under the superintendence of Mr. Charles H. Lowe, Surveyor to the Vestry, and will consist of one story, with a basement containing store and furnace-room. The accommodation will consist of a lending department, a magazine and reference library 31 ft. by 19 ft., and a news room 31 ft. by 20 ft., with a room for the staff, lavatory, &c. The walls will be faced externally with red bricks and red Corsehill stone. The roof will be covered with Broseley tiles. The floors are to be of wood blocks, on a concrete foundation. The building will be lit by electricity supplied by the Vestry. The cost will be about 3,000*l.*

CLOCK TOWER, MAIDENHEAD.—The new jubilee clock tower at Maidenhead has just been completed and the clock started. The clock has four dials and strikes the hours. The architect for the tower was Mr. E. J. Shrewsbury, of Maidenhead; and the clock is by John Smith & Sons, of Derby.

BANK, DEWSBURY.—New premises for the London and Yorkshire Bank, Limited, were opened at Dewsbury on the 23rd ult. The building, which is at the junction of Northgate and Corporation-street, is of Aberdeen grey granite to the first floor windows, the walls above being faced with ashlar wall-stones from the Holmfirth quarries, with bands and mouldings of grey granite. The entrance is at the corner of the two streets. The bank is on the ground floor, and comprises a large bank-room 34 ft. by 31 ft., the bank manager's room 12 ft. by 12 ft., and a strong room 10 ft. by 12 ft. The woodwork is of oak, French polished. The work was carried out by the following contractors:—Excavator, mason, and bricklayer's work, Messrs. William Scott & Sons, Dewsbury; carpenter and joiner's, including bank fittings, Messrs. E. Chadwick & Sons, Staincliffe; slater's, Mr. W. R. Thompson, Dewsbury; plumber and glazier's, Mr. Frank Newsome, Dewsbury; plasterer's, Messrs. C. Howroyd & Son, Bradford; painter's, Mr. Ned Ramsden, Dewsbury; the electric light installation by Mr. George J. Hood, Dewsbury. The plans were prepared by Mr. J. Lane Fox, of Dewsbury, with Mr. Ernest Newton, the bank's London architect, as consulting architect.

PUBLIC BATHS, STOURBRIDGE.—Mr. Isaac Nash, Chairman of Stourbridge Urban Council, laid the foundation-stone, on the 2nd inst., of the new baths which the Council are erecting in Greenfield-avenue. The baths have been designed by Mr. Woodward, the Town Surveyor, and are being erected by Mr. Vale, of Stourport. The water area of the swimming-bath will be 75 by 28 ft., and there are private baths for both sexes. The cost of the scheme will be about 4,500*l.*

VICARAGE, SCARISBRICK, LANCASHIRE.—A new vicarage is being erected at Scarisbrick, on a site near the church. The architect is Mr. G. S. Pucker, of Southport, and the cost will be about 1,500*l.*

PROPOSED TOWN HALL FOR CHELTENHAM.—A special meeting of the Cheltenham Town Council was held on the 3rd inst. to consider a report and plans by Mr. F. Waller, architect, for a new town hall, on the Winter Garden site. The great hall is to be 112 ft. by 52 ft. and 45 ft. high, and will accommodate 1,000 on the floor, with another 450 odd in the galleries. There are to be refreshment and supper rooms, with drawing-rooms, card rooms, supper-rooms, &c. The architect did not think an outlay of less than from 25,000*l.* to 30,000*l.* should be calculated for a good plain building, exclusive of decorative features and fittings, and a further sum of 5,000*l.* ought to suffice for the latter works. After an inspection of the plans, a motion to adopt them was carried, and it was further resolved to apply to the Local Government Board for sanction to a loan of £35,000 for the purpose in view.

PUBLIC BATHS, ROMFORD.—The new public baths erected in Mawneys-road were opened on the 2nd inst. The swimming bath has a water area of 70 ft. by 30 ft., with dressing-boxes on each side and galleries over. Slipper baths and an establishment laundry have also been provided on the ground floor, and there are separate entrances to the building for men and women. A workshop and class-rooms for technical instruction have been provided on the ground and first floors with superintendent's rooms over. The water in the swimming bath and for the slipper baths is heated by a Cornish boiler, the boiler being also utilised for warming the building by means of low-pressure steam pipes and radiators. The water for the baths is obtained from a well sunk on the site. The front elevation to Mawneys-road is executed in red brick and Bath stone, and the roof covered with green slates; the rear buildings are executed in yellow stocks. The engineering work has been executed by Messrs. Moorwood Sons & Co., of London and Sheffield, the builder being Mr. Thomas Bruty, of Hornchurch, Essex, and the architects Messrs. Harrington & Ley, of London and Romford.

PUBLIC SLAUGHTER-HOUSE, DENNY, STIRLINGSHIRE.—A public slaughter-house is to be erected at Denny from plans by Messrs. M'Luckie & Walker, architects, of Stirling. The estimated cost is 1,000*l.* The contractors are:—Masonry, Messrs. M'Lean & Grant, Denny; joinery, Messrs. David Mialls & Sons, Dunipace; plastering and slating, Mr. D. M'Nair, Falkirk; plumbing, Messrs. John Hunter & Sons, Denny.

RIPON TOWN HALL IMPROVEMENTS.—The Ripon Town Hall improvements have been completed, from the designs and under the supervision of the City Surveyor (Mr. Edson). The plaster, tile, and mosaic work has been done by Mr. W. F. Blackburn, and the joiner's work, glazing, and painting by Mr. E. Johnson, both of Ripon.

MUSIC HALL, BALHAM.—A new music hall has been erected in the High-road, Balham, on the site of the old swimming baths. Mr. W. Hancock was the architect. The decorations are by Messrs. Dean & Co., of Birmingham. The house is calculated to hold 1,500 or 1,800 full.

CITY OF DUBLIN TECHNICAL SCHOOLS.—Additions and improvements to the City of Dublin Technical Schools, Lower Kevin-street, are at present in progress. In designing the plans the aim of the architect has been to incorporate the new with the old structure as much as possible. For this purpose the floors of the various stories have been kept on the same level and openings formed in the dividing walls. When completed the capacity of the schools will be increased fully threefold. The new work is faced with red brick, having stone dressings. Due provision has been made internally for all the requirements of technical teaching, such as workshops, laboratories, lecture-rooms, and classrooms, all of which are conveniently grouped round the main staircase. Special attention has been given to the accommodation for instruction in drawing, both mechanical and freehand. For this important branch six large rooms, mostly lighted from the north, have been set apart. Three of them can when required be converted into an Assembly Hall by an arrangement of screens. The hall measures 63 ft. by 33 ft., and will have an open timber roof of ornamental design, over the centre of which is fixed a ventilating turret, covered with copper, and rising 80 ft. above the street. The new buildings will be heated throughout by radiators and pipes on the low pressure system, by Messrs. Maguire & Gatchell, who are also the contractors for the plumbing work. The general contractors for the building work are Messrs. H. & J. Martin, of Belfast and Dublin. The architect for the whole is Mr. William M. Mitchell.—*Dublin Express.*

NEW OUT-PATIENTS' DEPARTMENT, ANCOATS HOSPITAL, MANCHESTER.—A new out-patients' and accident department has been erected in connexion with Ancoats Hospital. The new accommodation provided comprises a waiting hall for patients, in connexion with which are male and female accident-rooms, each with a dressing-room attached; three doctors' consulting-rooms, with dressing-rooms adjoining, and a bathroom. At the end of the waiting-hall nearest the entrance are the registrar's and attendants' offices, and at the end adjoining the main building is a dispensary. The waiting-hall, which occupies the central portion of the building, is lighted from above the flat roofs of the accident and consulting rooms, which are arranged on either side. This will enable additional ward accommodation being provided in the future, should occasion demand, without any disturbance of the present building. The whole of the rooms are tiled from floor to ceiling, and the door and window architraves are executed in glazed faience ware. The joiners' work is of mahogany, and the floors are finished in marble mosaic. The work has been carried out in accordance with plans prepared by Mr. W. Cecil Hardisty, architect, of Manchester. The general contractors were Messrs. Wilson & Toft, of Ardwick.

NEW INFIRMARY, WEST HAM.—The West Ham Board of Guardians some years ago purchased Forest House, near Leytonstone, with its grounds, 45 acres in extent. On this ground they have commenced a large infirmary which, when completed, will consist of four wards, three stories high, with accommodation for 672 patients. Each block will be connected by a central corridor. An administration block of buildings, board-room, and chapel, committee rooms, dispensary, and rooms for lunatics, will be built behind. Provision is also to be made for the accommodation of seventy nurses. The electricity will be generated on the premises, and various workrooms are also to be built. It is expected the building will cost 225,000*l.* The architect is Mr. Sturdy, and the builders Messrs. John Shillitoe & Sons, of Bury St. Edmunds.

PROPOSED NEW THEATRE, DUNFERMLINE.—Plans have been passed for a new theatre for Dunfermline. The front elevation will be 83 ft. and will have a centre gable, with tower at either end and a moulded pediment over the main entrance, which will have an ornamental verandah projecting over the pavement. All the entrances and exits will lead from and to Reform-street. In regard to the interior, seating accommodation will be provided for about 1,250 persons, and the total holding capacity will be for 1,600. The plans have been prepared by Mr. Roy Jackson, architect, Perth.

CONSERVATIVE CLUB, HOLBECK, LEEDS.—A new club-house, erected by the Holbeck Conservative Club-house Company, Limited, in Sweet-street West, was opened recently. The new club premise stand nearly opposite the Holbeck Liberal Club, close to the junction of Marshall-street and Sweet-street. The club-house consists of two stories, with a billiard-room and bar on the ground floor, and an assembly-room above. The construction has been carried out under the supervision of Mr. Richard Wood, architect, of Leeds, and the cost of the whole amounts to something like 2,400*l.*

LUNATIC ASYLUM, WARLINGHAM, SURREY.—The Mayor of Croydon (Councillor N. Page) laid the foundation-stone recently of the Borough Lunatic Asylum, now in course of erection at Upper Warlingham, at an approximate cost of 200,000*l.* The site of the new asylum comprises 68¼ acres. When completed the building will accommodate 400 patients—200 male and 200 female. There is room, however, for extension to accommodate a further 200, the administration accommodation already provided for being sufficient for the whole. The original estimate for the asylum and works in connexion with it was 140,432*l.* (including 3,900*l.* for the purchase of land, and 105,432*l.* for the erection of building). Later on it was found necessary to increase the estimate by 58,643*l.* The excess is accounted for largely in consequence of the rise in the price of materials, partly because of further accommodation having to be provided in accordance with the demands of the Lunacy Commissioners, and partly because of wages being higher than at first thought. The architects are Messrs. George A. Oatley and W. S. Skinner, of Bristol. The contractors are Messrs. Wilcott & Ward, of Wolverhampton. The clerk of the works is Mr. Verrall, and the foreman in charge Mr. W. G. Colbourne.

THE SANITARY INSTITUTE.—At an examination in practical sanitary science, held at Liverpool, on July 20 and 21, 1900, seven candidates presented themselves, and the following five were awarded certificates:—Matthew Chapman, James Greenwood, R. Holmes, A. G. Leigh, and F. Wilkinson.

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SANITARY AND ENGINEERING NEWS.

OLDHAM WATERWORKS EXTENSION.—The members of the Oldham Corporation made their annual inspection of the waterworks on the 30th ult., and at the same time Mr. Griffiths, vice-chairman of the Waterworks Committee, opened Rooden reservoir, and Mr. A. Ashworth unveiled a tablet in the valve-house, commemorating the event. The completion of the scheme marked the exhaustion of all the powers obtained for the construction of works by the Corporation. The first sod was cut on July 30, 1894, and the reservoir has a top water area of 21 acres, is at an elevation of 1,068 ft. above ordnance datum, and has a capacity of 265,000,000 gallons. The natural gathering ground of the reservoir is only 25 acres, but it is augmented by collecting the flood waters from 370 acres from the Wenshaw Valley and 423 acres from the Piethorn Valley, making a total gathering power of 818 acres. The works have been designed by Mr. G. H. Hill, M.Inst.C.E., of Manchester and London, the resident engineers being Mr. W. Watts during the first portion, and Mr. C. J. Battey (the present waterworks manager) during the latter portion.

PROPOSED REACTION BREAKWATER FOR THE MISSISSIPPI.—Ever since 1837, the Louisiana Government has made sundry sporadic attempts to increase the depth of water at the delta mouths of the Mississippi River, but without satisfactory or permanent results. Harrowing and dredging operations, alone, and combined with jettes, were tried, but were only moderately successful, and so long as work continued. In 1875, Mr. Eads proposed to improve the South West Pass of the river by means of jetties. After some controversy he was commissioned to undertake the opening of the South Pass, and the effect of his endeavours was to secure a navigable channel 26 ft. deep by 700 ft. wide, which has been maintained up to the present time. As the contract has now expired, and in view of the increased dimensions of vessels, there is an urgent need of additional facilities for navigation. So far, no course of action has been inaugurated, although two or three schemes have been prepared. In January, 1899, a Board of Engineers appointed by the State recommended the formation of two parallel straight jetties, placed 2,400 ft. apart, to extend for about seven miles up the South West pass. Levees, sills, and auxiliary works were also proposed, in addition to two powerful dredges. These plans were merely tentative, and do not appear to have commanded the confidence even of their authors. Consequently, another Board of Engineers was created, and in January, 1900, a radically different plan was forthcoming. According to this, reliance was to be placed mainly upon dredging, but partly upon the establishment of two jetties, shaped so that they formed a bottle-shaped figure in plan, the neck being at the seaward end. The report of the second Board of Engineers closes with the curious recommendation that the work should not be commenced "until experiment and experience have developed the most economical methods of construction." Thus it appears that the efforts recently made by the State to obtain trustworthy guidance have not been particularly successful. Professor Lewis M. Haupt now brings forward the suggestion, in the July number of the *Journal of the Franklin Institute*, that a reaction breakwater should be formed for the opening of the South West Pass of the river. It is estimated that this particular channel carries down no less than 102,500,000 cubic yards of silt per annum, and any system tending to bottle up the natural outlet for this enormous quantity of material, and relying chiefly upon dredging, must involve immense and interminable expenditure. Professor Haupt does not advise a policy of conflict with the powers of nature, but rather one which will enable them to be used in removing the obstacles now existing to navigation. He proposes a single curved jetty disposed so as to produce a reaction and scour across the entire bar in such a manner as to effect lateral displacement of the material, and the deposition of silt on the opposite bank of the channel. It is a well-known fact that concave river banks produce deep pools and variations of curve occasion corresponding variations of depth. The rectilinear form, on the other hand, tends to reduce depth. In order that a river may exert destructive force upon its bed or banks concentration of energy is necessary, and parallel jetties do not conduce to this effect. A single concave curved jetty, as pointed out by Professor Haupt, does actually produce compression, causing reaction, deflection, and deep erosion; and if properly applied to a sedimentary delta bar it converts dispersion into concentration. Thus the available energy of the stream may be trained and applied to the maintenance of an ample waterway. In September last year Professor Haupt read a paper before the American Society of Civil Engineers on the subject of "The Reaction Breakwaters as applied to the Improvement of Ocean Bars." This paper was discussed at great length, and, although one or two members remarked the principle was by no means new, the general concensus of opinion was strongly in favour of the system advocated.

THE ARTHUR CATES PARIS EXHIBITION PRIZE.—The Arthur Cates Paris Exhibition Prize has been awarded to Mr. E. W. M. Wonnacott.

MISCELLANEOUS.

OLD BIRMINGHAM.—The Great Western Railway Company have acquired some premises between Lionel-street and Great Charles-street, on the west side of Snow Hill, for the purposes of an enlargement of their station at Snow Hill. Amongst the property to be demolished are Nos. 98, 99, and 100, Snow Hill, where the present firm of Messrs. Hammond, Turner, & Sons were originally established in 1717; it is believed that they represent the oldest button factory in England.

A NEWSPAPER LIST.—Messrs. Charles & Edwin Layton send us their pamphlet under the title "Handy Newspaper List; 1900" (6d.); containing the names and addresses of all the newspapers and periodicals published in England, the monthly and quarterly publications being for this purpose included under the general term "newspapers," though it is an unusual application of the word; it would have been more correct to have entitled the publication "Newspaper and Magazine List." The London publications come first, beginning with the dailies and ending with the quarterlies; the provincial towns then follow in alphabetical order. The daily newspapers in each town are given in larger type and at the head of each list, so that they can be distinguished at a glance. The publication is compact and useful.

MANCHESTER SHIP CANAL.—From the half-yearly report of this company it appears that in the ship-canal department the receipts amounted to 141,346*l.*, as against 124,183*l.* for the corresponding period of last year. The expenditure, however, has been larger than last year, so that only about half this increase is clear gain. An Act of Parliament has been obtained giving the company compulsory power to purchase the Manchester race-course and other property required for the intended dock and railway extension. From the engineer's report as to works, &c., we learn that the depth of water in the ship canal and docks has been fully maintained, although no diminution has taken place in the quantities of sludge and other material deposited in the docks and canal. A further area of land at Weaste has been levelled and prepared for the storage of timber, and an additional road and the necessary railway connexions are now in course of formation. The new workshops at Mode Wheel, together with the yard and railway connexions, have been completed and are in use. The old workshops have been removed and the site occupied by them has been laid out for traffic purposes. The extension of Trafford Wharf has been completed and is being employed for the timber and other trades. The new railway connecting the general dock railways with Ordsall Dock (authorised by the Company's Act of 1896) has been completed and is in use. At Throstle Nest a berth for barge traffic has been formed above Trafford Road, and the railway connexions are in progress so as to utilise further the timber storage ground recently provided there. The embankments and slopes of the canal generally are in good condition, and the works throughout the canal have been efficiently maintained. On the north quay of No. 8 Dock a large transit shed is in course of construction by the Manchester Ship Canal Warehousing Company, Limited; the works required for the foundations are in progress, and the contracts for the ironwork, superstructure, and flooring have been let.

REGISTERED PLUMBERS, ABERDEEN.—The tenth annual meeting of Registered Plumbers in the Aberdeenshire, Kincardineshire, and Banffshire district was held in Gordon's College, Aberdeen, on the 3rd inst., Professor M. Hay, M.D., Medical Officer of Health, Aberdeen, President of the District Council, in the chair. It was reported that things were working as well as for many years; that at the close of the year there were 136 registered plumbers on the list—forty-five masters and ninety-one journeymen; that there were from twenty to thirty students attending the theoretical and practical classes, and that the finances were in a satisfactory condition. The report was approved, and the office-bearers and members of council reappointed.

ELECTRIC LIGHTING, SHIPLEY, YORKSHIRE.—On the 3rd inst. Colonel Coke, an Inspector to the Local Government Board, held an inquiry at Shipley relative to an application of the Shipley District Council for sanction to borrow 22,000*l.* for electric lighting purposes. Evidence was given by Mr. R. C. Quinn, engineer to the Council.

LEGAL.

ACTION BY ARCHITECTS IN THE CHANCERY DIVISION.

THE case of Metcalf *v.* Hosegood came before Mr. Justice Stirling, in the Chancery Division, on the 1st inst. It was an action brought by the plaintiff for rescission of a contract to purchase Thorney House, Palace Gate, Kensington, and some adjoining land, at the price of 88,000*l.* The facts were shortly these. The conveyance to the defendant of the property in question was dated February 21, 1898, and part of the property was subject to restrictive covenants. After the defendant purchased the property he commenced to erect flats upon it, but he had a dispute with the London County Council as to the building line. This dispute, however, was ultimately settled. Subsequently he had another dispute with the trustees of the late Sir John Millais, who owned an adjoining house, as to the access of light, but this dispute was also settled. The defendant then, partly through financial difficulties and illness, discontinued building operations, and in December, 1898, a Mr. Rogers and the trustees of Sir John Millais commenced an action against him for an injunction to restrain him erecting flats on the site of Thorney House and the adjoining land, on the ground that such erection would be a breach of the restrictive covenants. This action was set down for trial in May, 1899. On May 1, 1899, a Mr. McManus interested himself in the sale of the property for the defendant, and this gentleman asked a Mr. Farmer, an estate agent, to submit the property to the plaintiffs, a firm of architects and surveyors, as one suitable for the erection of flats. This Mr. Farmer did, and on May 2, the gentleman, Mr. McManus, and the plaintiffs met. Mr. McManus then produced to the plaintiffs plans and particulars of flats to be erected on the site. The plaintiffs then entered into negotiation for the purchase of the property with the view of erecting flats thereon, and during the course of the negotiations an abstract of the deed containing the restrictive covenants was produced to the plaintiffs' solicitor. The case for the plaintiffs was that at that and at no time during these negotiations was the action of Rogers *v.* Hosegood brought to their notice. On the contrary, they alleged they were told by Mr. McManus that there was nothing to prevent the building of flats upon the property. On July 25, 1899, the plaintiffs entered into an agreement to purchase the property, and paid a deposit of 1,000*l.*, it being provided that completion of the purchase should be postponed until December 30, 1899. The action of Rogers *v.* Hosegood came on for trial before Mr. Justice Farwell in November, 1899, and in that action the plaintiffs succeeded, and this decision was subsequently affirmed by the Court of Appeal. The present plaintiffs saw a report of the proceedings before Mr. Justice Farwell, and commenced this action for rescission of the contract on the ground that there had been such misrepresentation of fact as entitled them to avoid the contract.

Mr. Justice Stirling held that Mr. McManus, as the defendant's agent, had represented to the plaintiffs that there was nothing to prevent a block of residential mansions as flats from being built on the site, and that the plaintiffs were entitled to rescission of the contract.

Judgment accordingly.

Mr. Dickens, Q.C., Mr. Upjohn, Q.C., and Mr. H. White were counsel for the plaintiffs; and Mr. C. E. Jenkins, Q.C., and Mr. G. Lawrence for the defendant.

APPLICATION BY THE OWNER OF A BUILDING ESTATE IN THE ISLE OF WIGHT.

THE case of Cole *v.* the Isle of Wight Land Company came before Mr. Justice Stirling in the Chancery Division on the 3rd inst. In this case the plaintiff had purchased six plots of land from the defendants on a building estate which had been developed near East Cowes. The land was conveyed to the plaintiff without any reservations whatever, but subsequently the defendants had constructed a sewer for the drainage of the whole estate which went through part of the plaintiff's land, and the plaintiff now sought an interim injunction to restrain defendants permitting sewage to flow through the sewer. The defendants alleged that the sewer had been passed by the Local Authorities, and that it now vested in the Local Authorities, therefore they were unable to effect any alterations.

Mr. Justice Stirling said it did not appear to him there was any possible justification for the action of the defendants in making a sewer through the plaintiff's land which had been conveyed to him without reservation, but the plaintiff seemed to have known of what had been done as long ago as September, 1899, and had he come then and asked for an injunction, the possibility was he would have succeeded, but he had delayed doing so so long his lordship thought he ought not now to grant an interlocutory injunction. What the plaintiff might obtain at the trial was another matter. His lordship therefore declined to make any order on the motion.

HEAVY CLAIM BY BUILDERS.

THE case of Patman & Fotheringham, Limited, *v.* Chadwick came before the Court of Appeal, composed of Lords Justices A. L. Smith and Vaughan-Williams, on the 7th inst., on the defendant's appeal from an order of Mr. Justice Lawrance dismissing an appeal from an order made by the Master in Chambers directing that judgment should be entered against the defendant for 9,500*l.* odd, and that the defendant should have leave to defend as to the balance of the claim.

Mr. Horace Kent in support of the appeal said that the plaintiffs' claim was for 14,200*l.* 18s. 9d., and the circumstances under which the claim arose were these: The plaintiffs were builders, and the defendant was and is the lessee of a piece of land in Queen's Gate. The plaintiffs contracted with the

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defendant to erect for him a set of residential flats for a sum of 9,800*l.* odd, and part of the bargain between the parties was that the plaintiffs should have from the defendant a mortgage of his piece of land, which would, of course, carry with it the buildings which the plaintiffs were erecting and were about to erect. The mortgage was executed on October 3, 1899. This mortgage recited that a sum of 3,310*l.* was due to the plaintiffs, and the mortgagor created a charge to secure that sum to the plaintiffs, and "also any other sum or sums of money which might hereafter be advanced, paid, or incurred by the plaintiff company on account of the mortgagor, or which may become owing from him to the company on any account whatsoever." Simultaneously with the document being executed by the defendant the plaintiffs entered into a contract with the defendant to complete the buildings for a sum of 6,556*l.* 6s. 2d. The plaintiffs then proceeded to erect and complete the buildings, and the architect nominated in the contract to give certificates certified that the sum of 5,385*l.* was due to the plaintiffs over and above the 3,310*l.* In April last, when the buildings were completed, the defendant was anxious to take possession of the buildings and to pay off the plaintiffs' claim. Ultimately the plaintiffs rendered an account. Mr. Young, the architect, went through the account, which amounted to 14,045*l.* On June 17 the defendant's solicitor wrote to the plaintiffs' solicitor offering to pay the plaintiffs, subject to the defendant's right to take measurements of the buildings, &c., 9,532*l.* 13s. 6d., and to deposit a further sum of 1,000*l.*, pending the appointment of an arbitrator or referee to whom the matter could be referred. The defendant's solicitor further offered, if the plaintiffs would not accept this offer, to pay 10,000*l.* in full discharge of all the plaintiffs' claims. The plaintiffs refused to accept that offer, and the defendant then issued his writ asking for an account to be taken on July 10. The plaintiffs, on the following day, issued a writ in the Queen's Bench Division against the defendant. The defendant's action had been referred to an official referee. The plaintiffs then applied for judgment in their action, and the Master in Chambers, having regard to the letter which had passed from the defendant's solicitor to the plaintiffs' solicitor, directed judgment to be signed in favour of the plaintiffs for 9,532*l.* 13s. 6d., and leave for the defendant to defend as to the balance. The learned counsel contended that where accounts had to be taken the Courts would not place a defendant mortgagor in such a position as to have personal judgment signed against him which might be the means of withholding from him the right of redeeming his property. He submitted that the defendant ought to have unconditional leave to defend.

Mr. Herbert Reed, Q.C. (with him Mr. Poyser), having been heard in support of the order appealed from, their lordships' varied Mr. Justice Lawrance's order by directing that the plaintiffs should have leave to sign formal judgment for the sum of 8,695*l.* instead of 9,532*l.* 13s. 6d., and subject to this they affirmed the learned Judge's order and dismissed the appeal, the costs of the appeal being made costs in the cause.

DISPUTE AS TO BUILDING PLANS AT EASTBOURNE.

THE case of the Queen (*ex parte* Wright) *v.* the Mayor and Corporation of Eastbourne came before the Court of Appeal composed of Lords Justices A. L. Smith and Vaughan Williams on the 4th inst., on the appeal of Mr. Wright from a decision of a Divisional Court composed of Justices Ridley and Darling discharging a rule *nisi* for a *mandamus* calling upon the Corporation of Eastbourne, as the Urban Sanitary Authority, to show cause why a writ of *mandamus* should not issue directed to them, commanding them to approve of the building line as shown on the plans submitted by Mr. Wright to the Corporation for the construction of a block of buildings for the purpose of residential flats upon certain land adjoining a house called Mixbury House, Hartington-place, in the borough. The Corporation passed a resolution that the plans should be approved as complying with the by-laws, but disapproved as regarded the building line shown on the plans on the ground that the flats proposed to be erected would be brought forward beyond the front main wall of Mixbury House, being a house on one side of and in the same street as the proposed flats. In other words, the Corporation disapproved of the plans on the ground that the proposed buildings would be a contravention of Section 3 of the Public Health (Buildings in Streets) Act, 1888. The Divisional Court discharged the rule for a *mandamus*, holding that according to the decision in Smith *v.* Chorley Rural Council the matter was within the discretion of the Corporation, and the Court could not interfere by *mandamus* with the exercise of that discretion. From this decision Mr. Wright, the applicant, now appealed.

Lord Justice A. L. Smith, after hearing arguments by Mr. Macmorran, Q.C., and Mr. B. A. Hall for the appellant, and without calling upon Mr. C. A. Russell, Q.C., and Mr. Boxall for the respondents, said that in his opinion a *mandamus* ought not to issue to command the Local Authority to approve plans which the latter honestly considered were in contravention of the statute. He thought the appeal should be dismissed.

Lord Justice Vaughan Williams concurred, and the appeal was accordingly dismissed, with costs.

ANCIENT LIGHTS—IMPORTANT DECISION.

MR. JUSTICE WRIGHT on the 4th inst. delivered a reserved judgment in the Queen's Bench Division in the case of Warren and others *v.* Brown, the case having been tried before his lordship at the Leicester Assizes. The action was brought by the plaintiffs, the freeholders and tenants of premises at Leicester, for an injunction to restrain the defendant from obstructing their ancient lights. The plaintiffs also claimed a mandatory injunction and further relief. The facts sufficiently appear from the following judgment.

Mr. Justice Wright in giving judgment said: This case raises a question of general importance in relation to ancient lights—namely, whether the right which is acquired by statutory prescription is a right to the continuance of substantially the whole quantity of light which has come to the windows during the twenty years, or is ordinarily limited to a sufficient quantity of light for all ordinary purposes of inhabitancy or business. It seems strange that such a question should be still open for discussion, but there is a considerable body of authority in favour of either proposition. The facts are these:—The plaintiffs as the owners and the tenant of a building in the town of Leicester claim damages and an injunction in respect of the obstruction of the access of light to windows more than twenty years old. At the trial the claim was limited to two rooms, one on the ground floor and the other above the former, both facing to the south. For a length of about 17 ft. in front of these rooms the defendant has raised his own building from a height of about 20½ ft. to about 26 ft., but has set it back about 2 ft. or 3 ft., so that the width of the street between the two buildings which was about 17 ft. is now about 19 ft. Four out of five windows in each of the two rooms are opposite to that part of the defendant's building which I have mentioned. These windows are large and high. Those of them which are on the ground floor are, and for years have been, glazed with fluted glass for about half their height from the bottom. In addition to the front light both rooms receive much side light, especially from the east and east-south-east, from a wide street running north and south at a distance of about 50 ft. to 70 ft. Light is not in any direction cut off by very high buildings. To the south-east the defendant has taken down a high chimney-stack which to some extent used to intercept the light from that quarter. I find that the defendant has not obstructed or diminished to any material extent, if at all, the light coming to the upper of the two rooms in question. As regards the four windows on the ground floor, I find that the defendant has materially diminished the light which the plaintiffs enjoyed from those windows for twenty years past, but that abundant light remains for all ordinary purposes of inhabitancy or business. The room in its present state is better lighted than the ground floor rooms in many of the principal streets. The plaintiff Baum (the lessee of the premises) has during some years, but much less than twenty years, carried on in the premises, and particularly in the ground floor room in question, a manufacture of hosiery by means of machinery which requires a very exceptional quantity and quality of light for the continued and accurate adjustments of filaments to fine needles moving at speed in bundles of some hundreds. Before this manufacture was established at these premises, a different industry (manufacture of boots and shoes) requiring good, but not special or extraordinary, light was carried on there. I find that the defendant has by the acts complained of diminished the light, so that it is now materially insufficient during some part of the day for the special requirements of the plaintiff Baum's industry. I find that the plaintiff's premises have throughout the twenty years before action been suitable for such a manufacture as that now carried on by Baum, and that the kind of manufacture is, and has long been, common in the district, and has for twenty years past required more light than most other industries, but not until the last few years in so high a degree as at present, the older machines having been less delicate and complicated. I think that the light as at present exists would have been sufficient for any but the most recent kinds of machines. In my judgment no sufficient case for a mandatory injunction is made out in any view of the plaintiffs' rights. The inconvenience to which Baum was subjected can be, and to a great extent it has been, obviated by the removal of machines to the upper room, and in any case it can be remedied by some increased expenditure of gas. The question is whether the plaintiffs are entitled to damages. If they are, I assess the amount at 100*l.* for the tenant and 200*l.* for the reversioners.

His lordship then dealt exhaustively with the authorities bearing on the question, from 1805 until when it appeared to his lordship that the nature of the cause of action in a case for infringement of rights to light was not clearly settled. The learned Judge thought he must take it that the law was laid down in the case of the City of London Brewery Company *v.* Tennant, agreeing as that case did with the criterion expressed by Lord Cranworth in Clarke *v.* Clark, and that the plaintiffs, having an abundance of light left for all ordinary purposes of inhabitancy or business, were not entitled to relief on the ground that their extraordinary use had been interfered with. Unless, indeed, there was some such limitation of the right to light for ancient windows, it was difficult, as Lord Hardwicke observed in effect in the case of the Fishmongers' Company *v.* East India Company, to see how the ordinary extensions and improvements of towns could be carried on. If every house which had existed for twenty years was entitled to have all, or substantially all, the same light come to its windows as during the twenty years, no new houses could be built opposite to old ones, unless at a distance which would impose on servient tenements an unreasonable burden, and might involve grave public inconveniences. Nor, if that were law, could there well be any presumption that so long as 45 deg. of light, or some approximate angle, was left, there was no actionable wrong. It was not necessary in the present case to consider the question raised in the case of Lanfranchi *v.* Mackenzie, whether a right to an extraordinary quantity of light for extraordinary purposes could be acquired by prescription. His lordship accordingly, for the reasons given, entered judgment for the defendant, with costs.

Mr. Hugo Young, Q.C., and Mr. W. H. Stevenson appeared for the plaintiffs, and Mr. Stanger, Q.C., and Mr. Neilson for the defendant.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

7,318.—MEANS OF ESCAPE FROM FIRE: *C. Grayson.*—The telescopical platform is adapted for facilitating escape from a fire as well as for carrying hose pipes; its lower section is pivotted on to a frame which runs upon wheels; the upper two sections are to be extended by a windlass, the ropes passing over guide-pullies affixed to the sections; the middle section is turned, with a screw and a nut, upon its pivots, and when pulled up is supported with a strut. It is also provided with a ladder; upon the top section are swivelling standards for the hose pipes.

7,367.—FIRE AND SIMILAR ALARMS: *F. Dockree.*—By means of this contrivance an alarm is sounded and an electrical circuit is closed when two limiting temperatures are attained. Curved strips of metal having unequal expansions are joined at their one end to a trunnion, and at their other end by levers and links to an index pointer. The curvature of the strips changes together with a change of temperature and the pointer traverses the dial, two stops being set at the limiting temperatures and joined to one terminal of an electric bell circuit, whilst the index is connected to the bell's other terminal. As the index makes contact with either of the stops the circuit becomes closed and the bell is rung. A screw that raises or lowers an extension of the strips is used for setting the pointer in its correct position upon the dial.

7,426.—A STOP-COCK FOR OIL CANS, &C.: *Bellenant et Cie.*—The stop-cock is adapted for use with oil cans and other vessels which are canted when their contents are to be poured out; a nozzle and ports in the plug serve as inlets and outlets for the liquid, and passages are provided for the exit or admission of air; a cord or wire is passed through holes in a lug and an extension of the handle when the valve has been shut, and if sealed will prevent any undue interference with the can's contents.

7,428.—MORTISING CHISELS: *A. Summers.*—The chisel's rear face is grooved so as to make two parallel walls, whose height gradually increases, and which end in sharp points beyond the cutting edge. On the walls are formed ratchet teeth having inclined and horizontal sides, the points of the teeth lie in a plane which is parallel to the plane of the front face of the chisel, and the teeth will draw the core away from the mortise.

7,440.—BEACH-GROYNES, &C.: *E. Case.*—A bolt and crossbars fix each pair of uprights (as specified in No. 14,115 of 1896) to a box which has a bottom and sides only, and is put into a hole dug out on the foreshore and filled in the ordinary manner. The two uprights of one box take the ends of the planks between them, the top planks being fixed with bolts.

7,489.—KILNS FOR BURNING CEMENT: *B. Liban.*—By means of a double arch the kilns, which are fashioned after the shaft or pit type, are separated so as to constitute upper and lower drying chambers. The material, being pushed forward with rakes, falls through openings that are formed in the double arch. Other openings are furnished for the passage of tools, and for affording a view of the condition of the charge within. The grate is formed in inclined portions, and the kiln's lower part serves for a cooling space.

7,490.—WINDING-DRUMS FOR USE WITH CRANES: —*C. W. Hunt.*—To the two drums, which are loosely mounted upon the shaft, are fitted end bevel wheels which engage with pinions upon radial axes carried by a spur-wheel, which is in gear with a pinion upon the power shaft, which a clutch throws in and out of gear; spur wheels upon a lower shaft engage

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with frictional clutches upon the outer ends of the drums, which are provided with band-brakes that will lock them when the clutches are out of gear; the mechanism enables the drums to be driven differentially in various ways, for instance, when the first-named clutch is out of gear and the frictional clutches are in gear, the two drums are driven in opposite directions, but when the latter clutches are out of gear, and the other clutch is in gear, the drums are driven in one direction and at a relative speed which depends upon the relative tension of the two ropes; in the case of jib cranes the jib is attached to the frame by means of a universal joint, and for an overhead traveller the scoop is lifted and lowered with one rope and is opened and closed with the other, whilst it is also sustained with a third rope which winds around a third drum mounted upon the axle of the two principal winding-drums.

7,538.—APPARATUS FOR TESTING THE STRENGTH OF MATERIALS: *G. Cussons and F. Eagles.*—The inventors devise a method of testing materials when exposed to tensile, crushing, shearing, and bending stresses. The knife-edge bearings of a lever are lifted up together with the stirrup by hydraulic action, or in the case of lighter machines by the screw-action of a worm and a worm-wheel, the worm-axis being mounted in a pivotted piece so that the removal of a holding-pin disengages the gear; an adjustable shackle and a spring balance join the lever's long arm to the cross-bar; its short arm has a counter weight. The test-piece is gripped for tensile stress between shackles, to which shearing-shackles for shearing stress are connected. One of the former shackles supports the suspending-links for the compression block, and when a crushing test is to be taken a block is put between stops. In the case of a bending test a V-shaped piece is laid upon the compression block and the test-piece is laid upon that, so that it shall stretch between brackets which are adjusted upon a bar. When the test-piece breaks the shock is taken by a buffer-rod which has an adjustable sleeve, with washers of metal and rubber or leather.

7,541.—BRICK MOULDING: *F. Thornton.*—For reciprocating the charger or feed-box are arranged a connecting rod, a lever, and a cam upon a shaft which is driven at half-speed as compared with that of the main shaft by spur-wheels; thus are furnished means for moving the charger after the alternate strokes of the plungers, and for pressing each of the bricks twice within the mould that it may be duly faced and finished.

7,561.—CHIMNEY POTS: *F. Morgan & D. Jeremiah.*—The chimney top is fashioned in the shape of a pear or truncated cone, and is placed with its wider end uppermost; around the top portion is attached a wind fence and an inlet for air is formed at its base.

7,607.—A COMPOSITION FOR USE BY GILDERS AND OTHERS: *F. H. Lewis.*—The inventor's object is to ensure that the waste gold-leaf shall be saved. He makes a compound by treating finely-cut crude rubber with kerosene oil or its equivalent, and adding a small quantity of oil of benzoin to the pulp when the superfluous oil has been drained away after an interval of about twenty-four hours; the substance is then kneaded upon a slab of marble, and after it has become dry is ready for use. In operation the fragments of gold-leaf are gathered up with a wad made of the composition, which is applied to the work as it is in progress; the fragments are kneaded into the wad, which, having been used until it has become sticky, is treated suitably for the extraction of the gold which it has accumulated.

7,614.—SAFETY SUSPENDING-APPARATUS FOR CAGE LIFTS: *G. Fox and G. S. Wright.*—Plates that project from the cage slide against the outer faces of channel-shaped guides; cams upon the cage move up and down in the channels though normally without engaging with them, but the cams can be thrown into engagement with the guides (in order to stop the cage in the case of an accident) by means of a hand-lever, with worm-and-bevel gearing, within the cage. The engagement may be effected also automatically by operating a governor, which is driven by a rope that hangs throughout the entire depth of the well, and is passed round a pulley that is geared with the governor; when the speed becomes too rapid pinions are turned into gear by rising arms, and the drum thereupon winds up a rope which is fastened on to the cam.

7,633.—LATHS AND STRIPS FOR BUILDING PURPOSES: *W. Brandt.*—The invention is for a method of fastening sheets, laths, or strips of metal to bars in the construction of buildings, fencing, walls, and so on. The bars are passed through holes made in the sheets or plates out of the lines of their edges, and the plates are bent or corrugated; or the holes may be made close to the edges of the sheets, with tongues or bearing-surfaces at the edges of the perforations.

7,640.—APPLIANCE FOR USE IN CLEANING, PAINTING, OR REPAIRING WINDOWS: *H. Gorton.*—The appliance consists of a seat or chair having a hinged back whose lower edge—when the back is opened out—butts against the edge of the seat and is thereby secured in its place; the two portions may also be maintained at right angles to one another by means of jointed rods; a cranked rod joins the ends of two jointed arms to rubber-covered ends that press against the sides of the window frame whilst the chair is being used.

7,696.—HANDLES FOR SAWS, PLANES, AND OTHER TOOLS: *F. H. Webb.*—Screws that pass through brackets secure the handle to the block of the plane; in one form a peg upon the handle fits into a socket, and a screw passes through the handle itself; for the handles of saws the screws enter into a block, which is slotted to take the blade of the saw, or one of the brackets is slotted to answer that purpose.

7,726.—AN APPARATUS FOR DISINFECTION: *L. Roberge.*—Gaseous formaldehyde is produced by an apparatus wherein trioxymethylene is laid upon a perforated basin inside a chamber, and is volatilised by a current of heated air admitted from beneath; steam, produced in a generator which has hanging tubes and is heated with burners, passes to an ejector; the air and formaldehyde vapour are drawn out of the chamber moistened with steam, being expelled at a high velocity through a pipe which leads into the place that is to be disinfected.

MEETINGS.

MONDAY, AUGUST 13.

Institution of Junior Engineers (Summer Meeting at Newcastle-upon-Tyne).—Reception at the Town Hall by the Mayor; Visit to Messrs. Swan & Hunter's Works and the Works of the Electric Supply Company.

TUESDAY, AUGUST 14.

Institution of Junior Engineers (continued).—Visit to Sir W. G. Armstrong, Whitworth & Co.'s Elswick Works; the Engineering Department of the Durham College of Science; and the Works of the Newcastle and District Electric Lighting Company.

WEDNESDAY, AUGUST 15.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Institute of Sanitary Engineers (Incorporated).—Examination and Literary Committee at 2.30 p.m. General Purposes and Finance Committee at 3.30 p.m. Election Committee at 5 p.m. Council Meeting at 7 p.m.

Institution of Junior Engineers (continued).—Trip on the river to inspect the Tyne Improvement Commissioners Works.

THURSDAY, AUGUST 16.

Institution of Junior Engineers (continued).—Excursion to Sunderland to inspect the Works of the River Wear Commission.

FRIDAY, AUGUST 17.

Institution of Junior Engineers (continued).—Visit to the Allhusen Works of the United Alkali Works Company; the preliminary Works of the Corporation's Electric Tramway Undertaking; summer dinner in the evening at the County Hotel, the President, the Hon. Charles A. Parsons, F.R.S., in the chair.

SATURDAY, AUGUST 18.

Architectural Association.—Summer Visit to Mereworth House, near Wateringbury, Kent.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 24.—By CASTIGLIONE & GIBBINGS (at Brampton).

Brampton, Cumberland.—The Barley Stack Inn and cottage adjoining, f. £890

By FULLER, HORSEY, SONS, & CO. (on the premises).

Woodchester, Glos.—Churches Mill and 2 a. 2 r. 34 p., f. 1,175
Southfield's Mills and 4 a. 2 r. 22 p., f. 2,340

By Messrs. SPELMAN (at Norwich).

Norwich.—Colegate-st., freehold buiness premises, warehouses and residence 2,100
St. Clement's-alley, freehold riverside premises and dye works, area 6,300 ft. 750
11, 13, and 15, Barrack-st., u.t. 63 yrs., g.r. 5*l.*: 5 and 7, Barrack-st., and 1 to 4, St. Paul's-opening, f. 285

July 26.—By NELMES, POOLE, & ATKINS (at Hereford).

Llanrothal, Hereford.—Parkside and 82 a., f. 410
1,150

By WOODHAMS & SON (at Hailsham).

Heathfield, &c., Sussex.—The Cowden Hall Estate, 100 a. 0 r. 6 p., f. 2,500
Warbleton, Sussex.—The Hole or Twizhurst Estate, 254 a. 0 r. 3 p., f. (in lots) 3,525

By COOPER & WACHER (at Canterbury).

Canterbury, Kent.—Monastery-st., a part of the site of the Old Monastery of St. Augustine and of the Church of St. Pancras, area 2 a. 3 r. 0 p., f. 3,020

By R. DALTON & SON (at Carlisle).

Lazonby, Cumberland.—Nord Vue Estate, 227 a. 3 r. 18 p., f. 4,590
New Inn Farm, 34 a. 2 r. 17 p., f. and c. 1,060
Garth and 3 a. 3 r. 19 p., c. 450
Ainstable, Cumberland.—Basco Dyke Head Farm, 154 a. 3 r. 25 p., f. 3,700

By E. GANDY (at Warrington).

Weaverham, &c., Cheshire.—Mere House Estate, 108 a. 1 r. 34 p., f. 10,000

July 26.—By FRANKLIN & SON (at Bishop's Stortford).

White Roothing, Essex.—Philpott's Farm, 80 a. 3 r. 38 p., f. 810
Freehold cottage and garden 145

By WYATT & SON (at Havant).

North Hayling, Hants.—Farm buildings, yard, and 0 a. 3 rd. 35 p., f. 250
Westbourne, Sussex.—Two freehold cottages 250

By G. DURRANT & SONS (at Bungay).

Ditchingham, Norfolk.—Six freehold cottages.... 295
Mettingham, Suffolk.—Enclosures of land, 36 a. 1 r. 19 p., f. 898
Freehold cottages 113
Minn's Farm, 17 a. 2 r. 36 p., f. 520
Benstead's Farm, 22 a. 0 r. 19 p., f. £480
Freehold double cottage 120
Shipmeadow, &c., Suffolk.—The Nunnery Farm, 54 a. 1 r. 33 p., f. and c. 915
Four freehold marshes, 8 a. 3 r. 26 p. 195
Hempnall, Norfolk.—Cullen's Farm, 14 a. 1 r. 27 p., f. and c. 210
Barsham, Suffolk.—High Common Farm, 73 a. 0 r. 18 p., f. 860

July 27.—By G. DURRANT & SONS (at Beccles).

Heckingham, Norfolk.—Enclosure of land, 2 a. 3 r. 25 p., f. 113
Kirby Cane, Norfolk.—Rose Cottage, and ½ a., f. 350

By J. HOWELL THOMAS & SON (at St. Clears).

Llandawke, &c., Carmarthen.—The Llandawke Estate, 621 a., f. 15,400

By NEWMAN & NEWMAN.

Hazleton, Glos.—The Manor Farm, 603 a. 0 r. 37 p., f. 4,000
The Puesdown Inn and 2 a. 0 r. 7 p., f. 1,000

By F. C. SQUIRE & CO.

Sydenham.—74, Kirkdale, u.t. 22 yrs., g.r. 1*l.*, e.r. 55*l.* 420

By TILLETT & YEOMAN.

Farringdon-st.—Turnmill-st., a profit rental of 73*l.* 18s. for 78 yrs. 550

By T. B. WESTACOTT.

Somers Town.—85, Stibbington-st., u.t. 40¾ yrs., g.r. 7*l.* 350
Holloway.—74, Parkhurst-rd., u.t. 31 yrs., g.r. 10*l.* e.r. 60*l.* 510

July 28.—By CHURTON, ELPHICK, & CO. (at Chester).

Whitby, &c., Cheshire.—The Whitby Stud Farm, 115 a. 2 r. 37 p., f. 12,000

By C. R. MORRIS, SONS, & PEARD (at Taunton).

Bradford, Somerset.—Rug Ham Close, 17 a. 0 r. 4 p., f. 1,200
Gardener's Hall and 67 a. 1 r. 8 p., f. 4,400
Nynehead, &c., Somerset.—Perry and Langhams Farm, 71 a. 1 r. 27 p., f. 3,000

July 30.—By CHANCELLOR & SONS.

Twickenham.—Richmond-rd., Ivermore, f., r. 100*l.* 1,550

By DUNN, SOMAN, & COVERDALE.

Sutton Courtenay, Berks.—The Limes and 12 a., f. 500

By LEOPOLD FARMER.

Hampstead.—81, Gascony-avenue, u.t. 84 yrs., g.r. 8*l.* 10s., e.r. 50*l.* 450

By HINDLEY & WILKINSON.

Chalk Farm.—Regent's Park-rd., f.g.r. 67*l.* 10s., reversion in 58 yrs. 1,810
King Henry's-rd., i.g.r. 70*l.*, u.t. 61 yrs., g.r. 14*l.* 1,105
Camden Town.—Oseney-cres., i.g.r. 48*l.* 6s., u.t. 49 yrs., g.r. 6*l.* 760

By MIDDLETON & CRACKNELL.

Hampstead.—Greenhill, Rookwood and 1 a., f. .. 5,000

By ROBINSON & FISHER.

Hampstead.—107, West End-lane, u.t. 85 yrs., g.r. 11*l.* 11s. 600
East Farleigh, &c., Kent.—Gallant's Court Farm, 229 a. 0 r. 36 p., f. 11,600
Gallant's House and 6 a. 0 r. 31 p., f. 2,050
St. Helen's House and 3 a. 2 r. 28 p., f. 1,950
Cokehurst and 6 a. 3 r. 8 p., f. 1,800
Boughton Monchelsea, Kent.—East Hall Farm, 157 a. 0 r. 17 p., f. 5,000
A plot of fruit land, 4 a. 1 r. 23 p., f. 460

By St. QUINTIN & SON.

Bloomsbury.—50, Gloucester-st., f., r. 50*l.* 1,100

By A. SAVILL & SON.

Bulphan, Essex.—Martin's Farm, 48 a. 3 r. 13 p., f. 1,045
Judd's Holding, 6 a. 2 r. 22 p., f. 290
Thrift's Enclosures, 26 a. 0 r. 11 p., f. 500

By J. A. TRYTHALL.

Norwood.—118 to 124 (even), Holmesdale-rd., u.t. 65 yrs., g.r. 17*l.* 11s., r. 108*l.* 820
26 and 28, Farnley-rd., u.t. 79 yrs. g.r. 14*l.*, r. 64*l.* 560

By WARLTERS, LOVEJOY, & TELFER.

Stroud Green.—15 and 17, Osborne-road, u.t. 66 yrs., g.r. 12*l.* 12s., r. 78*l.* 790
Harringay.—29, Lorne-rd., u.t. 73 yrs., g.r. 6*l.* 10s., r. 37*l.* 400
108, Seymour-rd., u.t. 95 yrs., g.r. 7*l.*, e.r. 40*l.* 375

By ELLIOTT, SON, & BOYTON.

Kensington.—Palace Gardens-ter., i.g.r. 118*l.* 15s., u.t. 53 yrs., g.r. 8*l.* 5s. 2,350
Palace Gardens-ter., i.g.r. 15*l.*, u.t. 52¾ yrs., g.r. 1*l.* 270
Palace Gardens-ter., i.g.r. 60*l.*, u.t. 52¾ yrs., g.r. nil. 1,215
Brunswick-gardens, i.g.r. 75*l.*, u.t. 52¾ yrs., g.r. nil. 1,510
Bayswater.—Leinster-gardens, i.g.r. 61*l.*, u.t. 50 yrs., g.r. 11*l.* 950
Leinster-st., i.g.r. 30*l.*, u.t. 38 yrs., g.r. nil. 465
Cleveland-gardens, i.g.r. 22*l.* 10s. u.t. 38 yrs., g.r. 2*l.* 345
Inverness-ter., i.g.r. 46*l.* 10s., u.t. 39½ yrs., g.r. 2*l.* 810
Inverness-ter., i.g.r. 36*l.* 10s., u.t. 38½ yrs., g.r. nil. 650
Queen's-rd., i.g.r. 70*l.*, u.t. 38 yrs., g.r. 4*l.* 1,170
Queen's-rd., i.g.r. 49*l.*, u.t. 38 yrs., g.r. nil .. 895
186, Queen's-rd., u.t. 38 yrs., g.r. 8*l.*, r. 90*l.* 1,505
Hyde Park.—Little Chester-st., The Talbot p.-h., u.t. 19 yrs., g.r. 10*l.*, r. 60*l.* 640

By HAMPTON & SONS.

Newport, Monmouth.—The East Usk Branch Railway, with sidings, wharf, &c., also 11½ acres of land and f.g.r.'s 142*l.* 10s., reversions in 91, 81, and 37 yrs. 34,750
Andover, Hants.—Cricklade House and 20 a., f... 3,750
Carbrooke, Norfolk.—South Moor Farm, 23 a. 1 r. 7 p., f. 340
A freehold windmill, residence, and 5¼ a. 375
Two enclosures of land, 5 a. 0 r. 16 p., f. 170
The Green Farm (part of), 109 a. 1 r. 4 p., f. and c. 2,550
Watton Green Farm, 152 a. 1 r. 36 p., f. and c. 3,100
A copyhold cottage and 1 a. 1 r. 39 p. 185
White Hall and 18 a. 3 r. 38 p., f. 1,150
Caudell Green Farm, 112 a. 3 r. 28 p., f. and c. 2,510
Two freehold cottages and 1½ a. 130
Bush or Beets Farm, 44 a. 1 r. 34 p., f. and c. .. 750
Sixteen cottages and 4 a. 0 r. 32 p., f. and c. 995

July 31.—By ABERCROMBIE & EDMUNDS.

Wood Green.—32, 34, 36, and 38, Lordship-lane, area 1¼ acre, f., e.r. 131*l.* 2,220

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By G. W. DAVIES & SON.

Islington.—2 and 3, Dean-street, u.t. 27 yrs., g.r. 8*l.* 8s. £660

By FIELD & SONS.

Rotherhithe.—45 and 47, Neptune-st., f. 400
15 and 17, Rotherhithe-st. (Mill Pond Wharf); 1 to 4, 15 and 16, Gillams-court, u.t. 33 yrs. g.r. 30*l.* 250
New Kent-rd.—Nos. 191 and 193, u.t. 54 yrs., g.r. 50*l.*, r. 150*l.* 1,150
Southwark.—263, Tabard-st., u.t. 73 yrs., g.r. 8*l.* 15, Little Hunter-st., u.t. 73 yrs., g.r. 8*l.* 500

By GOODMAN & CROWTHER.

Wickford, Essex.—Cray's Hill, freehold farm-house, and 25 a. 3 r. 0 p. 1,150
Cray's Hill, three enclosures, 19 a. 0 r. 4 p., f. 530

By HAMILTON & MIALL.

Norwood.—171, Knight's Hill, u.t. 57 yrs., g.r. 15*l.*, r. 70*l.* 950

By W. R. NICHOLAS & Co.

Chieveley, Berks.—Middle Farm, 15 a. 3 r. 20 p., f. 1,100

By ALEX. PHILLIPS.

Harlesden.—38, West Ella-rd., u.t. 96 yrs., g.r. 6*l.* 10s., e.r. 38*l.* 345
Kensal Rise.—121, Kempe-rd., u.t. 96 yrs., g.r. 7*l.* 7s., e.r. 45*l.* 400
Hampstead.—9, Sumatra-rd., u.t. 81 yrs., g.r. 15*l.* 10s., r. 32*l.* 365
38, Hillfield-rd., u.t. 71 yrs., g.r. 7*l.* 7s., e.r. 52*l.* 10s. 450

By FREDK. WARMAN.

Highbury.—71, Balfour-rd., u.t. 49 yrs., g.r. 6*l.* 6s., e.r. 48*l.* 475
169, Highbury New Park, u.t. 49 yrs., g.r. 15*l.* 1,050

By DEBENHAM, TEWSON, & Co.

Hornsey.—Middle-lane, Park View, Elm View, and St. Clare, u.t. 79 yrs., g.r. 25*l.* 10s., r. 100*l.* 850
Hammersmith.—77 and 79, Shaftesbury-rd., u.t. 52½ yrs., g.r. 12*l.*, r. 73*l.* 750
Notting Hill.—Portland-rd., the Portland Arms p.h., &c., f.g.r. 42*l.*, reversion in 49 yrs. 1,260
Elgin-cres., f.g.r's 20*l.*, reversion in 61 yrs. 590
Portobello-rd., f.g.r. 10*l.*, reversion in 22 yrs. .. 400
Hanwell.—Grove-ter., f.g.r. 10*l.*, reversion in 29 yrs. 270
Lansdowne-ter., f.g.r's 21*l.*, reversion in 28½ yrs. 490

By W. H. STICKNEY (at Hull).

Garnstead, Yorks.—A freehold close, 5 a. 0 r. 35 p. 475

By R. DONKIN & SON (at Newcastle).

Mitford, Northumberland.—The Spital Hill Estate, 159 a., f. 12,750

By SEYMOUR & WARING (at Rochester).

Hoo Street, Werburgh, Kent.—Four Elms and Heath's Farm, 116 a. 0 r. 23 p., f. 2,000
Allhallows, Kent.—New Hall Farm, 107 a. 2 r. 16 p., f. 3,030

By THOMAS WOODS (at Masons' Hall Tavern).

Twickenham.—Main-rd., the Railway Tavern, u.t. 15 and 54 yrs., r. 80*l.*, with goodwill, also shop and premises adjoining, f., r. 36*l.* 2,125

August 1.—By BAXTER, PAYNE, & LEPPER.

Bromley Common, Kent.—Brockhampton and 3 a. 2 r. 9 p., f. 3,525
Bromley, Kent.—13, Homefield-rd., f., e.r. 130*l.* 2,150
New-rd., a block of building land, 2 a. 0 r. 7 p., f. 900
Sandford-rd., a freehold cottage and plot of land 1,300

By BRADSHAW BROWN & Co.

Poplar.—2, Hack-st., f. 300
Old Ford.—Lefevre-ter., Plym Cottage, f. 230
Bromley-by-Bow.—10, Cook-st., u.t. 53 yrs., g.r. 3*l.* 215
Poplar.—45, 47, and 49, Brabazon-st., u.t. 62 yrs., g.r. 9*l.* 430
4 and 6, Hill-place-st., u.t. 52 yrs., g.r. 6*l.* 6s. .. 320
21, Woodstock-rd., u.t. 46 yrs., g.r. 4*l.* 10s., r. 34*l.* 400

By GARRETT, WHITE, & POLAND.

Regent-st.—34, Great Marlborough-st., f., r. 120*l.* 3,420

By GRANT, WHIELDON, & Co.

Whitechapel.—37, 38, and 39, Great Prescot-st., and 95, Mansell-st., area 1,900 ft., f., r. 190*l.* 4,500
Ealing.—South Ealing-rd., Weymouth Lodge, f... 1,025

By J. H. LYNCH.

Leytonstone.—Hartley-rd., Fernleigh and Woodlands, u.t. 96 yrs., g.r. 10*l.* 10s., r. 58*l.* 620

By SEDGWICK, SON, & WEALL.

St. Pancras.—5 to 13 (odd), Werrington-st., u.t. 44 yrs., g.r. 30*l.*, r. 213*l.* 2,030
Southwark.—28 and 30, Merrick-sq., u.t. 25 yrs., g.r., &c., 9*l.* 10s., r. 86*l.* 655

By C. SPARROW & SON.

Finchley.—Regent's Pk.-rd., St. Kilda, f. 1,795

By E. H. HENRY.

Camberwell.—41, Coleman-rd., u.t. 61 yrs., g.r. 4*l.* 10s. 330
Old Kent-rd.—1, 3, and 5, Bridson-st., f. 465
Clapham.—58 and 60, Ferndale-rd., u.t. 70 yrs., g.r. 13*l.* 2s. 560

By F. JOLLY & Co.

Hackney.—16, Gore-rd., u.t. 53½ yrs., g.r. 10*l.* .. 650

By PROTHEROE & MORRIS.

Upminster, Essex.—Moor-lane, two enclosures of pasture, 36 a. 3 r. 31 p., f. 1,675
St. Mary's-lane (near), an enclosure of pasture, 3 a., f. 140
Leytonstone.—61, 63, and 65, Oakdale-rd., u.t. 85 yrs., g.r. 11*l.* 5s. 430

By REYNOLDS & EASON.

Stratford.—41, New-rd., f. 135
Old Ford.—101, 103, and 105, Roman-rd., f., r. 102*l.* 10s. 1,980
40 and 42, Driffield-rd., f. 770
Bethnal Green.—2 to 18 (even), Venice-st., f. 2,095
14, 15, and 16, Octagon-st., f. 625
6 and 48, Maroon-st., c. 510
Bow.—14 and 15, Harley-st, u.t. 26 yrs., g.r. 7*l.* 10s., r. 84*l.* 855
Old Ford.—114 to 142 (even), Roman-rd., u.t. 42 yrs., g.r. 47*l.* 10s., r. 460*l.* 4,340

By SIMMONS & SONS and NASH, SON & Co. (at Royston).

Ashwell, &c., Herts.—The Redlands Estate, 334 a. 3 r. 18 p., f. 6,000

By ALFRED PREECE (at Holloway).

Holloway.—44, Ashbrook-rd., u.t. 60 yrs., g.r. 6*l.* 220
21, Bedford-ter., u.t. 56 yrs., g.r. 4*l.* 210
41, 55, and 57, Cottenham-rd., u.t. 61 yrs., g.r. 16*l.* 10s. 690
29, Wray-cres., u.t. 68 yrs., g.r. 8*l.*, r. 38*l.* 320

August 2.—By W. A. DELL.

Finchley.—10 and 11, Torrington-parade, u.t. 87 yrs., g.r. 24*l.*, r. 120*l.* £1,545

By H. J. BLISS & SONS.

Canning Town.—3 to 11 (odd), John-st., u.t. 77 yrs., g.r. 21*l.* 570
11 to 19 (odd), Emily-st., u.t. 77 yrs., g.r. 21*l.* .. 550

By WALTER COBB.

Sydenham.—Mayow-rd., Fairhill, f., r. 50*l.* 950
2, Crescent-rd., u.t. 38½ yrs., g.r. 15*l.* 7s. 6d., e.r. 120*l.* 1,100

By FISHER, STANHOPE, & DRAKE.

Stroud Green.—156, Stroud Green-rd., u.t. 67 yrs., g.r. 11*l.* 13s., r. 90*l.* 1,150
Stoke Newington.—30, Rectory-rd., u.t. 39½ yrs., g.r. 7*l.*, e.r. 55*l.* 545
Stamford Hill.—45, Northfield-rd., u.t. 85 yrs., g.r. 9*l.*, r. 60*l.* 715

By GLASIER & SONS.

Putney.—252, Upper Richmond-rd., u.t. 65 yrs., g.r. 13*l.* 15s., r. 70*l.* 820
Clapham.—95, Clapham Park-rd., f., r. 40*l.* 675

By GEORGE PEARCE & SONS.

Kentish Town.—9, 11 and 13, Charlton King's-rd., u.t. 45 yrs., g.r. 4*l.* 10s. 700

By ALFRED RICHARDS.

Dalston.—Dalston lane, Hartwell's Farm Dairy and Avenue Villa, u.t. 42 yrs., g.r. 20*l.*, r. 89*l.* 650
Homerton.—23 and 25, Hassett-road, u.t. 60 yrs., g.r. 4*l.* 510

By RUTLEY, SON & VINE.

Holloway.—24 and 26, Marlborough-road, u.t. 58 yrs., g.r. 14*l.*, r. 80*l.* 395

By WINCH & SONS.

Goudhurst, Kent.—Pound Field, 20 a. 0 r. 14 p., f. 740
Four freehold cottages and 23 a. 1 r. 39 p., f. .. 740
Freehold house and shop premises, r. 30*l.* 400

By FAREBROTHER, ELLIS, & Co.

Gt. Canfield, Essex.—Canfield Hall and Marsh Farms, 392 a. 0 r. 20 p., f. 3,550
Waylett's Meadow and six cottages, 3 a. 3 r. 21 p., f. 615
The Griffin p.h. and 1 a. 1 r. 0 p., f. 1,650
Blackhall and Evans Farms, 55 a. 3 r. 13 p., f. 560
Enclosure of land, 10 a. 0 r. 6 p., f. 150
Cottage, blacksmith's shop, and 0 a. 2 r. 1 p., f. 250
Whitehead's Cottages and 71 a. 0 r. 13 p., f. .. 450
Woolard's Ash Farm, 78 a. 2 r. 30 p., f. 600
Taverners Green and Grange Cottages and 1 a. 0 r. 8 p., f. 370
Whitehead's Farm, 83 a. 0 r. 30 p., f. 565
Deal Tree Farm, 65 a., 1 r. 8 p., f. 520
Frank Martin's Farm, 57 a. 3 r. 34 p., f. 400
Seven cottages and gardens, 1 a. 0 r. 39 p., f. .. 275
Pecker's Farm, 152 a. 3 r. 2 p., f. 1,250
The Grange Farm, 375 a. 3 r. 15 p., f. 3,000
Fanns Farm, 57 a. 1 r. 26 p., f. 650
Poplars Farm, 34 a. 3 r. 30 p., f. 350
Little Canfield, Essex.—Langthorns Farm, 104 a. 2 r. 39 p., f. 1,310
Great Dunmow, Essex.—Barnston House Farm, 108 a. 1 r. 33 p., f. 1,610
White Roding, Essex.—Greylands Farm, 47 a. 2 r. 16 p., f. 800
The Laurels, Old Rectory Cottages and Paddock, 1 a. 1 r. 26 p., f. 620
South Kensington.—Hollywood-rd., Hollywood, area 18,400 ft., f. 6,800

August 3.—By COOPER & GOULDING.

Clapton.—Evering-rd., freehold builder's yard and premises, e.r. 75*l.* 1,100

By ELLIS & SON.

Peckham.—New James-st., f.g.r's 42*l.*, reversion in 63 yrs. 906
Greenwich.—Annandale-rd., f.g.r's 25*l.* 45s., reversion in 64 yrs. 665
Harringay.—Umpeville-rd., f.g.r's 42*l.*, reversion in 83 yrs. 1,110

By Messrs. GIBSON.

Camberwell.—53 and 55, George-street, f. 840
1 and 2, Guildford-place, f. 385

By JONES, LANG, & Co.

Wandsworth.—34, Honeywell-rd., u.t. 79 yrs., g.r. 8*l.* 10s. 400
Islington.—77, Rotherfield-st., u.t. 33 yrs., g.r. 7*l.*, r. 40*l.* 855

***Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.**

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	s.	d.				
Hard Stocks	34	0	per thousand alongside, in river.			
Rough Stocks and Grizzles	30	0	,,	,,	,,	,,
Smooth Bright Facing Stocks..	58	0	,,	,,	,,	,,
Shippers	42	0	,,	,,	,,	,,
Flettons.....	29	6	,,	,,	at railway depôt.	
Red Wire Cuts ..	34	0	,,	,,	,,	,,
Best Fareham Red	71	6	,,	,,	,,	,,
Best Blue Pressed Staffordshire ..	87	0	,,		,,	,,
Best Stourbridge Fire Bricks	84	6	,,	,,	,,	,,
Best White Glazed Stretchers.....	260	0	,,	,,	,,	,,
Headers	240	0	,,	,,	,,	,,
Quoins and Bull-nose	340	0	,,	,,	,,	,,
Double Headers..	320	0	,,	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	,,	,,	,,	,,
Quoins and Bull-nose	280	0	,,	,,	,,	,,

PRICES CURRENT (*Continued*).

	s.	d.				
Double Headers..	280	0	per thousand at railway depôt.			
Seconds Quality White and Dipped						
Salt Glazed	40	0	per thousand less than best.			

	s.	d.	
Thames and Pit Sand	8	0	per yard, delivered.
Thames Ballast	6	9	,, ,,
Best Portland Cement	35	0	per ton ,,
Best Ground Blue Lias Lime..	23	6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s.	d.			
Ancaster in blocks	2	0	per ft. cube, deld. rly. depôt		
Bath ,, ...	1	7	,,	,,	
Beer ,, ...	1	6½	,,	,,	
Grinshill ,, ...	1	10	,,	,,	
Brown Portland in blocks	2	2	,,	,,	
Darley Dale ,,	2	1½	,,	,,	
Red Corsehill ,,	2	5	,,	,,	
Red Mansfield ,,	2	4½	,,	,,	
Hard York ,,	2	10	,,	,,	
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	7	per ft. super at rly. depôt.		
,, ,, 6 in. Rubbed Ditto..	2	10½	,,	,,	
,, ,, 3 in. sawn both sides slabs (random sizes)	1	3	,,	,,	
,, ,, 3 in. self-faced Ditto	0	9	,,	,,	

SLATES.

n. in.	£	s.	d.		
20×10 best blue Bangor..	11	5	0	per 1000 of 1200 at ry. dep.	
,, best seconds ,,	10	15	0	,,	,,
16×8 best ,,	6	2	6	,,	,,
20×10 best blue Portmadoc	10	18	0	,,	,,
16×8 ,, ,,	6	0	0	,,	,,
20×10 best Eureka unfading green.....	11	2	6	,,	,,
16×8 ,, ,,	6	15	0	,,	,,
20×10 Permanent green and Sedan green	10	0	0	,,	,,
16×8 ,, ,,	5	12	6	,,	,,

TILES.

	s.	d.	
Best plain red roofing tiles..	41	6	per 1,000 at rly. depôt.
Hip and valley tiles....	3	7	per doz. ,, ,,
Best Broseley tiles	48	6	per 1,000 ,, ,,
Hip and valley tiles....	4	0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000 ,, ,,
Do. ornamental Do.	60	0	,, ,, ,,
Hip tiles.....	4	0	per doz. ,, ,,
Valley tiles.....	3	9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000 ,, ,,
Hip tiles	4	1	per doz. ,, ,,
Valley tiles.....	3	8	,, ,, ,,

WOOD.

BUILDING WOOD.—YELLOW.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15 10 0	16 10 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0	,, ,,
	As per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 5 0	4 10 0
Seconds	3 17 6	4 5 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10
JOINERS' WOOD.	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	17 10 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	24 0 0	25 0 0
Do. 3 in. by 9 in.	21 0 0	22 0 0
Battens.....	16 0 0	17 0 0
Second yellow deals, 3 in. by 11 in.....	18 0 0	19 10 0
Do. 3 in. by 9 in.	16 10 0	17 10 0
Battens.....	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	14 10 0	15 10 0
Do. 3 in. by 9 in.	13 10 0	14 10 0
Battens.....	12 0 0	13 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in. ..	13 10 0	14 10 0
Battens.....	11 10 0	12 10 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
,, ,, ,, 3 in. by 9 in.	12 10 0	13 10 0
,, ,, battens	10 10 0	11 10 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	29 0 0	31 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Oddments	20 0 0	22 0 0

[*See also page 143.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Munic Bu	South Shields Town Council	200*l.*, 100*l.*, and 50*l.*	Oct.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
School, Renfrew-road	Paisley School Board	J. Hutchison, Architect, 127, St. Vincent-street, Glasgow	Aug. 14
Chimney at Workhouse	Todmorden Guardians	J. Horsfall, Architect, Todmorden	do.
Paving Streets	Salford Corporation	L. C. Evans, Town Hall, Salford	do.
Dye House, Bingley	.....	Jackson & Sons, Architects, Tanfield Chambers, Bradford	do.
Fire Engine House, &c., High-street	Southall U.D.C.	H. R. Felkin, Surveyor, Southall	do.
Street Works, Augusta-road, &c.	Yardley R.D.C.	A. W. Smith, Surveyor, 460, Stratford-rd., Sparkhill, Birmingham	do.
Additions to Residence, Burton Park, Ireland	.....	W. H. Hill & Son, Architects, 28, South-mall, Cork	do.
Sewers	St. Marychurch, Devon, U.D.C. ...	R. H. Worth, Civil Engineer, 42, George-street, Plymouth	Aug. 15
Sewerage Works, Kemnay	Garloch District Committee	Jenkins & Marr, Civil Engineers, 16, Bridge-street, Aberdeen	do.
Rebuilding Hollymount, Rathmullan, co. Donegal .	Mr. P. H. Edwards	J. P. M'Grath, Architect, 28, Carlisle-road, Londonderry	do.
Paving Works, High-street and London-road	Stoke-upon-Trent Corporation	J. B. Ashwell, Town Hall	do.
Granite (1,500 tons)	Felixstowe U.D.C.	G. S. Horton, Surveyor, Town Hall	do.
Additions to Cottages, Middleton-road, Alston	do.	G. Dale Oliver, County Architect, Carlisle	do.
Twenty-four Cottages, near Porth	Lewis Merthyr Collieries, Ltd. ...	James & Morgan, Architects, Charles-street Chambers, Cardiff..	do.
Three Houses, near Porth	do.	do.	do.
Schools, Lord-street	Colne (Lancs.) School Board	H. Holgate, Architect, Market-street, Colne	do.
Water Supply Works, Kilbirnie	Ayrshire County Council	W. R. Copland, Civil Engineer, 146, West Regent-street, Glasgow	do.
Alterations, the Rock Inn, Morley	Mr. J. A. Sykes	Buttery & Birds, Architects, Morley	do.
Alterations to Schools at Workhouse	Middlesbrough Guardians	Lofthouse & Sons, 62, Albert-road, Middlesbrough	do.
Kerb, Granite Cubes, &c.	Watford U.D.C.	Engineer, 14, High-street, Watford	do.
Granite Road Metal (2,000 tons)	do.	do.	do.
Drainage Works, Rathfarnham	South Dublin R.D.C.	A. Scott & Son, Architects, Drogheda	do.
Hotel, Blue Row, Bishop Auckland	Cashel (Ireland) Guardians	F. H. Livesay, Architect, Bishop Auckland	Aug. 16
Additions to Workhouse	Trustees	W. Phelan, Workhouse, Cashel	do.
Chapel, Roathe, Cardiff	St. Giles (Devon) School Board ..	Rees & James, Architects, 37, St. Mary-street, Cardiff	Aug. 17
School Buildings	Met. Bank of England & Wales, Ld	Wise & Wise, Architects, Launceston	do.
Alterations to 20 & 21, High-street, Haverfordwest ..	Managers	D. E. Thomas, Architect, Victoria-place, Haverfordwest	Aug. 18
Alterations to Chapel, Lion-street, Blaenavon	Mr. E. E. Bevan	S. Alsop, 13, New William-street, Blaenavon	do.
Farm Buildings, Farnham	Skerries (co. Dublin) Baths Comte.	A. H. Guyer, Architect, South-street, Farnham	do.
Re-erection of the New Inn, Resolven, Wales	Kingston-on-Thames Corporation	J. Cook Rees, Architect, St. Thomas's Chambers, Neath	do.
Baths, Concert Hall, &c.	Sunbury-on-Thames U.D.C.	F. Shaw, Architect, 20, Laurence-street, Drogheda	do.
*Electric Works Extension	Woodford (Essex) U.D.C.	Borough Surveyor, Clattern House	do.
Sewerage Works	Sedgley School Board	H. F. Coales, Surveyor, Council Offices	Aug. 20
Granite Road Metal (1,500 tons)	Bredbury U.D.C.	J. A. Simpson, Woodford Green	do.
Additions to Schools	Brighton County Council	S. H. Eachus, Architect, Lichfield-street, Wolverhampton	do.
Sewage Outfall Works	Maesteg Hospital Committee	W. Spinks, Engineer, 20, Park-row, Leeds	do.
Foreman's House, &c., at Mill Oak	Lytham, Lancs. U.D.C.	Town Clerk, Town Hall, Brighton	do.
Hospital	South Mines R.D.C.	J. Humphreys, Civil Engineer, Town Hall Chambers, Maesteg ..	Aug. 21
Purifying House at Gasworks	Leeds Tramways Committee	T. Newbigging & Son, Engineers, 5, Norfolk-street, Manchester..	do.
Granite Road Metal, Barnet	.....	G. D. Byfield, 16, High-street, Barnet	do.
Boiler House at Generating Station, Crown Point	Hull School Board	City Engineer, Municipal Buildings, Leeds	do.
House and Cottages, Portslade, Sussex	Lexden and Winstree R.D.C.	F. J. Tillstone, Town Hall, Brighton	do.
Additions to Schools, Warone-street	Fenny Stratford School Board	B. S. Jacobs, Architect, Bowlalley-lane, Hull	do.
*Bridges, &c.	Shoreditch Guardians	See Advertisement	do.
*Girls' School	Aylesbury U.D.C.	Clerk, School Board Offices, Fenny Stratford	do.
*Alterations at Infirmary	Mr. H. M'Lennan	F. J. Smith, Parliament Mansions, Victoria-street, S.W.	do.
Paving, &c., Market-square	Brighton County Council	J. H. Bradford, Surveyor, 2, Rickford's-hill, Aylesbury	Aug. 22
House, Springhill Nurseries, Aberdeen	Taunton T.C.	Jenkins & Marr, Civil Engineers, 16, Bridge-street, Aberdeen	do.
*Concrete Groyne	West Ham County Council	Borough Engineer, Town Hall, Brighton	do.
*Storage Reservoir, &c.	Aston Guardians	See Advertisement	Aug. 24
*Sewers, &c.	Derbyshire County Council	Borough Engineer, Town Hall, West Ham, E.	Aug. 27
Additions to Workhouse, Gravelly Hill, nr. Birmingham	.....	C. Whitewell, Architect, 23, Temple-row, Birmingham	do.
Police Station, Clown	Marlborough (Wilts) Corporation	J. Somes Story, County Surveyor, County Offices, Derby	Aug. 28
Church Restoration, Wilton-le-Wear	Messrs. Bushill & Sons	Boreham & Morton, Surveyors, 24, John-street, Sunderland	Aug. 29
*Taking Down Town Hall and Erecting New Hall, &c.	Hand-in-Hand Fire and Life Office	See Advertisement	Aug. 31
Additions to Factory, Cow-lane, Coventry	Messrs. Robinson Bros.	H. Reed, Architect, 12, Castle-street, Exeter	Sept. 4
Business Premises, Park-row, Leeds	Mr. T. Lister	Oliver & Dodgshun, Architects, 3, East-parade, Leeds	No date
Nine Houses, House and Shop, Beeston-road, Leeds..	.....	J. Robinson, 4, Marley-view, Beeston	do.
Business Premises, St. Cuthbert's-lane, Carlisle		J. Graham, Architect, Bank-street, Carlisle	do.
Water Supply Works, Uffington, near Stamford		R. M. English, Stamford	do.
House, Brighouse		A. E. Kirk, Architect, 13, Bond-street, Brighouse	do.
Road Works, &c., Sea View-road, Brightlingsea		Baker & May, Architects, Colchester	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Surveyor and Inspector of Nuisances	Waltham Holy Cross U.D.C.	275*l.* per annum	Aug. 22
*Clerk of Works	Coventry Corporation	3*l.* 10*s.* per week	do.
*Assistants	do.	.....	do.
*Clerk of Works	Hackney Vestry	4*l.* per week	Aug. 24
*Engineer and Chief Surveyor	Tottenham U.D.C.	600*l.* per annum	Sept. 3
*Architectural Assistant (temporary)	.....	3½ guineas per week	No date

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xviii. xix. & xxi.*

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PRICES CURRENT (*Continued*).

	£	s.	d.	£	s.	d.
Kauri Pine—						
Planks, per ft. cube	0	3	6	0	4	0
Dantzig and Stettin Oak Logs—						
Large, per ft. cube	0	2	6	0	2	8
Small " "	0	2	4	0	2	7
Wainscot Oak Logs, per ft. cube	0	5	6	0	6	0
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	0	0	9
Mahogany—						
Honduras, Tabasco, per ft. sup. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	16	0	0	20	0	0
American Whitewood Planks—						
Per ft. cube	0	2	3	0	3	0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	9	7	6	-	-	-
Compound Girders " "	13	10	0	-	-	-
Angles, Tees and Channels, ordinary sections	12	10	0	14	10	0
Pitch Plates	12	0	0	0	0	0

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON—						
Common Bars	10	5	0	10	15	0
Staffordshire Crown Bars, good merchant quality	11	5	0	11	15	0
Staffordshire "Marked Bars"	13	5	0	-	-	-
Hoop Iron, basis price	11	5	0	11	15	0
" " galvanised	17	0	0*	-	-	-
(* And upwards, according to size and gauge.)						
Sheet Iron, Black.—	£	s.	d.	£	s.	d.
Ordinary sizes to 20 g.	11	10	0	-	-	-
" " to 24 g.	12	5	0	-	-	-
" " to 26 g.	13	15	0	-	-	-
Sheet Iron, Galvanised, flat, ordinary quality.—						
Ordinary sizes, 6 ft. by 2 ft. by 3 ft. to 20 g.	14	15	0	-	-	-
" " 22 g. and 24 g.	15	5	0	-	-	-
" " 26 g.	16	15	0	-	-	-
Sheet Iron, galvanised, flat, best quality.—						
Ordinary sizes to 20 g.	18	10	0	-	-	-
" " 22 g. and 24 g.	19	0	0	-	-	-
" " 26 g.	20	10	0	-	-	-
Galvanised Corrugated Sheets.—						
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14	0	0	14	15	0
" " 20 g. and 24 g.	14	15	0	15	10	0
Cut nails, 3 in. to 6 in.	11	10	0	-	-	-
(Under 3 in. usual trade extras.)						
LEAD—Sheet, English, 3 lbs. & up.	20	7	6	-	-	-
Pipe in coils	20	17	6	-	-	-
ZINC—Sheet—						
Vieille Montagne ton	28	0	0	-	-	-
Silesian	27	10	0	-	-	-
COPPER—						
Strong per lb.	0	1	0	-	-	-
Thin "	0	1	2	-	-	-
Copper nails "	0	1	3	-	-	-
TIN—English Ingots "	0	1	6	-	-	-
SOLDER—Plumbers' "	0	0	8	-	-	-
Tinmen's "	0	0	10	-	-	-
Blowpipe "	0	1	0	-	-	-

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3¼d. " "
" " fourths	3d. " "
26 oz. thirds	4¼d. " "
" " fourths	4d. " "
32 oz. thirds	5¼d. " "
" " fourths	5d. " "
Flatted sheet, 15 oz.	3¼d. " "
" " 21 "	4¼d. " "
½ Hartley's Rolled Plate	3d. " "
⅜ " " "	3½d. " "
½ " " "	4d. " "

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	3	1
" " in barrels	"	0	3	2
" " in drums	"	0	3	4
Boiled " in pipes	"	0	3	4
" " in barrels	"	0	3	5
" " in drums	"	0	3	7
Turpentine, in barrels	"	0	2	11
" in drums	"	0	3	2
Genuine Ground English White Lead	per ton	27	10	0
Red Lead, Dry	"	24	0	0
Best Linseed Oil Putty	per cwt.	0	9	6
Stockholm Tar	per barrel	1	7	0

VARNISHES, &c.

	per gallon. £	s.	d.
Fine Elastic Copal Varnish for outside work	0	16	6
Best Elastic Copal Varnish for outside work	1	0	0
Best Elastic Carriage Varnish for outside work	0	16	6
Best Hard Oak Varnish for inside work	0	10	6
Best Extra Hard Church Oak Varnish for inside work	0	10	6
Fine Hard Copal Varnish for inside work	0	16	0
Best Hard Copal Varnish for inside work	1	0	0
Best Hard Carriage Varnish for inside work	0	16	0
Extra Pale Paper Varnish	0	12	0
Best Japan Gold Size	0	10	0
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	9	0
Berlin Black	0	15	6
Knotting	0	10	0
Best French and Brush Polish	0	10	0

TO CORRESPONDENTS.

W. H. H. (your letter is not a suitable one to publish.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BATH.—For the erection of a house, stables, &c., Midford, for Mr. W. B. Grant. Mr. H. W. Matthews, architect, Terrace-walk, Bath. Quantities by architect :—

Wills & Sons, Bath	£3,210	Mannings & Son, Bath	£2,740
Rudman, Wilts	2,921	Erwood & Morris, Bath	2,625
Hayward & Wooster, Bath	2,884		
Long & Sons, Bath	2,765		

BRIGHOUSE.—For the erection of a hospital laundry, Clifton, for the Joint Hospital Board. Messrs. Sharpe & Waller, architects, 32, Bradford-road, Brighouse. Quantities by the architects :—

Masonry.—Marshall & Co., Brighouse	£236 10 6
Joinery.—Wm. Halliwell, Brighouse	76 18 0
Plumbing.—Fred. Ogden, Brighouse	46 0 0
Plastering.—Castle & Hynes, Brighouse	33 10 0
Slating.—Jas. Smithies, Bradford	37 18 6
Painting.—A. Marshall, Rastrick	35 0 0
Laundry Machinery.—Tomlinson & Milan, Huddersfield	317 10 0
Boiler.—Tomlinson & Milan, Huddersfield	132 0 0

BRIGHOUSE.—For the erection of four houses Dyson-street, Brighouse, for Messrs. Dyson & Broomhead (mason's work excepted). Messrs. Sharp & Waller, architects, 32, Bradford-road, Brighouse. Quantities by architects :—

Carpentry and Joining.—B. Rayner, Rustrick	£157 0
Plumbing and Glazing.—A. L. Waddington, Brighouse	53 2
Plastering.—J. Barraclough, Brighouse	55 0
Painting.—E. Earnshaw, Brighouse	12 0

DEAL (Kent).—For the erection of Wesleyan Sunday-school buildings, for the school trustees. Mr. C. L. Crowther, architect, Deal. Quantities by the architect :—

Austin & Lewis	£1,672 0	Denne & Son	£1,430 0
Gibbons & Son	1,559 0	A. W. Thompson	1,289 16
G. & A. J. Cottew	1,532 0	F. Collyer	1,280 0
T. Turner	1,469 0	Hayward & Son Wellington-road, Deal†	1,259 0
Lewis & Sons	1,450 0		

HANLEY.—For the erection of shop, Lamb-street, Hanley, for Messrs. Huntbach & Co. Messrs. R. Scrivener & Sons, architects, Hanley :—

J. Gallimore	£4,534	Grant & Son	£4,130
Bennett Bros.	4,500	G. Ellis, Hanley*	4,100
Cornes & Son	4,152	T. Godwin	4,099

KING'S LYNN.—For extensions to electricity station for the Corporation. Mr. H. J. Weaver, Borough Engineer, Town Hall, King's Lynn :—

A. F. Foreman	£1,395 10 6	Bardell Bros.,	
Robert Dye	1,292 0 10	King's Lynn*	£1,178 0 0

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Excavating, Bricklaying, Flagging, and Slating.—Brailsford & Hayes*	£589 0
Masonry.—Robert Berry*	240 0
Carpentry and Joinery.—James Tomlinson*	460 0
Plumbing and Painting.—Thomas Cocker*	155 5
Plastering.—J. Tomlinson*	42 17

[All of Leyland.]

LONDON.—For certain structural alterations, and new shop fronts, &c., to Nos. 31 to 37, Westbourne-grove, for Messrs. Wm. Whiteley, Limited. Messrs. Howgate & Keith, architects, 70, Gower-street, W.C. :—

Holloway Bros.	£5,620	Dove Bros.	£4,995
Hall, Beddall, & Co.	5,400	Lawrance & Sons	4,548

LONDON.—For the erection of new counting-house in Douglas-place, extension of shops, Nos. 31 to 37, Westbourne-grove, for Messrs. Wm. Whiteley, Limited. Messrs. Howgate & Keith, architects, 70, Gower-street, W.C. :—

Holliday & Greenwood	£39,256	McCormick & Sons	£37,890
Lascelles & Co.	38,900	Lawrance & Sons	37,773
Holloway Bros.	38,500	Simpson & Son	36,442

LONDON.—For sanitary and hot-water engineer's work at The Mount, Duppas Hill, Croydon, for Mr. W. F. Knight. Mr. H. Fuller Clark, architect, 28, John-street, Bedford-row, W.C. :—

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NORTHAMPTON.—For fitting up Bective Shoe Factory, Northampton, for Messrs. James Branch & Sons, Limited. Mr. Alexander Anderson, architect, Northampton. Quantities by the architect :—

Benches, Partitions, Cupboards, Office, and Gas Fittings.

E. Archer	£720	A. J. Chown, Northampton*	£700
H. Beeby	710		

Heating, Low Pressure System.

Mobbs & Co.	£530	A. Marriott, Higham Ferrers*	£299
Lowke	383		
Jones & Attwood	320		

Shafting, Pullies, &c.

Pearson & Bennion	£397	Gascoigne	£333
Lowke	395	Simpson	321
Grose Norman	367	Whitfield, Kettering*	299

Electric Lighting.

Alliance Co.	£468	National Electric Wiring Co., Northampton*	£170
Whitmy Smith	248		
Duckenfield	240		
Hanwell	234		

Piping for Dust Extraction.

Whitfield	£130	British United Shoe Machinery Co., Leicester*	£100
Standard Engineering Co.	114		
Brinkloe	107		

NORTHAMPTON.—For erection of new residence for Dr. Cairns, Barrack-road, Northampton. Mr. Alexander Anderson, architect, Northampton :—

A. J. Chown	Sharman & Son*

* Accepted at schedule of prices.

Plumbing and Decorator Work.

C. Westley	H. Hanwell*
E. Nichols	

* Accepted by schedule.

NORTHAMPTON.—For erection of new warehouses, workshops, Northampton, for Messrs. Jeffery, Sons, & Co., Ltd. Mr. Alexander Anderson, architect, Northampton. Quantities by architect :—

W. Heap	£2,745	Wingrove & Stanley	£2,510
A. P. Hawtin	2,655	Harper	2,430
Branson	2,610	Crow & Gardner, Northampton‡	2,400
Wilford & Judkin	2,555		
Allright	2,530		

‡ Accepted subject to modification.

NORTHAMPTON.—For erection of new leather warehouse, Fish-street, Northampton, for Messrs. Malcolm Inglis & Co., Glasgow. Mr. Alexander Anderson, architect, Abington-street, Northampton. Quantities by architect :—

Bricklaying, Masonry, and Carpentry Work.

H. Martin	£6,923	G. J. Fisher	£5,967
Sharman & Son	6,816	H. Green	5,963
J. M. Panting	6,608	E. Archer, Northampton*	5,874
Wingrove & Stanley	6,125		
A. P. Hawtin	5,985		

Plumbing, Glazing, and Painting.

R. Cleaver	£1,025	Westley	£892
A. P. Hawtin	970	Martin	888
H. Green	960	Harris	872
E. Archer	937	Nichols	867
Wingrove & Stanley	920	Hanwell, Northampton*	819

PAIGNTON.—For alterations, additions and new stabling at Kingshurst, for Mr. W. Morrison. Mr. W. G. Couldrey, architect, Paignton. Quantities by Mr. Vincent Cattermole Brown, Paignton :—

R. F. Yeo	£2,794 15 0	Webber & Sons	£2,648 10 6
E. Westlake	2,766 0 0	C. & R. E. Drew Paignton*	2,490 8 4
R. Harris	2,716 0 0		
E. P. Bovey	2,673 0 0		

PETERSTON-SUPER-ELY.—For additions to National School, Peterston-super-Ely, near Cardiff. Mr. Geo. E. Halliday, architect, 14, High-street, Cardiff. Quantities by Mr. J. W. Rodger, Cardiff :—

Knox & Wells	£447 0 0	E. A. Thomas	£330 0 0
C. H. Cooksley	400 0 0	Steadman & Harris, Peterston*	324 16 0
Blacker Bros.	368 14 2	W. Cox	296 0 0
Couzens & Co.	362 8 4		
F. Couzens	344 16 4		
J. Morgan	340 10 0		

ROCHFORD (Essex).—For additions to schools for the School Board. Mr. W. Y. Hobbiss, architect, 57, High-street, Southend-on-Sea :—

Shelborne & Co.	£509 12 0	Davis & Leaney	£399 0 0
Howard & Ruffell	452 19 4	A. Woodiwiss	398 8 0
F. & E. Davey	431 0 0	Dupont & Co.	395 0 0
W. E. Davey	430 0 0	E. West	390 0 0
A. J. Golding	413 12 2	S. Norden, Rochford, Essex*	368 16 0

RUSHDEN, NORTHANTS.—For the erection of a Baptist Chapel. Mr. H. H. Dyer, architect, 1, Sheep-st., Northampton. Quantities by architect.

E. Mitchel	£5,712	T. Wilmot, junr.	£4,805
T. H. Coleman	5,450	H. Sparrow	4,799
E. Brown & Son	5,300	R. Marriott	4,778
Hacksley Bros.	5,089	Bayas, Griffith-st., Rushden*	4,763
Geo. Henson	5,060		
Whittinton & Tomlin	4,839		

[*See also next page.*

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RUSHDEN.—For extensions and alterations to shoe factory, for Messrs. Cunnington Bros., Rushden. Mr. Alexander Anderson, architect, Abington-street, Northampton. Quantities by architect :—

Brown & Son	£2,142	T. Swindall	£1,974
Willmott	2,050	E. Mitchell	1,973
T. & C. Berrill	2,013	H. Sparrow (Rushden)*	1,900
Whittington & Tomalin	1,997		

SHREWSBURY. — For alterations to Shrewsbury College. Messrs. Dalgleish & Dickens-Lewis, architects, Shrewsbury. Quantities by the architects :—

G. H. Bickerton	£1,780	John Gethin	£1,694
Geo. Bullock	1,727	Price & Sons, Shrewsbury*	1,660
Henry Price	1,699		

THORNBURY (Glos.).—For the erection of a villa residence, Milbury Heath, for Mr. G. J. Barrett. Mr. S. Fudge, architect, Thornbury :—

Bruton & Son	£1,550	E. Preece, Bristol*	£933 10
J. Slade	1,370 6		

WARMINSTER.—For the erection of a residence, Boreham-road. Mr. H. F. Price, architect, Weston-super-Mare. Quantities by architect :—

Cock & McLean	£2,830 0 0	G. & J. E. Stokes	£2,523 0 0
P. J. Ponton	2,738 15 2	Butcher & Son	2,475 2 10
J. Gaisford	2,703 0 0	C. Addicott, Weston-super-Mare*	2,404 8 0
Parsons & Son	2,684 9 7		
H. Franklin	2,675 16 5		

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect :—

ALDENHAM-STREET.—Painting :—

T. Cruwys	£235 0	Wall & Co.	£170 15
J. W. Dixon	230 0	W. Chappell	160 0
W. Brown	179 6	Marchant & Hirst*	152 10

ATLEY-ROAD.—Painting :—

Gibb & Co.	£277 0	G. Wales	£213 14
S. H. Corfield	270 0	Elkington & Sons	197 0
J. Kybett	253 0	J. T. Robey	194 0
A. W. Derby	244 0	J. Haydon*	168 10

BROAD-STREET.—Painting :—

S. H. Corfield	£275 0	Gibb & Co.	£234 0
J. T. Robey	268 0	A. W. Derby	217 0
J. F. Holliday	262 0	J. Kybett	211 10
Johnson & Co.	257 0	G. Barker*	169 0

CHEQUER-STREET.—Painting :—

T. Cruwys	£230 0 0	Bristow & Eatwell	£164 14 0
J. W. Dixon	216 0 0	W. Hornett	153 18 0
B. E. Nightingale	189 0 0	Marchant & Hirst	149 10 0
W. Banks	174 15 6	W. Chappell*	135 0 0

COLUMBIA-ROAD.—Painting :—

S. H. Corfield	£179 0 0	Elkington & Sons	£135 18 11
J. F. Holliday	172 0 0	G. Barker	130 0 0
G. Wales	152 0 0	M. Pearson	130 0 0
Silk & Son	147 0 0	J. Haydon	114 10 0

DETMOLD-ROAD.—Painting :—

McCormick & Sons	£141 0	G. Barker	£107 0
Silk & Son	121 10	Heard & Co.	104 0
A. W. Derby	120 0	G. Wales	101 0
T. Cruwys	108 0	Barrett & Power*	90 0

FARNCOMBE-STREET.—Painting :—

White & Co.	£249 0	Johnson & Co.	£150 10
E. Triggs	168 0	G. Brittain	133 0
W. Banks	165 0	G. Barker*	130 0

GILLESPIE-ROAD.—Painting :—

F. Britton	£298 0	Stevens Bros.	£166 0
Silk & Sons	250 10	G. Barker	156 0
McCormick & Son	210 0	J. W. Dixon	134 0
G. Wales	188 0	C. & W. Hunnings*	102 10

GOODRICH-ROAD.—Painting :—

W. V. Goad	£220 14	Maxwell Bros.	£189 9
J. & C. Bowyer	214 0	C. G. Jones	184 0
Rice & Son	197 0	W. J. Mitchell	179 0
H. Line	190 0	G. Kemp*	175 0

GLOUCESTER-GROVE EAST.—Painting :—

R. S. Ronald	£147 2	C. Gurling	£96 0
S. Polden	125 0	W. Hornett	56 0
Lathey Bros.	119 0	Edwin Flood	54 0
W. Hammond	114 0	F. Chidley*	86 4

OLD PALACE.—Painting interior and exterior :—

Gibb & Co.	£572	T. H. Jackson	£432
S. H. Corfield	510	G. Barker	409
J. Kybett	491	A. W. Derby	382
A. E. Symes	490	J. T. Robey*	345

QUEEN'S HEAD-STREET.—Painting :—

McCormick & Sons	£210	J. W. Dixon	£151
Barrett & Power	163	Marchant & Hirst	148
Stevens Bros.	156	C. & W. Hunnings*	130

SOUTHWARK PARK. — Painting interior and exterior :—

H. J. Williams	£650 0	Johnson & Co.	£545
W. Banks	598 10	A. White & Co.*	439

TOOTING GRAVENEY.—Painting :—

R. S. Ronald	£35 8	Rice & Son	£65 0
Garrett & Son	81 0	Johnson & Co., Ltd.*	64 0
Lorden & Son	77 10		

WORNINGTON-ROAD.—Painting :—

B. E. Nightingale	£289 0 0	Bristow & Eatwell	£210 16 0
S. Polden	232 0 0	W. Chappell	210 0 0
W. Brown	225 2 6	W. Hammond	184 10 0
W. R. & A. Hide	213 19 0	F. T. Chinchen*	170 0 0

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The Builder.

VOL. LXXIX., No. 3002. AUGUST 18, 1900

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Gardening from an Architectural Point of View.

THE last few years may be said to have been, in this country, the epoch of the revival of the interest in gardening as a form of artistic invention, more especially in connexion with and in relation to dwelling houses. The number of books on the subject is one outward indication of this. The mere landscape gardener, with his sham rivers and bridges, his sinuous walks, his picturesquely arranged clumps of trees, and his artificial landslips and geological features, has had his day. Mr. Milner's book, reviewed in our columns a few years ago, was an attempt to reaffirm the landscape gardener which met with little sympathy or encouragement as far as the author's notions of garden design were concerned, though it contains valuable information in regard to the purely gardening work of selecting and planting trees and shrubs. Since then two well-known architects, Mr. Blomfield and the late J. D. Sedding, produced books on the subject, thus asserting the architect's claim to interpose; and Mr. Mawson, the author of the latest important work on garden-making,* calls himself on the title-page "garden architect"; a title in itself significant of the change of public attitude on the subject. The "landscape gardener," in short, though still existing, has became obsolete.

Mr. Mawson, whose book is far in advance of anything produced by professed garden artists since Repton, draws a broad and very good distinction, in his introductory chapter, between the old and the modern or recent school of garden-makers; the older men, before the days of Brown, were idealists, engaged in creating something of their own; Brown and his followers were realists, considering a garden only as a contrived imitation of the irregularity of Nature. Repton, however, must not be classed precisely with these; he was a man of genius, and though he did not escape the mistakes of the school, he was far beyond any of them in artistic perception and in grasp of his subject, and his great book will always be worth study.

As Mr. Mawson rightly points out, Sedding's observation, "A garden is man's report of earth at her best," however charming in a literary sense, does not quite express the main point or include the whole truth. A garden may be what Sedding called it, but it should be something more; it should be a creation by man out of materials furnished by Nature. That is the true condition of an idealist's garden.

The process of laying out a garden on new ground is well illustrated by the author, in his chapter on "Choice of a Site and its Treatment," by taking an actual site in its main features from the ordnance map, only slightly altering it to avoid identification, and going through the gradual process of placing the house and garden on it, commencing with considering the site in regard to larger features which cannot be much altered—contour of land, position of woods, &c., and consequent on these the various lines of vista from the house, which will partly determine its situation and orientation. Having considered the main features of the site, the next thing is to consider the plan of the house and of the accessory buildings; "and herein," the author observes, "lies a great difficulty with which the garden designer has to contend; for directly he begins to inquire into the planning and arrangement of the house, the architect looks upon him with suspicion, or his client thinks he is endeavouring to enlarge the scope of his work beyond the area in respect to which he consulted him." This latter may be true; clients are strange creatures. But surely there are very few architects who, if the garden designer asked for a plan of the house before laying out the garden, would not say that he showed his good sense in doing so. A block plan is not sufficient, for the position of the windows of the principal rooms, and of the entrances to the various quarters of the house, must or ought to influence the design of the garden. The more probable point of dispute between the house architect and the "garden architect" (since the author adopts that term) would be, in the present day, that the house architect would himself wish to have a hand in the designing of the portions of the garden immediately adjoining the house; and he has a claim to this too, since the effect of his building must depend a good deal upon the treatment of these immediate surroundings. In fact, we should say that the garden architect should, as far as the immediate surroundings of the house are concerned, work under the house architect and have to satisfy him; but we fear this view will not suit Mr. Mawson. They ought at all events, however, to work in collaboration.

The imaginary house on this estate is given in detail. The manner in which the stable court is connected with the circular carriage court before the main porch of the house is very good, as it preserves the dignity of appearance of the carriage court by keeping a symmetrically disposed exit and entry; but this part of the treatment is very much simplified by the fact that dining-room, drawing-room, and morning-room, are all placed facing the same way (S.S.E.) on the opposite side of the house to the entrance court.* They are obviously placed for the *prospect*, and that is what a garden architect always thinks of; whereas an architect considers, or ought to consider, *aspect* as well, which is fully as important, if it be not even the more important of the two. In working out the further extent of the garden after leaving the immediate vicinity of the house, the author thinks the best plan is to work outward from the house, studying the sectional lines of

* "The Art and Craft of Garden-Making." By Thomas H. Mawson, garden architect. London: B. T. Batsford. 1900.

* We observe, by the way, that in the general plan of the grounds and house, forming plate 5, the north point has been revolved through nearly a quarter of a circle, so that in this case the house faces S.S.W. instead of S.S.E. which is still worse for the three entertaining rooms; the dining-room would have too much sun, and the morning-room none.

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the land, and arranging the terraces and gardens so as to preserve some indication of the original lie of the ground. In the plan showing the estate more at large with the house on a small scale, there is an irregularly-shaped lake, and the plantations which nearly surround it are traversed by that kind of artificially winding walk which is the special invention of the landscape gardener, and which seems to us to have no connexion with the functions of a "garden architect;" but the irregularity of lines of lake and walk is cleverly dominated by a straight walk between thick clipped hedges, which starts from a circular parterre with a central fountain near the house, and is terminated on the margin of the lake by a small circular house with steps round each side of it down to the margin of the lake, which is responded to by another circular erection and a flight of steps on the opposite side of the lake. The whole effect is illustrated in the drawing forming the frontispiece to the book, of which we give here a reduced reproduction. This manner of connecting the irregular portion of the grounds with the house and the formal garden by a formal walk and structures symmetrically placed in regard to each other is an idea capable of many applications, and is worth bearing in mind. As to the irregular lake, the author defends it on the ground that it was not artificially excavated, but is simply a use made of a natural feature of the ground; in other words, there was an irregular depression in the land here, and it is filled up with water. That is a reasonable excuse for the lake; though we confess that we should be more pleased to find a formal and symmetrically planned piece of water at the end of the clipped-hedge walk. It must be admitted however that the cost of making it would be very much greater—in fact, except in the case of a client of more than average wealth, would be prohibitive.

The important subject of fencing is very well treated by Mr. Mawson in a chapter specially devoted to it. While of course not adopting the old craze about invisible fences which gave rise first to the "ha-ha" and then to the wire fence, the author suggests that a medium course may be found in the adoption of fences with intermittent piers or solids between which wires can be strained, so as to give some character to the fence and render it important in the garden design. The same object can also be attained by open wooden railing between widely spaced stone piers. Two or three sketches given of this kind of fence are excellent as suggestions, and look as if they came from the hand of the well-known architectural artist who has drawn the principal plates. The suggestions for garden gates are also good; but the larger iron gates on page 27 are very poor, as the detail sketch more emphatically shows, the main fault being realistic foliage—a fault worst of all in a garden gate, where it has to compete with real foliage. But the author is quite right in endeavouring to suggest, as he puts it, that owners of gardens should give their attention to the formation of a form of fence which would be an improvement rather than a detriment, "instead of concluding that everything that can be done is shown in the hurdle-maker's catalogue." The wire fence may have its commercial value on a farm, as a fence which does not interfere with supervision and does not shut out sunshine from growing stuff; but in connexion with gardens or pleasure grounds of any kind it is one of the most unpicturesque and depoetising divisions of land ever invented.

The cognate subject of hedges is treated in another portion of the book. The author, we are glad to say, does not advocate the fantastic hedge-clipping of older days, but gives the sensible advice that simple forms are the best, not only because they serve their purpose without show or pretence, but also for the practical reason that "they are much more likely to be kept in good form than those requiring great skill in clipping." Some simple and broad forms of varied outline may however be used without this drawback. All imitations of natural or artificial objects in cut hedgerows are poor taste and out of place, however they may be archæologically interesting when found in ancient gardens.

A country house presupposes carriages and their means of access. It may be true that the time-honoured "loop" shape into which the majority of drives expand at the house entrance follows the lines which a carriage would naturally take in coming up to and turning away from the door, but it is a wretched, ugly way of laying out the lines of the ground, and we prefer either to see a complete circle or semi-circle drive, geometrically laid out, or a "carriage court" large enough for turning about without following the lines of a border. The question of single or double lodges at the gate is one of state and importance mainly. There should in fact be no duplicate lodges; a cottage on each side of the entrance gates, when the only object is to provide an abode for the gate-keeper, is absurd; it is so palpable that the second one is added merely to balance the other. For a house and estate of average size and importance a single lodge, adjoining the gate, is a sufficient and suitable provision; a second one serves no practical purpose. For a large mansion, a state house, the most suitable and effective form of lodge is a larger and more formal building with an arched entrance through it, the two sides being connected by the story over the arch. Such a lodge is one house, and is both more dignified and more practical than a duplicate. It affords, moreover, much of suggestion to the architectural designer.

Let not the owner of a flat site despair of a good garden. The treatment will be different from that suggested by an undulating or sloping section of land, but it may be almost equally effective in its own way. What were the natural capabilities of Versailles? Level lawns, and parterres, and water, have still their effect, even when there are no declivities to afford the opportunity for terraces on different levels. A beautifully kept, clean shaven lawn, as the author observes, is one of the greatest charms of an English garden; and in regard to it he gives a useful piece of practical advice:—

"A lawn, like a meadow, requires to be in good heart, and must, therefore, be prepared with a sufficient quantity of good soil. To prevent worms, however, a layer of sharp clean ashes or coke breeze may be laid under the turf, or, where the lawn is to be sown down, under the top spit of soil. Another error is that of neglecting proper drainage. This is the most important factor in the maintenance of good turf, because if the ground retains too much moisture, the grass soon grows yellow and is really apt to burn up sooner than well-drained ground. This is explained by the fact that in wet ground the roots are near the surface, while on dry warm soils they go down deep."

It is seldom indeed that we see the most made of the opportunities afforded, in the construction of summer-houses and bridges in a garden or park, of designing something entirely with an eye to beauty, and to its relation to the surroundings of lawns, foliage, and water. What are called summer-houses rarely rise above the commonplace in architectural character; and they frequently fall below it, from a mistaken notion that, being in the midst of foliage, they should be treated in a kind of naturalistic or "rustic" manner, with the idea of harmonising with their surroundings, whereas they should contrast with their surroundings. A summer-house should be a little bit of refined artificial design introduced amid the work of Nature. A mere arbour is another thing—that is not architecture; but a summer-house should be architectural. The examples given in the book before us are not much better than usual; but the author is on the right track in regard to these things, especially in condemning those foolish things called rustic bridges, which, as he says, are not only a mistake in point of taste but, owing to the insufficient way in which they are almost necessarily put together, are constantly requiring repair. We may add that where over a deep stream or a waterfall they may be a source of danger from the unsuspecting visitor leaning against the "rustic" parapet when it is not in a state to resist pressure. A good example is given on page 65 of an oak bridge which, while soundly constructed, is quite in keeping with an out-of-the-way and informal corner. We are also entirely in accordance with Mr. Mawson in his remark as to the unsatisfactory style of most "catalogue" garden seats, though whether the village carpenter of the present day would produce anything better, as the author suggests, may be doubtful; what is called (and sometimes miscalled) education has penetrated everywhere so much, that probably the village carpenter himself will think it his duty to do something consciously "ornamental" for a garden seat. Mr. White, of Bedford, with the assistance of one or two architects, has started something more to the purpose in the way of garden seats, and we should think that the one shown in Mr. Mallows's pretty sketch of "circular garden seat and lead figure," on page 69 of the book, came from that quarter.

On the important question of the treatment of water we find that in regard to miniature lakes the author does recommend architecturally treated and formal ponds rather than quasi-natural ones; but he does not seem quite to recognise that the principle is just as good when you come to artificial water on a larger scale, and that it is really only cost that should stand in the way. If a lake is to be artificially formed without making it part of a formal design, he is certainly quite right in recommending that it should be done by merely flooding a natural depression of the ground, without making artificial capes and bays on a small scale. But even this can only be called a make-shift. The only natural water worth having in a park is a real lake on a large scale, pre-existent and merely taken into the boundary. The author gives a plan of Wolverhampton House and grounds, where the house stands centrally at the head of a piece of ground

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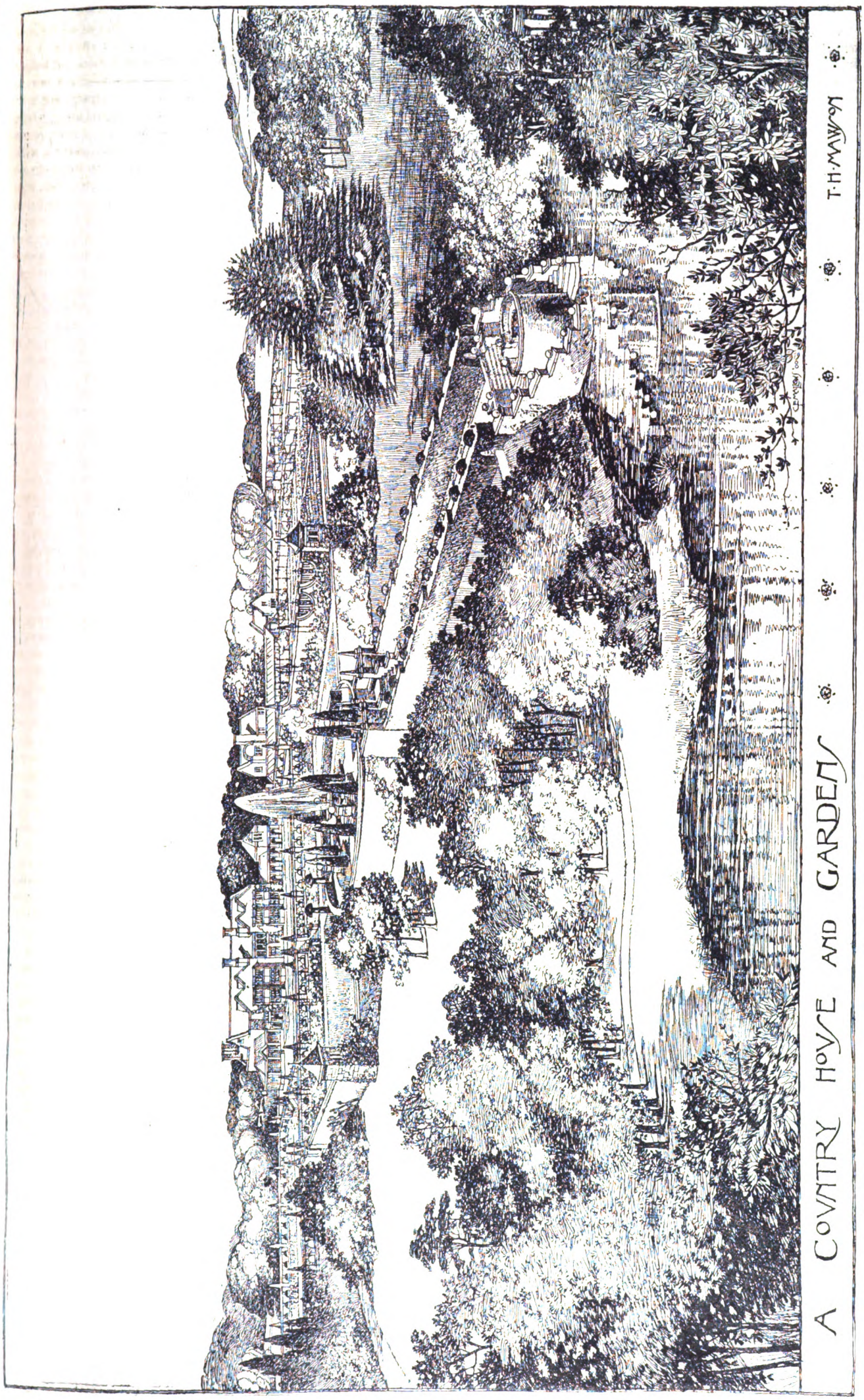

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1,000 ft. wide and 1,500 ft. long, bounded by straight avenues sweeping round in a true semi-circle at the end opposite where the house is placed. Except the formal garden immediately fronting the house, this space is occupied by an irregular wilderness treatment with artificially winding walks (not geometrically laid out) and what is euphuistically called a "lake," formed by filling in an irregular depression (partly consisting of spoil banks) with water. But on applying the scale we find this "lake" is 500 ft. long and averages 100 ft. wide. What is the use of calling a thing like that a "lake"? Treated as a formal piece of water it would have been large enough for effect; as a quasi-natural lake it is futile. And what an opportunity—what an actual suggestion—is offered for a stately symmetrical laying out of the ground, by the mere shape of the bounding avenue with its great semicircle, axial with the house at the upper end! We should call this a great opportunity thrown away. At all events, let us not hear a straggling pond 500 ft. long called a "lake"; it is a misapplication of terms. Nothing under a mile long by half a mile wide can be called and treated as a lake—and that is but a small one. Such attempts at irregular lake scenery on a diminutive scale only make one melancholy.

We recommend to the attention of the owners of estates Mr. Mawson's plea for a greater recognition of the kitchen garden, as an element in the scheme of the grounds and a place worth penetrating into for other purposes than to cut cabbages for the table, and therefore not to be entirely divorced and rendered inaccessible from the professedly ornamental grounds. A kitchen garden has a beauty of its own, different from that of the flower garden and lawn; not to speak of the pleasure, in its season, of eating fruit straight off the trees, which the author seems to pass over as frivolous. There is much sense too in his treatment of that architectural bugbear the conservatory, which, however pleasant a retreat it may be internally, spoils the exterior of many a fine house, hanging on it as a kind of parasite. It is gratifying to find that a writer who can speak with authority as a gardener is of opinion that the sheets of plate glass and the attenuated architectural features which characterise the ordinary modern conservatory are not even practically necessary. As he points out, a conservatory is really more for displaying plants than for growing them, and has to be more or less dependent upon the purely utilitarian supplementary plant houses, which need not be thrust into view. As long as the conservatory is accepted as a department of the dwelling house, and grouped with it, it should be designed to harmonise with it architecturally. Some architects, as we have had occasion to notice, have recently made a decided move in this direction; we hope others will follow their example.

We fear that the whole subject of "Planning for Landscape Effect," to which a separate chapter is devoted, is to our minds fraught with unreality and pretence, and it is only in fact in this chapter that the author seems to fall into some of the cant of the landscape gardener, though by no means to the extent that we have met with in books specially professing that unlawful art. Nor do we agree with the remark, in the chapter on "Forest Trees and Hedges," that the radiating avenue is "very rarely justified by results." We should be inclined to say that it is one of those devices which, when carried out on a large scale, cannot fail to produce a fine effect. Of course it must be remembered that an avenue is only in place at all when the condition and importance of the house are such that stateliness in its surroundings is natural and justifiable. An avenue leading up to a second-class house becomes a vulgarity.

Mr. Mawson's book contains a great amount of practical gardening information in regard to trees and shrubs, and the treatment of soil, &c., on which we have not touched, as we are considering the subject from the point of view of effect. But owners or prospective owners of estates to lay out will find the book of much practical value, and the generally sound views of the author in regard to the architectural treatment of gardens may be very useful, from the point of view of the architect, in the education of the client. Architects themselves may not learn much from the book, but they will be glad to welcome a gardener whose views on many points will be in harmony with their own. We may add that the illustrations to the book, drawn by Mr. Mallows "and others," are admirably done; and the volume generally is, in a decorative sense, worthy of its subject.

NOTES.

The Workmen's Compensation Act.

THE recently-published Parliamentary Paper, containing statistics of the operation of the Workmen's Compensation Act, 1897, during the year 1899, will not add appreciably to the general information which is common knowledge in regard to the working of the Act. It is interesting, however, to note that the number of cases connected with building which came into court amount to 159, the total number of cases which were commenced being 1,347. Having regard to the large number of claims for accidents, the general impression to be gathered from these statistics is that litigation arising out of the statute is not so great as has been generally thought. As a matter of fact, the percentage of litigated cases to accidents is a little under 1 per cent. On the other hand, it is impossible to say whether this percentage is too large or too small, but certainly, had the Act been better drafted, the percentage would have been smaller. Out of the 999 cases finally settled by some species of judicial decision (for not every case which was begun by litigation was finished in that manner), 753 were decided in favour of the workman, and 246 for the employer. The practical moral to be drawn from this group of figures seems to be that generally speaking the employer had better pay than fight. Yet it has to be borne in mind that, in spite of the want of principle and form in the Act, some of the decisions in 1899 have settled the law, and, therefore, employers will not need in future to dispute so many cases in order to elucidate the meaning of the Act. As regards appeals, 4 per cent. of the cases which came before the lower Courts were appealed, being fifty-four taken to the English Court of Appeal. Of the twenty-three appeals by workmen five were successful; of the thirty-one by employers twelve were given in favour of the appellant. Here again the statistics do not give much encouragement to appellants. On the whole we are bound to say that, while we are still of opinion that the Act has given rise to much unnecessary litigation, we think there will be a good deal less of it in the future.

Technical Education.

WE have received an interesting letter-pamphlet issued by the Technical Instruction Committee of the Corporation of Manchester, who are doing admirable work. It is by Mr. F. Brocklehurst, and gives some account of and some comments on Messrs. Ferranti's scholarship scheme. The object of it is to unite technical education with practical work. The firm offer a Day Scholarship at the Manchester Municipal Technical School to the apprentice who, not being more than nineteen years of age, obtains the highest position in the Science and Art examinations of any given year. Among other things, wages at the standard rate corresponding to his age will continue to be paid to the successful youth. Mr. Brocklehurst takes the opportunity of Messrs. Ferranti's scheme for some plain speaking on the apathy of a large number of employers in regard to the improvement of the education of the workman, both general and technical. One remark we would emphasise: Evening classes "are but of trifling value, because they come at the end of the day when body and brain are fatigued." This is quite true—evening classes are all very well as a kind of amusement or slight adjunct to manual labour; but they cannot take the place—as so many amiable persons in England seem to suppose—of a thorough, general, and technical educational course.

Arbitration in Light and Air Cases.

THE lawyers seem to have some apprehension that the arbitration of architects in light and air cases may take the bread out of the mouth of the legal profession. The objections are put, of course, on public grounds but there seems a note of alarm in the following passage quoted from the *Law Times* of July 28:—

"If there is any truth in the rumour that architects wish to settle questions of light and air in new buildings by arbitration among themselves, their wish is hardly likely to have a very good reception from the public at large. The judge is in reality an arbitrator, though a completely independent one; but if an architect, however eminent, is to take his place, it will be very difficult to exclude the personal element. A is the architect of some new buildings which architect B says will interfere with the light and air of certain other buildings. They call in architect C. He may know one of the other architects, or know that one of them is a much more eminent man than the other. Then, human nature being what it is, a bias will spring up in his mind in favour of one or the other, or what, perhaps, is almost as bad, it will be believed to have done so. The very formality of a trial in court gives an impersonal character to the judge, and removes him from the dangers of feeling a professional bias in favour of one side or the other."

There is truth no doubt in the remark as to the essentially impersonal character of a trial in a court of law; but we think it will be quite possible to discover architect arbitrators who will be as impartial and "impersonal" as any judge, although they may not be hedged round by the paraphernalia of a court of law.

Newgate Prison and the Sessions House.

THEY who love Old London, together with those who can appreciate the expressive façade of the younger Dance's prison which

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so well declares its austere and retributory purpose, will be glad to learn that as many as possible of the stones are to be used in the building of the new Sessions House and Central Criminal Courts. Begun in 1770, and still incompleted when broken open and burned by the "No Popery" rioters in June, 1780, the existing gaol was erected in the bailey or ditch of the City wall, a portion of which yet remains along the east side of the passage that leads to the Courts. The south, north, and west walls of the two wings, as seen from the street, are nearly four feet thick at their base, forming screens around the two blocks of cells for the men's and the women's sides, which stand clear within, and were erected in 1857 by J. B. Bunning, architect to the Corporation. Along the east side, and separated by the exercising grounds from the chapel and the governor's house (in the central block), is one block of the old wards wherein the prisoners crowded together in common; the ward, disused for some while past, was the scene of Mrs. Fry's humane ministrations. The north wing, formerly the "Debtors' Side," occupies part of the site of the original prison that stood across Newgate-street, in the gate of the City wall. Turning down Old Bailey one passes by the "Debtors' door" in front of which the pillory was placed and the scaffold used to be put together over night. At the side of the door, which if opened would admit one into the prison kitchen, is one of the staples to which the scaffold was fastened. The large iron door adjacent in the face of the wall was made for driving the prison-van from the street into the courtyard. The iron door was not used for any long period, and the van is now driven into the yard, erroneously identified with the old Press yard, on the prison's south side. The shed for execution of sentence stands near the north-east corner of the central block, in the ground-floor of which are the rooms wherein prisoners are seen by their friends and legal advisers. Close by the shed is a portion of the arched doorway and part of the wall of one of the wards, their stones bearing manifest traces of the fire to which they were exposed by the rioters on June 6-7, 1780. The site of the Surgeons' Hall, in Old Bailey, built in 1745-6 by George Dance the elder, and pulled down in 1809, was taken for the enlargement by William Mountague, city architect, of the Sessions House, which George Dance, the younger, had rebuilt in 1773-4. On the site of the Hall are offices of the clerk of the peace, above the colonnade of two rows of Doric pillars erected for witnesses in waiting. The Sessions House was again enlarged, eastwards, by J. B. Bunning, and its interior was improved about fourteen years ago, at a cost of 2,100*l*.

Sanitary State of Coleford, Gloucester.

JUDGING from Dr. Fletcher's Report to the Local Government Board upon an outbreak of enteric fever last year in the Urban District of Coleford and the surrounding district of West Dean, the sanitary state of the district appears to be in a very backward condition. This is the more discreditable to the District Council, seeing that in 1892 Dr. Fletcher inspected the Coleford district, and the sanitary condition of the district is to-day substantially the same as it was seven years ago, when Dr. Fletcher reported:—"Excrement disposal is mainly by means of privies with pits. Some of these privy pits admit surface water, others are covered in. But in general the pits are much too large and too deep, and they are often in a wet and filthy condition. The contents of the privies are emptied periodically by the occupiers of premises, and are disposed of upon gardens and fields. In some cases the privy accommodation is inadequate. There are also in the town a few pail-closets, and water-closets with flushing cisterns. In a few instances closets of the hopper description have been erected; but, as no water is laid on to them, they are dependent on hand flushing. Some were seen in a dirty state." The drainage and sewerage of Coleford, proceeds the Report, are highly unsatisfactory, and the polluted state of the water-courses in the town is dangerous to health. Nevertheless, not any of these conditions, singly or collectively, suffices to account for the occurrence of enteric fever cases spread over a wide area, and occurring in some instances at a distance from the insanitary conditions in question, and the cause of the fever is traced to the milk supply—either to the infection of milk cans by polluted water from a well, or through the agency of a milk-boy who suffered from a mild attack of fever. In concluding his Report Dr. Fletcher makes the following remarks, which it is to be hoped the District Council will act on:—"It must be said that the District Council have shown themselves incompetent and indifferent to their sanitary duties. Seven years ago the then Sanitary Authority were advised as to the action they should take to improve the sanitary condition of the town. They ignored the advice, and their successors, the District Council, have had a sharp lesson in the late epidemic of enteric fever. It remains for them to endeavour to meet the requirements of the town, and to take care that the numerous unwholesome conditions, which afford means of fostering the infection lately introduced, do not maintain the disease in the district in an endemic form."

The Banister Fletcher Bursary.

THIS newly-founded bursary has been awarded to Mr. Arthur Stratton, A.R.I.B.A., in open competition. As previously announced, the bursary has been founded in memory of the late Professor Banister Fletcher for the purpose of the promotion of the study of seventeenth and eighteenth century architecture in London by means of measured drawings, and for the preservation of records of buildings of historic and artistic interest which are likely to be destroyed or disfigured. Mr. Stratton, who was a pupil of the late A. E. Street, has made a special study of the work of this period, and especially of Sir C. Wren, and gained the Architectural Association Essay Medal for his life of Wren, since published. He has held the appointment of Demonstrator of Architecture at University College, Liverpool, since the formation of the department, a post which he has just resigned for the purpose of resuming practice in London.

Mural Tablets on Historic Houses, Bath.

IN continuation of the Bath Corporation's interesting scheme for placing mural tablets on historic houses, it has been arranged that on Thursday, September 20, Mr. Emerson, President of the Royal Institute of British Architects, shall unveil tablets to the elder and younger Wood, whose architectural works in Bath are well known. It is, we understand, expected that there will be quite an assembly of prominent architects on the occasion. The houses on which the tablets will be fixed are No. 24, Queen-square, the centre house on the north side, where John Wood the elder lived, and where he died on May 23, 1754; and No. 41, Gay-street, where John Wood the younger resided. The latter died in 1781 at his father's villa at Batheaston, near the church.

THE PARIS EXHIBITION:

NOTES ON MATERIALS OF CONSTRUCTION.

AN architect or engineer desirous of studying the various materials of construction in the Exhibition will not thank the Commissioners for adopting their present method of classifying the exhibits. In former exhibitions it has been the custom to classify the exhibits according to their country of origin, and whilst that method has several obvious drawbacks, very few people will find the mode now adopted a convenient one. The British Commissioners state that the classification of all products of a similar nature, whatever their origin, is preferable, as it enables both the student and the expert to appreciate the comparative merits of exhibits when industries of a similar nature are shown side by side. If that method of arrangement were adhered to, no doubt it would be a good one; but it is not, and in too many instances the result is chaos. In addition to showing in the French buildings, British exhibitors have erected separate buildings in various parts of the grounds, for the exclusive exhibition of their goods, and those from some other countries have followed suit. Add to this the Royal Pavilions, in which a miscellaneous assortment of exhibits in the various classes is shown! The muddle is accentuated by a peculiarity on the part of the French authorities which consists in employing a separate classification for colonies. As the British Commissioners remark, such a method applies more to countries in the preliminary stages of development, and they naïvely add, "British colonies and dependencies participating in the Exhibition are past this stage; they are producers and manufacturers of many articles which come under other classes of the classification, and, consequently, are entitled to rank with other nations in this respect." There can be no question as to the truth of this assertion, but this apparent conflict of the British with the French authorities only further intensifies the difficulty of pursuing the vicissitudes of materials of construction in the Exhibition.

Let us follow, say, the fortunes of building stones throughout the Exhibition. If "all products of a similar nature, whatever their origin," were classified accordingly, we ought to find building stones from all countries in close proximity to each other, and in the same building. Here, however, are the facts. Some building stones are classified under the heading of mining and metallurgy because the quarrying of building stones is now regarded by most countries as a mining operation, and because the study of them, from a scientific standpoint, may be included under mineralogy. This section will be found at one end of the Champ de Mars. A walk of about ¼ mile enables the visitor to see some more building stones in the department of civil engineering and transportation. Retracing his steps down the Champ de Mars, across the Pont d'Iena, he will arrive at the section devoted to India, where on a balcony on the first floor one of the best collections of building stones in the Exhibition will be found. Still following the marvellous classification adopted, he will pass from the India building to that erected by Canada, where there is an excellent exhibit of the building stones raised in the Dominion. To see the remainder of this class of materials the visitor may now proceed to the Esplanade des Invalides, about 1½ mile away, where they may be found in that part of the Exhibition known as "Decoration, Furniture, and Various Industries." On the way by the Royal Pavilions, he will see sundry slabs and blocks, some labelled and numbered, and some not.

Another point showing the distinct breakdown of the method of classification adopted may be exemplified by the inclusion of stone-dressing machines, under the heading of

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mechanical engineering. Of course, there could be no objection to this in the abstract if it was not given out officially that "the raw material, processes of manufacture, and finished products of an industry" were to be included under one heading, and were to be exhibited alongside of each other. The official announcement is, "Machines will be shown in operation all over the Exhibition, those employed in certain manufactures being exhibited together with the raw and finished material in the groups to which they belong." After distributing the numerous building stones exhibited amongst divers sections and classes, the authorities probably found some difficulty in placing the building stone cutting and dressing machines near the "raw and finished material . . . to which they belong," and so placed them in a section which, so far as the classification adopted is concerned, can only be regarded as a refuge for the destitute.

Practically the same observations apply to other materials of construction. Timber may be found in the section devoted to forest, sport, fishing, and gathering wild crops, in the Indian pavilion; in the part devoted to education and instruction, in the Champ de Mars; in the Western Australian building; in the Ceylon section; and as a "finished material" in the "decoration, furniture, and various industries" section. The wood-working machinery, instead of being anywhere near the "raw and finished material," finds a home in the civil engineering group — though what such machinery (seeing that it consists largely of carving, moulding, planing, and mortising machines) has to do with civil engineering, it is not easy to see. Perhaps the best commentary we could make, in reference to the Parisian idea of classifying exhibits, is that the morning and evening daily papers shine forth under the heading of "Liberal Arts"—Or is that intended for sarcasm?

So far we have only alluded to the difficulties the visitor has in finding any sort of classification in regard to materials of construction; but a word or two may be said as to the great nuisance this method (or want of it) must entail on the makers of certain classes of goods, who are exhibitors. To deal no farther than with certain exhibitors of clay goods in the British sections: here we find some well known firms exhibiting. One firm, because it shows earthenware jars, mixing pans and bottles suitable for chemical purposes, finds these portions of its exhibits in the group of "Chemical Industries"; the same firm having other clay goods, such as baths, water-closet pans, and urinals, has been compelled to erect a special stand for their reception in the group relating to "Hygiene"; again, the same firm, desirous of showing its salt-glazed stoneware, china, and earthenware, has that portion of its clay goods relegated to the group of "Decoration and Furniture," nearly two miles away from the last-mentioned section; finally, the Royal Pavilion, having been open to receive this same firm's decoration of bath-room, tiles, sanitary fittings, &c., we find another part of its exhibits there. This must prove an intolerable nuisance, not only to that particular firm, but to many others placed in similar circumstances.

In the description of the various exhibits which follows, we have not adopted the official "method" of classification except in a limited way. We have preferred to follow that ideal but not as it is presented in practice. We shall place clay goods under one heading, timber and wood and machinery relating thereto under another, building and ornamental stones under a third, and so on; and we shall deal almost entirely with exhibits of British and colonial firms and Government departments.

The building stone exhibits, with which we will deal in this article, are, on the whole, somewhat disappointing. That may be accounted for, perhaps, in that so far as Great Britain is concerned, we have little to sell to the Continent in the way of building stones, whilst the Continent, on the contrary, sends a great deal to us. The cost of labour here practically prohibits the export of stone on a large scale, whilst the royalties demanded are far in excess of those, even in the form of a local tax, paid in any Continental country. The Continental seller (frequently an Englishman) pays nothing to the Custom House, whilst the British seller cannot land his stone on the Continent without being mulcted in taxes. Unless, therefore, the stone sent from this side is of some peculiar kind, such, for instance, as a good red granite (a rarity the world over), or a "black marble" which is really black (also difficult to procure), or good roofing slates, there is but little incentive to the British stone producer to exhibit on the Continent unless it be for honour and glory, or with a view to getting a medal or a mention for advertisement purposes. In any case, there can be little hope of his doing much business abroad, and the average stone firm is not in the habit of showing its products unless there is a likelihood of business resulting. On the other hand, we can well believe that some stone producers show at a place like the Paris Exhibition solely with the view to let the world see what they can do, as they are proud of their work.

Nevertheless, stones raised in this country for building, engineering, and surveyors' purposes are well represented in the exhibition, though after what we have said this last statement may seem paradoxical. The fact is, as very few British firms showed any signs of making a large exhibit, the Home Office took the matter in hand, and the result is a collective exhibit. If the stones look more like museum specimens than the produce of business firms, that cannot be wondered at, because, to our knowledge, the amount of money devoted to getting the series together was quite inadequate to obtain a better display. The fact that any money at all was devoted to any display, either in connexion with building stones or minerals, seems to indicate that at length the Home Office is becoming alive to the desirability of letting other nations know that they are not the only stone and other mineral producers. The Blue-books issued annually on the subject, which have a large circulation amongst Members of both Houses of Parliament, are rarely looked at by the public, and never by hon. Members, if we may judge from the ignorant questions frequently put in both Houses. It would have been interesting if the Home Office could have seen its way to have published a little book to accompany the Paris exhibit, giving a description of each sample shown and its uses. However, as we have before said, the Home Office exhibit, situated in the gallery of the Department of Mining and Metallurgy in the Champ de Mars, is distinctly good, and has the great merit of being of an educational value as distinguished from a mere advertisement.

We now propose to describe in some detail the stones shown, the more because whilst not being very numerous, they are good examples of the British production of that material and are largely representative. The collection also indicates that the Mining Department of the Home Office is now keenly alive as to the scope of building stone found in the country; before the passing of the Quarries Act, however, the Government inspectors had little opportunity of learning much about the stone industry, and it may be that we are indebted to that recent Act for this very exhibit, which is distinctly of practical value. It is to be hoped that when the specimens return to England they will be captured by some museum of architecture; such things, on the clearing out of a great exhibition, usually perish for want of looking after; but we believe that any influential representation to the Home Office could get them if for a public purpose and if not already promised. We merely throw this out as a hint.

The exhibit has been arranged under the supervision of Mr. W. W. Ware, Clerk of the Mineral Statistics Branch of the Home Office. It consists of statistics, &c., relating to British mining during the last quarter of a century: (1) diagrams showing for each year the number of persons employed above and below ground, the annual output of principal minerals wrought, and the death-rates from accidents; (2) maps showing the distribution of minerals; (3) reports of mining inspectors; (4) a selection of miners' safety lamps; and (5) specimens of the various minerals wrought in the United Kingdom. As showing what the Home Office authorities believe to be representative, we give the following; the description attached to each stone mentioned is our own:—

1. Portland stone; a cream coloured oolite (it is not stated whether the sample came from the base bed or whit bed).

2. Preshope quarry, Salop; a grey limestone, probably from the Carboniferous series.

3. Bath stone, Box Ground, and Monk's Park varieties; cream coloured oolite.

4. Hopton Wood stone, Derbyshire; a Carboniferous limestone. The following varieties, some of which are used as marbles, are shown:—(*a*) Light Hopton, a very fine-grained stone of light yellowish brown tint, chiefly composed of the débris of crinoids; (*b*) yellow Hopton, similar to last, but rather coarser in grain; (*c*) bird's eye marble; this stone is of two varieties in the quarries, one known as black bird's eye and the other as grey; it is mainly composed of disjointed segments of crinoid stems; (*d*) brown marble, coarser in grain, but of similar origin; and (*e*) crinoid coarse marble, in which large crinoid fragments cut at various angles, and giving a great variety of pattern, are set in smaller débris of the same.

5. Devonshire marble from East Ramsley quarry; of Devonian age; of a red colour veined white and pink. Several specimens from Petitor, which take an excellent polish; and dark coral and red marble, from Stawell's Bushes quarry.

Turning to the sandstones we find—

6. Cream brown sandstone from the Bridge and Cureton quarry, Salop.

7. Fine-grained, dark red sandstone from St. Bee's Head Quarry, Cumberland.

8. Light grey sandstone from Hollington Quarry, Staffs.

Amongst igneous rocks the following are represented:—

9. Cornish granites from Carnsew, Lamorna, and other localities; chiefly schorlaceous granites of grey tint, speckled black, and varying in grain from medium to coarse, some being of a well-marked porphyritic character.

10. Peterhead granite; a hornblendic granite of red tint, characterised by the abundance of smoky quartz.

11. Newry granite, Ireland; a grey rock of dioritic character and fine-grained.

12. Mountsorrel granite, polished, a red variety. (This, however, is not extensively used in the arts in a polished state, the well-known Mountsorrel stone being principally employed for surveyors' purposes.)

13. Donegal granite from Dungloe quarry; a red granite of medium-coarse grain with small proportions of hornblende.

14. Kirkcudbright granite from Craignair quarry.

15. Diorite of very fine grain from Penmaenmawr, North Wales.

16. Luxullianite, from Luxullyan, Cornwall; a coarse-grained red rock, chiefly composed of schorl and orthoclase felspar, with a little quartz. (This rock ought not to have been shown in a representative series of stones useful in the arts; it has never been found, except in one limited instance, *in situ*, and its principal claim to notoriety, outside its petrological interest, is that a boulder of it was employed in the manufacture of the sarcophagus which contains the body of the famous Duke of Wellington.)

17. Porphyry, of a red tint, with phenocrysts of orthoclase felspar. (We have never seen this rock used in the arts, though from its striking appearance it has found its way into collections, and it may be used locally as a road metal.)

18. Felsite from the Askham quarries.

19. Syenite from Stoney Stanton, Leicestershire; a fine-grained rock of red tint, principally composed of orthoclase felspar and hornblende.

20. Welsh syenite, Eifl quarries, North Wales; fine grained, and in three varieties, grey and pink tints being represented.

21. Felsite, Threlkeld quarries, Keswick, Cumberland; the stone is fine grained and of a grey tint.

22. Basalt from Clee Hill; a black rock of fine grain, with small acicular crystals of plagioclase felspar, largely used as a road metal.

23. Basalt, from Barrasford, Northumberland.

24. Porphyritic granite, Shap, Westmoreland; both light and dark red varieties are represented. This rock is characterised by the presence of large phenocrysts of orthoclase felspar and of the mineral sphene; small crystals of hornblende are also present.

25. Serpentine from the Lizard, Cornwall; the red variety.

26. Serpentine from Lissoughter quarry, Galway; a green rock, probably an ophicalcite.

Typical examples of slates are shown:—

27. Welsh slate from Dorothea Slate quarry, Carnarvon, in three varieties—(*a*) reddish purple, (*b*) purple, and (*c*) blue; also the well-known slate from Blaenau, Festiniog.

28. Lake District slates from Coniston, near Ambleside, of a deep olive-green tint; from Elterwater of a light sea-green tint; and from Buttermere of a green tint.

29. Scotch slate from Aberfoyle, Perthshire; dark blue and green slates.

30. Irish slate from Killaloe, county Tipperary.

Looking down this list it is evident that much care has been bestowed on the selection of the specimens; nevertheless, it might have been somewhat enlarged to advantage. Amongst the limestones, there are both hard and soft varieties, used for ashlar and as marbles, including oolites and shelly limestones. The sandstones, however, have not received the attention they deserve,* inasmuch as none of the Yorkshire stones are represented,

* At the time of our visit some two or three labels had fallen from the stones to which they referred, and were hidden from view, and one certainly referred to a sandstone. Our list is incomplete to that extent.

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nor any from Scotland. The principal absentee, so far as we were able to see, from the igneous rocks is the well-known Aberdeen grey granite (though Aberdeen granites are represented in other exhibits, as will presently be seen). The slates are representative.

In the same section of Mining and Metallurgy there is a special exhibit by Messrs. Garden & Co., of Aberdeen, consisting of worked red granite, raised not far from the "granite city." There is a large and ornate carved and sculptured tomb, polished in parts, the carvings standing in high relief, and these latter are not polished—altogether a representative exhibit of the kind of work turned out from the best masonry establishments in Aberdeen. There is one part of this exhibit, however, which seems to be somewhat out of place, and this consists of several specimens of granites, augite syenites, &c., polished in small samples, and mounted together in a frame hanging on the wall. The majority of these samples are of foreign origin apparently, for we seemed to recognise some well-known Scandinavian stones which are largely imported into Aberdeen, though we could see no labels on them. If the British Commissioners know anything about building and ornamental stones they should certainly have seen that what is exhibited in a British section is of British origin.

Messrs. Robert Patterson & Son, of Newcastle-on-Tyne, have a number of their grindstones and millstones in graduated sizes on view in the same section. They are of a grey tint, range from 48 in. up to 6 in. in diameter, and are manufactured from the solid rock. Messrs. Pease & Partners, Limited, of Darlington, amongst other things show some Frosterly marble, which takes a good polish, and has a black ground with grey sections of the coral *Cyathophyllum*.. To see how beautifully the Parisian method of classification works in practice, it may be noted that if this firm's exhibit had been classified according to the method theoretically adopted, one part of it—the marble—ought to be under "Decoration"; another—the by-products obtained in the manufacture of coke, ought to be placed in the group of "Chemical Industries"; and a third portion—building bricks—might be placed under "Civil Engineering, Decoration, or Various Industries," whilst a fourth—coke and coal—rightly finds a home where it is, under "Mining."

(*To be continued.*)

THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT LEICESTER.

THE following is the conclusion of our account of the proceedings at Leicester of the annual Congress of the British Archæological Association :—

Thursday, August 2.

This day was devoted entirely to viewing the objects of interest in Leicester itself, under the guidance of the hon. secs. of the Leicestershire Architectural and Archæological Society. Leaving the hotel at 10 o'clock the members and visitors proceeded first to St. Margaret's Church. Its history and description were given by the Vicar, the Rev. Canon Rendell. The church stands outside the walls of the town at its south-eastern angle, upon the very spot occupied by the primitive cathedral of Leicester when Leicester was a city and a bishopric, and the site is still called the Bishop's Fee. No traces of the church of the eighth century remain; the oldest portion of the present edifice is of about the year 1200. The fine, well-proportioned tower is of the middle of the fifteenth century, as is also the south porch, with chamber over it, which are said to have been built out of the proceeds of the "smoke farthing," a tax levied by the authority of the Bishop of Lincoln. Within the chancel rails is the fine tomb and effigy of Bishop Penney, who was sometime Abbot of Leicester, but was promoted to the Bishopric of Bangor in 1508. He died and was buried in the Abbey in 1520, but at the suppression his remains and tomb were removed to St. Margaret's, the mother church of the town. There is a good Perpendicular sedilia and piscina in this church and some nice old painted glass in the south-west window of the south aisle, probably Flemish.

All Saints' Church was next visited. It is a small edifice, dating from 1199, when it was founded by Earl Robert, "le bossu." The font is very elegant and richly carved of thirteenth century date. In many particulars this church is still in an unrestored condition. In the square pews there is worked up much old carved panelling, all, however, painted and grained. There is a curious external clock with figures which strike the hours with hammers; this has recently been restored, painted and gilt, and set up over the south entrance close to the street. A visit was next paid to the old Grammar School, now a carpet warehouse. It was built out of the materials of the demolished Church of St. Peter taken down in 1573. Queen Elizabeth, by a deed of grant in that year, sanctioned, as head of the Duchy of Lancaster, the sale of the materials of the old church for the sum of 35*l*. A very interesting collection of antiquities, made by Mr. Spurway, was laid out specially for the inspection of the members of the Congress, and amongst them was a wool weight of the time of Elizabeth. All these antiquities were discovered in Leicester, and will eventually, no doubt, be transferred to the museum.

St. Nicholas Church was the next item on the programme, and it was described by Mr. Lynam, F.S.A., hon. treasurer of the Association. This church is the most ancient in Leicester, and stands upon the site of a Roman temple. Roman materials are abundantly used in its construction. The church is particularly interesting because of the very early nature of some of its features. The small, semicircular upper windows in the north wall of the nave, with double arches formed of Roman brick and tile, have all the appearance of Saxon work, although the nave arches beneath them are Early Norman. The central tower is also Norman, of coarse ashlar, having a blind arcade of five arches on each of the four sides of the interior in its upper stage. The chancel is Early English, and the south doorway of a date between the tower and chancel. There are no monuments nor any remains of old glass. On the east wall over the chancel arch the lines of the original roof are visible.

Leaving St. Nicholas Church a passing glance was given to the remains of the Old Jewry wall adjoining, and then the party inspected the recently-discovered Roman pavement, now so well preserved, well lighted, and accessible in the basement of newly-built premises just opposite. Proceeding on their perambulation the members next had their attention directed to the old Chantry House in the Newarke, which was built about 1510 by Wm. Wyggeston as a residence for two priests attached to the Collegiate Church in the Newarke. The house is very picturesque, covered with ivy, and is distinguished by the Wyggeston arms over the entrance. The church was demolished after the Reformation. In the old Town Hall, next visited, Shakspeare is said to have performed. The hooks and pulleys to which the curtains were suspended when the hall was used as a theatre still remain in the old tie-beams of the roof. The building appears to belong to the time of Henry VII., and it has a fine open timber roof. The Mayor's parlour adjoining is a very quaint old chamber, with a fine carved mantel-piece and Mayor's seat, both dated 1637. There are also some nice pieces of old glass in the long, narrow, many-mullioned windows. The hall belonged originally to the Guild of Corpus Christi. St. Martin's Church was next visited, where the vicar, the Rev. Canon Sanders, gave a full account of its history. The church is a large one of ancient foundation, but has in great part been rebuilt; for many years it was in the hands of the late Mr. David Brandon. The south aisle, of the date of 1350, belonged to the Guild of Corpus Christi. The Guild of St. George also had a chapel in this church at the west end of the south aisle. Over its altar used to be an equestrian figure of St. George, which was carried in procession on the festival day, and there is an entry in the churchwardens' accounts for 1540 of its sale by them. These accounts are perfect and complete from the Reformation. In this churchyard, as in several others in Leicester, there are many gravestones of slate, with, in many instances, very artistic designs in incised ornament, sometimes coloured and gilt. There appears to have been a school of artists in slate who did this work even as late as 1830. After luncheon at the hotel, the programme was continued, and a visit paid to the newly discovered Roman pavement beneath the Great Central Station. This is a magnificent specimen of most elaborate ornamental patterns, one of the richest ever discovered, and was greatly admired. The members, however, regretted to find that, notwithstanding the costly nature of the works carried out by the railway company in order to preserve it and give adequate daylight and ample facilities of approach for the public to examine the pavement, something more requires to be done to keep water and dampness from continuing to injure the work, and the members of the Congress passed a resolution, to be forwarded to the company and the authorities concerned, expressing the hope that such steps would be taken without further delay. St. Mary's Church was then visited, and was admirably described by Colonel Bellairs. It was originally the chapel of the Castle of Leicester, and was founded by Ethelfleda, the Lady of Mercia, but nothing now remains of the Saxon Church. The oldest architectural portions of the church are to be seen at the west end, where there is a low mural arcade of Norman work and an upper story of the same date. The church originally was without aisles and had a low central tower. That was as it was built by Robert de Bellemont, about 1107, and situated as usual in the outer ward of the Castle. Some years afterwards he made the church a collegiate church for a dean and canons. The present north door would be the main entrance from the outer ward, and was the outer door of a porch which seemingly had a room over it lighted by the small Norman window over the doorway. This doorway is richly decorated with zigzag ornament. The double doors themselves are very richly carved with panelling of Perpendicular date. There appears to have been very great care taken that no entrance should be made to this church from the inner ward of the Castle or Castle yard, not even a window looked that way below the level of the belfry windows of the tower. The south aisle, tower, and spire are said to have been the work of John of Gaunt. At about the same period the Parish Church of St. Mary was added to the Castle Church on the south side and absorbed the south aisle of the Castle Church from which it was separated by a wooden screen, a small part of which still remains at the east end of the south arcade. About the latter end of the fifteenth century the Parish Church was widened to its present extent and the beautiful roof added, and the exclusiveness of the inner ward of the Castle, which was then in a very dilapidated condition, was to some extent broken through. There is a very elaborate and nearly unique Norman sedilia and piscina in the chancel of the collegiate church. This church is one of the most interesting in Leicester owing to its connexion with the Castle. A move was now made to the Castle, the Norman hall of which, now encased outwardly with brickwork, is used as the Assize Courts, and thence to the hospital or Bede House of the Holy Trinity, founded and largely endowed by Henry, Earl of Lancaster, in 1331. Here the visitors saw the huge so-called porridge-pot, date 1331, which was used for cooking the food of the Hospitallers. In the chancel of the hospital chapel is an effigy of the widow of the first Earl of Lancaster. The history of the hospital was given by Col. Bellairs. This visit concluded the day's perambulations. At the evening meeting in the large room of the hotel, Major W. J. Freer, V.D., hon sec. of the Leicester Society, presiding, Mr. I. C. Gould read a very useful and carefully prepared paper on "Early Fortifications," dealing mainly with the earthwork forts which abound throughout the land, but which have not been studied until recently with the importance the subject demands. He traced the various forms of fortifications still existing and compared them with others of similar character in other countries, and illustrated his paper by many excellent plans and diagrams. Dr. Brushfield, F.S.A., contributed a paper upon a subject of local interest—"A Leicester Church Brief" of 1640, and dealt with the question of church briefs generally.

Friday, August 3.

This day, being fixed for the annual meeting of the Leicestershire Architectural and Archæological Society, a united excursion of that Society and the British Archæological Association was arranged, under the guidance of Mr. Thomas Harrold, of the former Society. The two bodies in a large party left the hotel in carriages about ten o'clock, and drove first to Newbold Verdon Manor House. The house was built about 1680, but there is evidence in

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the masonry of an older building. The house possesses a fine oak staircase and some oak panelled rooms, but the effect is marred by the whole of the woodwork having been painted a dark-brown colour.

There are the remains of what must have been a fine double avenue of yew trees. Market Bosworth was soon reached, and the members visited the grammar school, in which Dr. Johnson was for some time an usher. Then the fine church was inspected, dating, in part, from the thirteenth century. The chancel walls are of rubble, the aisles of ashlar; they date from the fifteenth century. There is a good Perpendicular east window, with canopied niches on either side, and a hagioscope in the wall from south aisle to chancel. The church possesses a very substantial, but plain, old oak chest, probably of the fifteenth century. The registers date from 1568. The font is very elegant, of early fourteenth-century date upon an earlier base. The tower is vaulted and groined, and of the Decorated period. After lunching at Market Bosworth the members departed for the field of the famous battle which decided the long wars of the Roses. They ascended the mound from which King Richard III. addressed his troops on that fateful day, and listened to Mr. Harrold's description of the battle and the disposition of the opposing forces. They saw the well from which it is said that the king and his charger drank before the last charge in which he fell. Greatly changed must be the aspect of the land since the battle; then it was all open rolling plain, now it is divided into fields by hedgerows, and a railway station covers the spot on which the king's body was found. A passing call was made at Dadlington, in the churchyard of which it is said many a brave soldier killed at Bosworth Field found a grave. The church is small but very interesting. Before restoration it possessed a shingled spire, almost unique, it is said, in Leicestershire. The old oak door, much weatherworn, is now preserved in the vestry at the west end.

Stoke Golding, the last church to be visited, is a fine fourteenth-century building. It has not been much touched by restoration. It has richly-moulded clustered piers, with fine capitals of beautifully-carved foliage in which the marguerite is introduced, the church being dedicated to St. Margaret. It is a double-aisled church, of very good proportions. A massive oak and iron bound chest, lettered a "Stocke Cheste," and dated 1636, with the initial letters of the churchwardens carved upon it, is preserved in the south aisle. Leicester was reached about 7.30, the only day on which the times given in the programmes had been exceeded; but the ground covered was considerably over thirty miles, and the weather wet and dreary. The evening meeting was held in the large room of the hotel, under the presidency of the Rural Dean, the Rev. Canon Rendell. Mr. Thomas Blashill gave a short account of the "Origin of the Frame Work Knitters' Company," one of the City companies. The company received its first charter in 1657 from the Protector Cromwell, and its present charter dates from the Restoration. The company had authority over all workmen engaged with the stocking frame and over all machine-knitted fabrics, the great development of which in Leicester made the subject appropriate at this congress. The company could search out and destroy all bad work, prevent the exportation of machinery, and regulate apprenticeship. These functions it continued to exercise until early in this century, when all like powers and duties of the old companies came to an end. Mr. W. T. Rowlett, a member of the Framework Knitters' Company, explained, by means of plans and diagrams, the various processes, both ancient and modern, used in the manufacture of stockings and other knitted fabrics. A paper was then read, in the absence of the author, by Mr. Patrick, hon. secretary, on "Wickliff and his Times," by the Rev. W. S. Lach-Szyrma, M.A., in view of the proposed visit to Lutterworth the next day. Mr. Lach-Szyrma recommended the study of Chaucer, Piers Ploughman, and, above all, of Wickliff, to all who wished to understand something of the social life of England in one of the most attractive periods of English history, viz., the age between Cresey and Agincourt, *i.e.*, the era of Edward III., Richard II., and Henry IV. and V. These three writers he considered to be the most trustworthy guides.

Saturday, August 4.

The weather was fine and bright after the recent rain, and a goodly number of the members left at 9.50 by the Great Central Railway for Lutterworth, of which parish the celebrated Wickliff was rector from 1375 to 1384. Mr. Patrick, hon. sec., read a paper on the "History of Lutterworth and its Rector," and described the church. Lutterworth is mentioned in "Domesday Book," but there is no record of a church there in Saxon or early Norman times. The present building, in its oldest part, dates from the thirteenth century. It consists of a nave, aisles, chancel, and massive tower at the west end. The tower, up to the middle stage, and the chancel and north aisle are the earliest parts. The rest of the church is of the early Decorated and Perpendicular periods. The rood loft was approached from the interior of the church, and a large semicircular recess on the south side of the chancel arch indicates the position of the stairs. This church affords good examples of the various forms of window tracery, some of which are illustrated in the text-books of Freeman and others. Some interesting examples of mural decoration of the fourteenth and fifteenth centuries are still preserved here. One, over the north door, consisting of three full-sized figures, two kings, with a lady between them, carrying hawks on their wrists, was considered by the late Mr. Bloxam to represent Edward II. and Edward III., but he did not account for the lady. Other interpretations have been suggested, but none are sufficiently conclusive. They may, perhaps, commemorate Richard II. and his Queen, Anne of Bohemia, and John of Gaunt, Duke of Lancaster, who claimed to be King of Castile. The wall above the chancel arch is covered with a large painting of the Doom or Last Judgment, probably not earlier than the fifteenth century.

In this church the great reformer John Wickliff ministered and worshipped for some years, and it was whilst engaged in the sacred office of the Eucharist that he was seized with his last illness and died December 28, 1384. He was buried in the chancel, and his body rested there for forty-four years, when, in fulfilment of the decree of the Council of Constance, his remains were disinterred, burnt, and cast into the river Swift. There is an interesting piece of embroidery preserved in a glass case in the vestry which appears to belong to the fourteenth century, and may have formed a part, as is said, of a vestment worn by Wickliff, but it is uncertain, and the other relics said to be associated with him—the chair in the chancel and the fine carved oak table in the nave, are several centuries later in date; the table particularly is Jacobean and a fine example. Mr. Andrew Oliver gave a careful description of the Fielding monument in this church, which is an altar tomb with two recumbent effigies of a knight and lady in alabaster. Upon the floor close by are two brasses, said to represent the same individuals. Mr. Oliver, however, drew attention to the differences in the costume of the figures, and said they could not be intended for the same persons, although members of the same family of Fielding, and that there was an interval of at least seventy years between them. After strolling about the little town the party returned to Leicester in time for luncheon and the closing meeting of the Congress at the Museum Buildings at 3.30. Mr. Lynam, hon. treasurer, took the chair, and the usual votes of thanks to the local authorities and all who had contributed by work or papers to make the Congress successful were passed, and the members separated.

Information Office, Paris Exhibition.—The Royal Commission at the Paris Exhibition has instituted a Commercial Information Office for the use, without charge, of British exhibitors, visitors, and members of congresses. They have at the disposal of English members, who may be attending congresses, a spacious room where they can meet and discuss. This office is situated on the Quai D'Orsay; entrance by the side door on the east. A writing-room is provided for the use of members of congresses, and information on trade matters will be given as far as possible. In the office will also be found a comprehensive set of Customs tariffs, information as to transport by land and sea, books of reference, directories, &c. Letters and telegrams can also, during the congress, be addressed to members, as follows:—Telegrams, care of "Britpav," Paris; letters, care of Commercial Information Office, British Royal Pavilion, Quai D'Orsay. The office will be open daily from 10 a.m. to 5 p.m.

BUILDING TRADES' GIFT TO THE NATION:

HOMES FOR DISCHARGED SOLDIERS.

We are informed that, whilst rapid progress is being made with the erection of the Homes for Discharged Soldiers at Bisley, it has been found that they are still short of certain building materials, so that further gifts in kind are now again invited. The gifts which would be most welcome are the following, and any communications or offers regarding these gifts, dimensions, and the like, should be addressed to the Executive of the Building Trades' Gift, No. 1, Waterloo-place, Pall Mall, S.W.:—

Bricks.—30,000 red facing bricks (in two batches of 15,000).

Cement and Lime.—100 tons of Portland cement; 100 yards of lime.

Terra Cotta.—400 ft. (run) coping, 9 in. by 6 in.; 200 ft. (run), sills, 10 in. by 6 in.; 100 ft. (run) coping, 2 in. by 5 in.

Stonework.—400 ft. (run) coping, 9 in. by 6 in.; 200 ft. (run) sills, 10 in. by 6 in.; 100 ft. (run) coping, 2 in. by 5 in.

Carpenter.—10,000 ft. (run) 2-in. by 4-in. rafters and ceiling-joists; 3,500 ft. (run) 2-in. by 9-in floor-joists (average 15-ft. lengths); 5,000 ft. (run) 2-in. by 5½-in. floor-joists in short lengths; 1,000 ft. (run) 9-in. by 3-in. timber for trusses (various lengths).

Joiner.—2,000 ft. (run) 10-in. or 12-in. moulded skirting; 2,000 squares, 1 in. thick, best yellow flooring.

Doors.—Seventy-five four-panelled doors, moulded both sides to detail, average size 6 ft. 6 in. to 2 ft. 6 in., with lining complete; 2,000 ft. (run) 1-in. by 4½-in. architraves.

Casements and Frames.—Twenty-four large windows, frames fitted with three casements and three fanlights, complete off the bench; twenty-four small windows, frames fitted with two casements, complete off the bench.

Lead.—25 cwt. 4-in. lead soil pipe; 200 lb. solder; 10 cwt. lead pipe for water supply; 500 ft. run ¾-in. steam barrel.

Sheet Lead.—10 tons 5-lb. sheet lead for roof work.

Zinc Sheeting.—1,500 ft. 14 gauge zinc.

Rain-water Pipes.—1,500 ft. 5-in. by 3-in guttering, 500 ft. run 4-in. round or square rain-water pipes.

CRYSTAL PALACE SCHOOL OF PRACTICAL ENGINEERING.

Mr. A. T. Walmisley presided on Thursday last week at the award of certificates to students of the School of Practical Engineering at the Crystal Palace. Mr. W. Gardiner, secretary to the Crystal Palace Company, read the list of awards and the reports from the examiners, two of whom were former students.

Referring to the future of the school, Mr. Walmisley said that it had long been a cherished idea on the part of the directors to give this school the opportunity of becoming the leading school for engineering training in the country; but more space was needed and more plant to work with. He hoped the directors would at an early date be in the position to consider spending further sums upon the development of the school, and he felt sure that their efforts would be appreciated in the profession. Those who had inspected the students' work on this occasion must feel that it was satisfactory to themselves, as well as to the teaching and governing body.

It was half the battle in life to choose one's calling rightly, and here students had the advantage of seeing whether they had done so before proceeding further. Many young men imagined that, if they could construct a boat or a model of an engine, they were born engineers, but they soon found out that more than the "cunning" of the hand was needed, and that it was a study involving the "cunning" of the brain. The engineer must be more than a man of method and routine. He must be a man of reflection. He (the speaker) was glad to see evidence of mental resource in the exhibits he had inspected, because no profession needed training of the mind more than that of a civil engineer. He should be no mere copyist, but possess inventive fertility in order to deal with new and difficult cases. Nature, calm and unrelenting, always stood looking at his work, and if he did not understand how to direct the vast resources of Nature, with which he dealt, to the use and convenience of man, they would soon reward his interference by directing him to shut up shop. The days were past when the engineer could be a rule-of-thumb practitioner—one who carried a pair of brass compasses in his pocket

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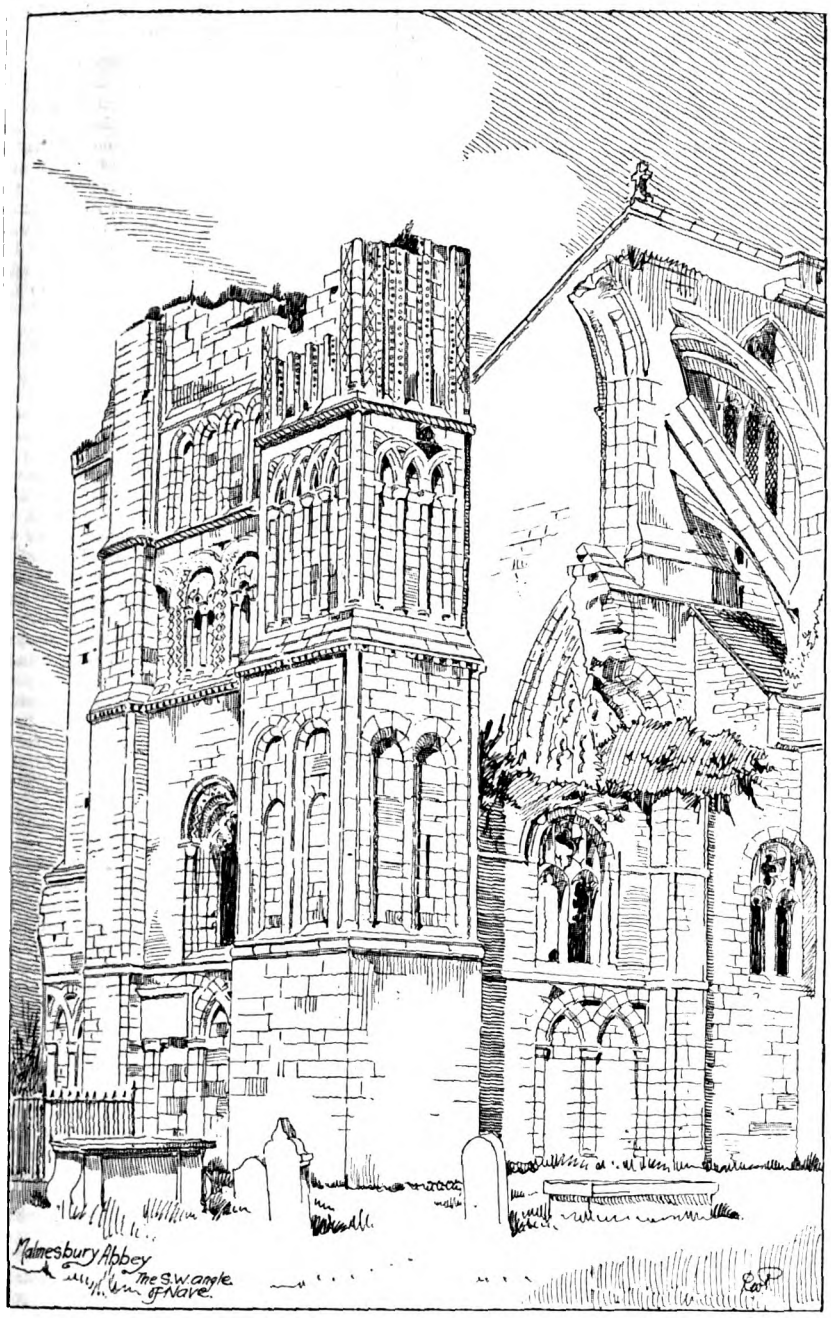

and plenty of "brass" in his face. He must be able nowadays to state reasons for his assertions if he wished to maintain the confidence of his clients. The main object of understanding the calculation of the theory of stresses in girders and similar structures was not to be able to cut down the sections to a minimum, but to be able to avoid putting excess of metal in wrong places, and to know that the structure was uniformly strong. They had to consider the endurance of the material. The late Sir John Hawkshaw was once asked if he had not made a certain beam stronger than theory demanded. "Yes, I have," he replied, and added, "I used to be stronger than I am now, so I have made that beam to be able to take its work when it is as old as I am." Herein was the difference between the use of so-called "factors of safety" and such factors of ignorance as were the result of groupings in the vague atmosphere of empiricism. They understood the composition of their formula and knew how to apply it reliably. Without this the formula was purely conventional. In this school they had the advantage of learning the theory in a practical way. They were shown what book work to read carefully and what pages might be skimmed over, and this oral tuition was certainly more fruitful than solitary reading, while the workshop and laboratory practice furnished treatment based upon real knowledge and prepared them to profit by the subsequent experience which might offer in actual work.

Mr. J. W. Wilson, the principal, gave a short address, and Mr. H. E. Milner, one of the directors, proposed a vote of thanks to Mr. Walmisley, which was accorded with acclamation.

The next term commences on September 10.

MALMESBURY ABBEY.

THE sketch shows the south-west angle of the nave of Malmesbury Abbey Church, referred to in one of our "Notes" last week as being included in the scheme of restoration. The fragment of the Norman west doorway shows on the extreme left with the jamb of the Perpendicular window above it. The south aisle has later tracery inserted in the Norman windows, and the clearstory was rebuilt in the fourteenth century. The western tower (Malmesbury resembled Hereford in having western and central towers) probably stood over the first two bays of the nave, now ruined. The double flying buttress to support the south-east angle of the tower shows on the right of the sketch and the angle of the south porch.

COMPETITIONS.

IMPROVEMENTS, EAST BAY, DUNOON.—The awards of 100*l*., 50*l*., and 25*l*. respectively for the best plan of improvements in the East Bay, Dunoon, have been announced. First, Messrs. Wardlow & Millar, C.E., 109, Bath-street, Glasgow; second, Mr. James More, jun., 13, Drummond-place, Edinburgh; and the third was divided between Mr. C. J. M. Mackintosh, C.E., Burgh Surveyor, Dunoon, and Messrs. Wylie & Blake, C.E., 134, St. Vincent-street, Glasgow. The plans, twenty-three in number, are to be on view to the public on the 24th and 25th in the Burgh Hall.

WORKMEN'S DWELLINGS, BRADFORD.

THE problem of the suitable housing of the working classes is one of the most serious now before the local governing bodies of this country. At the meeting on the 8th inst. the Building Committee approved of plans and ordered them to be lithographed in order that builders and others who may be disposed to invest their money in such an undertaking may know the class of accommodation that is needed and the style of house that must be built in order to satisfy the requirements of the Local Authority. In consequence of the undertaking given to Parliament when the boundaries of the city were last extended, back-to-back houses cannot be built in Bradford. The problem therefore is to build through houses to comply with the by-laws, and at such a prime cost that the rental charged will be within the means of those by whom such accommodation is most needed. In the plans approved—which were submitted by Mr. Michael O'Flynn, Bradford—an apparently very successful attempt has been made to combine the maximum of convenience with the minimum of cost, and by this standard the plans must be judged. It would of course be a very simple matter to make improvements in the plans, but at the same time the cost would be increased. The plans provide all the essentials of a comfortable sanitary home for a working man and his family. On the ground floor there is a living-room 15 ft. by 14 ft. 6 in. fitted with a kitchen range with two large cupboards. Behind the living-room is a scullery with a depth of about 7 ft., and fitted with a set-pan, a sink, and an earthenware bath with a movable table over it. Under the stairs is a pantry. The first floor, reached by convenient stairs, contains a large front bedroom—14 ft. 6 in. by 11 ft.—a small bedroom at the back, and a clothes closet. Above is an attic, 15 ft. square, forming another large bedroom. At the back of the house there is a court-yard having an area of 180 square feet, and opening on to a back road. In the courtyard are coal-store, water-closet, and ash-bin. The outside walls will be built of stone, lined with brick, and the parting walls will be of 9-in. brickwork. The living-room is a comparatively large apartment. It is intended that it shall be in truth a "living-room," the practice of setting aside the front room as a parlour, more or less for show purposes, and living in a dull, stuffy back kitchen, being one that it is not desirable to encourage in small houses. There is also no cellar, partly on account of the extra cost and partly because cellars are apt to be used as living-rooms though they are utterly unfitted for such a purpose. The arrangement of the scullery, though cheap in cost, is yet very convenient. The bath—which when not in use will be covered by a table—will have cold water laid on, but not hot water, the fittings for which would be too expensive. The set-pan, however, is at hand, and will provide hot water for baths. In the whole of the house no space will lie idle. Every corner has its use, but at the same time the accommodation is on a more liberal scale than in the majority of Bradford cottages. Ventilation has been especially considered, and in addition to the window a ventilator will be placed in the wall of the back bedroom. The through construction of the house also ensures under ordinary conditions a free current of air from back to front. The most important point of all is the cost. Calculating the cost of land at 5*s*. per square yard, the total estimated cost is 225*l*., including the cost of paving streets and the purchase of the land. The land and building by themselves have been variously estimated to cost from 207*l*. to 211*l*. 10*s*. This is very little more than back-to-back houses affording the same accommodation could be built for. In arriving at the estimated cost it has been assumed that the houses would be built in blocks of not less than twelve. Assuming the actual cost to work out near to these estimates, the houses could be let at 5*s*. 6*d*. per week each, including rates. Let at 6*s*. per week, including the rates now levied in Bradford, such houses should show a return to the investor of about 5 per cent., and they would certainly not be likely to stand long empty. In a short time lithographed copies of the plans will be obtainable on application to the City Surveyor.—*Bradford Observer.*

THE GRECIAN THEATRE AND EAGLE TAVERN.—The site of the Eagle tavern, and that of the Grecian theatre in the rear, are now being cleared for, we gather, the erection of a police-station. The tavern was erected on the site of the old Shepherd and Shepherdess tea-gardens, near Wenlock Barn. The Grecian theatre with its gardens and grottoes, formed a highly popular place of entertainment some thirty or forty years ago; it was built by Thomas Rouse, and had latterly been used for purposes of the "Salvation Army."

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Illustrations.

ENTRANCE HALL, EASTERN TELEGRAPH COMPANY'S NEW OFFICES.

THE entrance hall of the new offices of the Eastern Telegraph Company forms an important feature in the new building. In the archway is a light screen in which are bronze and glass swing doors, the arch opening being entirely glazed. The barrel roof of the hall is a continuation of the arch.

The walls are to be carried out in Bath stone, and a frieze has been designed to represent the extensive work done by the company.

Beyond this hall are the grand staircase and the lifts to the upper stories.

Mr. John Belcher, A.R.A., is the architect. We illustrated the Finsbury-pavement elevation of the building in our issue for May 26.

LIVERPOOL DOCK OFFICES COMPETITION:

THIRD PREMIATED DESIGN.

WE give this week the perspective view and plans of the third premiated design in the Liverpool Dock Offices competition, by Mr. J. H. Cook. The following extracts from the architect's report, sent with the drawings, serve to explain the intention of the design :—

"The shape of the site is a somewhat unusual one, and calls for a treatment, both as to plan and elevation, peculiar to itself. Its main façade, being composed of three planes, of which the two outer do not agree in angle with the central one taken as a base, naturally forces the designer to adopt some means to connect these in such a manner as to overcome their differences, and present a harmonious and balanced frontage. For this purpose I have introduced circular towers at the junctions of the planes, which fit the rounded angles given on the plan of site furnished me; and further, I have kept my building fully up to the boundaries of the site on this western end, and by balancing the lengths of the flanking sides I am enabled to effect a saving in area of land required of 264 square yards, in a strip 9 ft. wide along the eastern boundary.

The main entrance from an architectural point of view must naturally be placed in the central one of the three planes. This I have recessed, and flanked on either side with pavilions and the towers before mentioned. The resultant effect of this treatment is to give a feeling of breadth to the central block, and so assist to emphasise its importance in the composition. In this matter the towers give a great assistance, as can be seen by reference to the perspective view, which is a true rendering of the plans and elevations, and in no way forced. I am, of course, aware that the entrance in this position is not in the line of approach from the shipping offices, which is altogether from the Eastern side, from the James-street and Water-street direction; but in a building of this size it is neither desirable or possible to provide one entrance which shall serve all purposes. Therefore, minor but still important entrances have been provided from Brunswick-street and the proposed new street, both of which will be more in general use than the main entrance.

In the internal planning of an office building the chief essential requirement is simplicity of corridor arrangement; and this, to avoid all confusion, should be an absolute repetition on each floor. The way about when once inside the building should be an obvious one, and it must be possible to be in touch with all departments on any floor without having to travel far out of a direct course from point to point. By the scheme I give, all these points are adequately met, and it would be impossible for any one to experience the feeling of being 'lost' (a complaint often made in connexion with large buildings). Fitting this into the square shape of the building, and using the spandrels for light courts, and with other light courts as the plans show, this main corridor and all minor corridors are lighted by windows opening to the outer air—practically throughout their entire length. I have arranged this main corridor to give entrance to offices and staircases only, and have entirely freed it from all direct communication with the vent cuts to the several lavatories—the coal lifts, janitors' rooms, service stairs, &c.—which are all planned to open from minor corridors, giving them a very desirable seclusion. All the vent cuts are fully open to the outer air on one side and to the larger areas on the other, so that thorough cross ventilation will be ensured, and by their being situated away from the offices the lavatories will give no offence. The internal arrangements of these places are fully indicated on the plans, and the accommodation provided is ample in water-closets, urinals, and wash-basins; and they are conveniently disposed so that no great distance has to be traversed from a given point. I am of opinion that to group this accommodation to one point is unadvisable for a building of so large an area, and would prove exceedingly wasteful of time and in every way inconvenient. The accommodation for ladies is made on the first floor, and could be repeated if requisite on any of the floors over. The vent cut in this instance is for an obvious reason made to be entered from the main corridor. The internal areas for corridor light and ventilation are large enough for the purpose they have to serve and are planned with all due economy of space; these and the main central light court will be faced with white glazed brick. This court has been made of such a diameter and size as to ensure all the offices grouped around it being efficiently and pleasantly lighted, with the outlook as agreeable as possible, and it is the only court giving light to offices. The office accommodation asked for in the various departments demands a plan which shall permit of large general offices, to which the public will have access, being provided on each of the several floors, and here again my corridor shape fits in and helps the scheme as the plans show, and at the same time allows the smaller rooms to be planned in connexion with them with economy of space and all convenience. . . .

The lighting of the building would be by electricity, with all wires laid in armoured coverings, all properly grouped and with switch, cut off, and fuse boxes, and so arranged that the burning out of a fuse would not cause any part of the building to be left in total darkness. The heating would be by steam, from boilers situate in the centre of the building on the basement floor. Radiators would be fixed in the window recesses, with ventilator bases connected with fresh air inlets from the outside, as shown on the sections, and the heating would be planned as a complete system for the entire building, including all vestibules, halls, and corridors, so that there would be an equable temperature throughout, with a consequent absence of all draughts. I am of opinion, based upon personal experience, that with a building properly heated and ventilated, fireplaces, except for appearances, are superfluous, and also entail unnecessary expense both in the building of them and in their use.

The ventilation is shown in principle on the sections as far as the small scale to which they are drawn would permit. The inlets are described above. The outlets would be by flues in the corridor walls carried up to the top of the building, and there connected to a foul air trunk formed above the ceiling of the main corridor on the top floor. This trunk is divided to work sectionally from three points, so as to ensure even extraction throughout and avoid long pulls, fans at each outcast being provided, driven by electric power. Two of these outcast shafts appear on the new street elevation and the third is in connexion with the fleche on the main façade. . . .

The construction throughout would be fireproof, all ironwork been thoroughly encased, and columns, exposed girders, &c., lathed with expanded metal and plastered. The floor construction would be steel joists and girders, with concrete breeze filling between. The roofs would all be of steel construction, properly encased, the portions slated having tee bar purlins, with porous terra-cotta slabs between, bedded in cement. The flat portions would be constructed similarly to the floors, and finished with asphalt. No timber for constructional purposes would be used, and such as will be used for finishings, &c, I would suggest should be fireproofed by the non-flammable process.

The materials will be :—For the street frontages, stone from either the Old Darley Dale, Derbyshire, or the Cefn quarries; external steps, a fine grade of Yorkshire stone; internal walls and the backing of stonework, brick; slates for roofs, green Westmoreland; crestings and gutters, stamped sheet copper, as also the encasing of the fleche; copings and internal sills, York stone; area and light-court facing, white glazed brick; basement floor, concrete throughout; corridors and lavatories, mosaic finish; office floors, pitch-pine boards on embedded sleepers; boardroom floor, oak parquetry, and English oak panelling from floor to spring of ceiling; doors, casings, and trim throughout, oak; windows glazed with plate glass, skylights with rolled plate, protected with wire guards.

The architectural treatment of the façades is conceived on broad and dignified lines, in which massing and grouping are used for emphasis, rather than any particular elaboration of detail, and I think the resultant effect of my efforts is a building thoroughly in keeping with its purposes, strong in character, and in no way over elaborated. The style is an adaptation of modern French Renaissance."

SQUARE TOWER WINDOWS IN EAST ANGLIA.

THOSE who know Norfolk must be familiar with the constantly recurring feature, in the church towers of the district, of a small square traceried opening, generally a little above the middle of the height of the tower.

The illustrations are a small collection of examples of these traceried openings, drawn by Mr. E. J. Munt. They show some of the various methods of treating this square opening which are to be found among the churches on the coast of Norfolk.

THE SANITARY INSTITUTE CONGRESS IN PARIS.

IN response to a cordial invitation from the French Society of Hygiene the Sanitary Institute commenced a series of meetings (held in Paris) on Tuesday last week, when a number of members of the Institute, who had started from London on Monday, August 6, were welcomed by Professor Grehant, President of the French Society, and some of its leading members, at the Zoological Museum of the Jardin des Plantes. Among the members of the Institute taking part in the visit to Paris were Professor Corfield, the President of the Congress; Dr. Wynter Blyth, Mr. de Courcy Meade, M.Inst.C.E., and Mr. W. H. Grigg, Presidents of Conferences; Mr. E. White Wallis, Secretary of the Sanitary Institute, and delegates from the Sanitary Inspectors' Association and other bodies interested in questions affecting the public health.

The proceedings, which were held in the lecture-room of the Zoological Museum, began with a cordial welcome offered by Professor Grehant to the members of the Sanitary Institute, a compliment which was acknowledged on behalf of the Institute by Professor Corfield. In an inaugural address Professor Corfield showed by statistical tables the favourable influence that the study of sanitary science, and the various enactments intended to give practical effect to those studies, had exerted upon public health. In the period from 1851 to 1870, during which the Nuisances Removal Act of 1855 and the Sanitary Acts of 1866 had been put into force, the average death-rate per 1,000 of the population of London was 24·1. During the period 1870 to 1890 this rate had been reduced to 22·5, in the period 1891-5 to 20·2, and finally to 18·8 in the period from 1896-9. The death-rate for England and Wales had in the same way been reduced from 22·4, before the passing of the Public Health Act of 1875, to 20·8 five years later, and to 17·4 for the period from 1896 to 1898, the latest for which figures are available. In a third table Dr. Corfield compared the vital statistics of the decades 1861-70, 1871-80, 1881-90, and of the shorter periods from 1891 to 1895 and from 1896 to 1898 in regard to certain diseases; but these comparisons belong rather to the medical aspect of the subject.

The first day's sitting of the Congress was supplemented by a visit to the French section of the Exhibition, where the extensive exhibits of the Pasteur Institute were examined and explained. The English and French members of the Congress breakfasted together before the visit, at the Café Lyonnais at the Exhibition.

Conference of Medical Officers of Health.

Dr. Wynter Blyth, on being introduced by Professor Corfield, took the chair as President of this Conference, and gave an address on "International Sanitary Regulations with regard to the Control of Infectious Diseases." He concluded his address by proposing two resolutions. The first ran as follows :—

"That in the opinion of this Conference success in the international control of the diffusion of infection from country to country is likely to result from an organised system of medical inspection and of reciprocal information, and the isolation of travellers found to be actually suffering from infectious disease."

The second resolution suggested the advisability of the Council of the Sanitary Institute approaching her Majesty's Government, suggesting that the Government convene a sanitary conference, composed of delegates from all civilised governments throughout the world, with a view of ascertaining how far general rules could be adopted as to the control by land and sea of the diffusion by travel and commerce of all the more important infectious maladies.

Professor Corfield, in proposing a hearty vote of thanks, opened a discussion by referring to some of the points raised in Dr. Wynter Blyth's address.

Dr. Boobbyer, Nottingham, seconded, and the motion was agreed to.

Dr. Wynter Blyth, having replied, put the first resolution he had proposed, which was agreed to.

The second resolution was also put and carried unanimously.

After the morning sitting, the afternoon was spent in visits to the central section of the sewers of Paris, and in a visit, under the direction of M. Lannay, Chief Engineer of the Commission for the Sanitation of the Seine, to

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the purification works at Clichy and the irrigation grounds at Gennevilliers.

Conference of Engineers and Surveyors.

On Thursday a Conference of Engineers and Surveyors, under its President, Mr. T. de Courcy Meade, M.Inst.C.E., City Surveyor, Manchester, and subsequently a conference of the Sanitary Inspectors, presided over by Mr. W. H. Grigg, Chairman of the Sanitary Inspectors' Association, were held at the Museum of Natural History, Professor Corfield, the President of the Congress, again presiding. Mr. de Courcy Meade, on being introduced, took the chair, and delivered an address on "The Prevention of River Pollution and the Purification of Sewage." The problem still remained to be solved of "How to prevent pollution at a reasonable cost." The question had been before Municipal Authorities, and they had been assured in every decade that the solution had been found, but they were still far from a perfect solution. Nowhere, perhaps, was there more pressing need for a solution than in certain portions of Lancashire and Yorkshire, where many of the rivers and streams were long ago deprived of their natural purity. The Local Government Act of 1888 authorised the formation of joint committees such as the Mersey and Irwell Joint Committee, which controlled the watersheds of the rivers Mersey and Irwell, an area of 482,195 acres, with a population of 2,500,000 inhabitants and a rateable value of over 10,000,000*l.* sterling. Over this area 450,000 or 500,000 factories of all kinds are distributed. In the more populous districts, where little land is obtainable for purification purposes, it is desirable, where circumstances permit, to allow manufacturers to discharge their refuse, liquid or otherwise, into a sewerage system in order to be dealt with by the Sanitary Authority, but the admission should be subject to the inspection and control of the authority, and matters liable to generate dangerous gases should be rigidly excluded. The approximate quantity of sewage effluent from towns which passes into the rivers within the Mersey and Irwell watersheds amounts to a normal flow of something like 68,000,000 gallons per twenty-four hours. Most of this sewage now undergoes treatment before admission into the rivers, and it represents about 52 per cent. of their minimum dry-weather flow, and the estimated quantity of sludge now annually removed from the sewage of the towns is about 620,000 cubic yards as against 638,877 cubic yards removed from the non-tidal waters of the Ship Canal last year.

The solids were removed by purely mechanical filtration by means of the Wilson filter. The filters erected in 1895 were supplemented last year by three additional filters and a small septic tank installation. A portion of the sewage was treated by chemical precipitation at the Manchester works, and the sludge has since been forced through a rising main into elevated tanks, from which it gravitates into a sludge steamer in about fifty-five minutes. Formerly the sludge was pressed into cake, which was thrown away (for the most part), being tipped on low land adjoining. The cost of pressing amounted to 11·5d. per ton of wet sludge; the cost of conveying it to sea was only 5·9d. per ton.

Open Spaces in Towns.

Another portion of Mr. de Courcy Meade's paper dealt with the open spaces, parks, gardens, and squares of towns. In Manchester many open spaces of small extent had been created, which were believed to exert a salutary influence on the general health of the population around them, and the Corporation had expended a considerable sum upon this work. In an appendix, the lecturer gave a list of these, and for comparison a statement with regard to such open spaces in the City of London, in Liverpool, Birmingham, Glasgow, Edinburgh, Cardiff, Sheffield, &c. In most cases no definite statement as to the effect of open spaces on the general health of the surrounding population could be obtained, but as to Liverpool a statement was made that the "death-rate in the vicinity of open spaces was much lower." It was perhaps desirable that the system of creating small open spaces adopted in Manchester should be followed by other towns. Some of these spaces were provided with trees and plants, of which the city of Manchester possesses a nursery in extensive gardens, cultivated for the purpose of supplying plants as needed.

Planning and Construction of Streets.

The minimum width of streets according to the present by-laws was not considered sufficient, as the large sums annually spent in large towns for widening streets amply proved, and in anticipation of the largely extended street locomotion of the future he would suggest that new main thoroughfares in our chief towns should have a minimum width of 80 ft., so as to admit of rows of trees being planted on each side near the footways. There should be carriageways 18 ft. wide, two lines of tramways, and a centre track for cyclists 11 ft. wide.

Subways under Streets.

Except in the City of London, in Nottingham, and one or two other towns, the adoption of subways to prevent the continual breaking up of the pavements for various purposes has not obtained in Great Britain. The paper was accompanied by a typical section through a Manchester street, indicating the pipes and other appliances belonging to the Corporation which are laid under that street. They comprise main and local sewers, drains, trunk water mains, water supply mains and service pipes, hydraulic power mains and service pipes, gas trunk mains, supply mains and service pipes, telephone and telegraph pipes and conduits, pneumatic tubes, electric light and power conduits, and distributing electricity mains and services. All these sewers and pipes require provision for inspection, and in some streets no space is left for extensions; when, therefore, it becomes necessary to duplicate some pipes great difficulty is experienced, and the alteration or removal of existing pipes on an extensive scale is often necessary.

Street Cleansing.

"The question of street cleansing more nearly concerns the sanitary reformer than street construction, because ill-scavenged streets cause discomfort and have a bad effect upon the general health of the residents of the vicinity. The cost of cleansing the streets in the City of Manchester has varied from about 1s. to 2s. per 1,000 yards cleansed per annum during the past fifty years. In the same period the cost on the rateable value has varied from 1½d. to 3⅝d. in the pound, whilst the rate of labourers' wages has increased from 12s. 6d. to 21s. The net expenditure has increased from 7,714*l.* to 44,527*l.* per annum, the area cleansed having also increased from 118 million square yards to 554 million square yards."

In conclusion the President said: "I would observe that I selected the subject of streets, open spaces, and subways as being most suitable for discussion in this city, where the magnificent boulevards, avenues, and streets surpass those of any other city. I remember many years ago being permitted by the City Engineer to inspect the subways of this city, and to those of you who have not done so I would strongly recommend a visit to underground Paris before you leave, and the visit arranged for this afternoon will give you an opportunity of doing this."

Professor Corfield, in proposing a cordial vote of thanks to the President of the Conference, regretted he had not said more of his own work in Manchester. Mr. Cowan (Local Government Board, Ireland) seconded the vote of thanks, and congratulated Mr. Meade on the Sanitary Museum originated by him at Hornsey twelve or fifteen years ago, as well as upon the value of the work he had done since in Manchester, the classical reports of which city might provide valuable hints even to Paris.

The vote was unanimously accorded and briefly acknowledged by Mr. Meade, and discussion followed, the leading speakers being Dr. Rideal, Mr. Rudolf Herring, a sanitary engineer from the United States, and Mr. Roechling, of Leicester.

Dr. Rideal said the difficulties experienced in England and all other countries in this matter had arisen from past legislation, and they were not now avoidable. It was possible under certain circumstances to allow a certain amount of sewage matter to go into streams. The problem was to ensure that streams should remain pure. Future legislation should be based upon the ratio of the volume of a stream to the volume of sewage matter discharged into it. Large volumes of sewage might go into a large stream without detriment to towns lower down, even where the water was used for drinking purposes. The Legislature should establish a ratio between the volume of a stream and the volume of sewage proposed to be discharged. At Manchester the effluents had been tested by the incubation test, and it was found that where the discharge was not sufficient to render the water putrid upon being kept for a certain time, then the water of the stream was in a satisfactory condition. It was found that where the oxygen remaining in a stream did not fall below 50 per cent. the water would remain in a satisfactory condition. The adoption of this principle would do away with all questions as to standards of purity, which were always more or less unsatisfactory. Mr. Meade had shown that the secret of success was to arrange for manufacturers to discharge their effluents gradually and not in flushes. If that were done we should have no trouble in dealing with the sewage question except in cases of some special classes of manufactures. Breweries or soap factories, for instance, should be required to discharge slowly. In America they had no trouble of this kind, because its streams were much greater than ours. The trouble in England arose from our small sources of water supply.

Mr. Rudolf Herring, U.S.A., referred to the special difficulties sanitarians had to contend with in America, where municipal government was a failure. A civil engineer would be appointed for a year or two, and sometimes four years, and then he must go out on account of a change of Government. If he could not remain in office long enough to carry out plans he might have made or might be engaged upon, he could not possibly have the same interest in his work. This made a great difference in the efficiency of all officials in his country. The water supplies in his country were not so good as in Europe. They were now demanding better water because bacteriological science had shown that good looks did not make good water. In Plymouth there was an outbreak of typhoid in winter, and a search for the cause revealed the fact that it had been the practice to throw the excreta on snow. This accounted for the remarkable circumstance that it was precisely in a part of the town supplied with the purest water that typhoid had broken out. They must keep out germs, and this had suggested the filtration of all water, even that which was derived from the mountainous regions. The supply of water demanded and supplied in the great towns was large. In Philadelphia the daily supply was 160 gallons per head, in Buffalo it was 200. They had little difficulty in the disposal of sewage. They could throw sewage into a river, and it could not be found even with the aid of chemistry. It was so in New York and in Philadelphia, where they had the Delaware River. At Chester, twelve miles below the city, they drank the water. At Chicago they had had some trouble when the sewage was discharged into Lake Michigan. They had now constructed a channel into which the sewage was turned, and then the water of the lake was let in to dilute it in such volumes that it had raised the level of the Mississippi by a foot.

Mr. Roechling, Leicester, said he agreed with Dr. Rideal that in the treatment of sewage they must split up the solid matters. The outside of a lump of excreta was aërobic and the inside was anaërobic, but he would prefer to split it up by screens or other mechanical means. River pollution was a question of standards. He was of opinion that where a water supply was drawn from a river, the sewage turned into it ought to be purified first—whatever process they had. The first necessity for successful treatment in any process whatever was good management. They must educate their sewage-works managers, and County Councils must take up that phase of the question or they would not succeed. Effluents from bacterial (self-purification works) should be regularly and carefully observed. Often it would be found that luxurious vegetation had been set up, and this in turn was liable to set up putrefaction.

Conference of Sanitary Inspectors.

Professor Corfield now called upon Mr. W. H Grigg, the President of the Conference of Sanitary Inspectors, to take the chair. In the address with which Mr. Grigg opened this Conference, "The Status and Duties of a Sanitary Inspector in England" was the subject selected for discussion. After expressing gratitude for "the magnificent reception" given by the French Society of Hygiene to the Sanitary Institute and the Sanitary Inspectors, Mr. Grigg said the object of Conferences such as these was to enable every participator to

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extend his knowledge of the subjects discussed and to compare experiences in order that the best systems of work might be arrived at. He would confine himself to a review of the status and duties of an officer who in England is universally regarded as essential to efficient sanitary administration (the sanitary inspector). It would be approximately correct to attribute the appointment of sanitary inspectors to three Authorities, County Councils, Urban Sanitary Authorities, and Rural Sanitary Authorities, though there were occasionally appointments by Port, Sanitary, and other Authorities, and it would be most convenient for their Parisian hosts if he limited himself to the position and work of the London inspectors, and not those of general England. The London County Council, the one chiefly concerned, "is composed of 137 members, elected by Greater London, having a population of 6,652,145, and a rateable value of 45,093,000*l.*, and is the authority for that part of sanitary administration which is best centralised. The remainder is under the Urban Authorities, of which there are forty-two in London, varying in population from 350,000 to 11,750. These are by law compelled to appoint 'a sufficient number of properly qualified men as sanitary inspectors.' 'Sufficient number' is not defined, but is generally accepted as meaning about 1 to every 20,000 of population, and, as a matter of fact, there are about 260 sanitary inspectors in London alone. If this 'sufficient number' are not appointed, the Local Government Board have power to compel the defaulting authority to appoint them, or, if they fail to comply with an order to do so, the Local Government Board may themselves appoint. It has never yet been necessary for the Local Government Board to exercise this veto." The duties of the sanitary inspectors were enumerated as referring to nuisances, complaints of infractions of the law, enforcing regulations referring to offensive or noxious trades, supervision and examination of food exposed for sale, offences against the Food and Drugs Acts, keeping animals, &c., prevention of smoke, inspection of drains and sanitary fittings, proper housing of working classes, regulation of lodging houses, inspection of canal boats, inspection of dairies, cow-sheds, and milk shops, regulation of slaughter-houses and workshops. From this list, which was by no means exhaustive, it was obvious that to perform these duties efficiently a sanitary inspector must be a man of no mean talents. The possession of the necessary requirements was ascertained by examination, and the certificate of the Sanitary Inspectors' Examination Board must now be possessed by every aspirant to the office. The syllabus of subjects for examination was given in the paper, together with the regulations as to qualifications of candidates and the payment of fees. In conclusion, the paper set forth the heads under which it would be well that the subject should be discussed, namely:—

1. The desirability of a Ministry of Public Health.
2. Cremation of the bodies of persons dying of infectious diseases.
3. Security of tenure and superannuation of health officers.
4. Whether discovery that tins of (A) meat, (B) fish, and (C) fruit, are "blown" is a sufficient reason for seizing them as containing unsound food.

Dr. Wynter Blyth, in moving a vote of thanks to Mr. Grigg, said they must all feel under an obligation to him for his very able and very useful address, which would give their friends of France an exact idea of the work of the sanitary inspector in England.

Mr. Curtin (Chief Sanitary Inspector, Lincoln) seconded the vote, which was supported by Messrs. Ollett (Eastbourne), Barralet (Godstone), and Bastiman (Chief Sanitary Inspector, Scarborough). The proposition having been carried by acclamation, Mr. Grigg responded.

The President of the Congress said it only now remained to conclude their very pleasant proceedings, and to accord their thanks to Professor Grehant (President of the Society of Hygiene), M. Lavier de la Chanière (Vice-President), M. Gothain (Secretary), M. Bechurann (City Engineer of Paris), M. Lannay (Chief Sanitary Engineer of Paris), with their coadjutors, M. Masson, M. Betillon, and assistant engineers. The proposal was carried with acclamation. These gentlemen having severally replied, Mr. White Wallis, Secretary of the Sanitary Institute, proposed a vote of thanks to M. Perrier for providing them with that hall in which to hold their meetings. This and other votes of thanks, which included M. Fouveau de Courmelles and Mr. Nicholson, were carried by acclamation, and the Congress then closed.

In the afternoon, a visit was paid by several hundreds of the members of the Congress to the exhibit of the Paris Municipality (Pavillon de la Ville de Paris), which forms a part of the Exhibition buildings on the north bank of the Seine.

HEALTH CONGRESS AT ABERDEEN.

The Architecture and Engineering Section of the Congress of the Royal Institute of Public Health resumed its sittings in the Physics Classroom, Aberdeen, on the 3rd inst. The chair at the outset was occupied by Councillor Cooper, Aberdeen, until the arrival of the President, Mr. Honeyman, Glasgow.

The meeting at the outset took up the discussion on the paper of Mr. Fletcher, London, read the previous day, on "The Architecture of the Twentieth Century." A vote of thanks was accorded to Mr. Fletcher for his paper.

Fever Hospital Construction.

Mr. R. Morham, City Architect, Edinburgh, contributed a paper on "Suggestions on Fever Hospital Construction." In the first place, he alluded to the generally-conceded need for fever as distinct from general hospitals, and he went on to point out the need for employing competent architects; the desirability of supporting the architect with ample, but not extravagant instructions; of the distinction between ordinary and fever patients—the one class being in hospital for their own benefit chiefly, the latter not less so for that of others. The latter had a special claim to have ample provision for requirements, beyond the mere treatment of their trouble, to while away the tedium of their constrained, or in some cases even enforced, seclusion. Mr. Morham then went on to describe the stages through which patients passed in ordinary course in hospital treatment, and for illustration of the subject exhibited a block-plan of the hospital now in course of erection for the city of Edinburgh, and on it traced the progress of the patient through reception, observation, ordinary isolation, and discharge blocks, referring also to mortuary, educational, and ambulance blocks. As to the staff quarters, he specially dwelt on the risks run by fever nurses, and the need for every possible means being taken to maintain them in the best possible health condition by means of ample provision for their comfort and healthy recreation when off duty. After dealing with the kitchen, dining-room, store, dispensary, and laundry blocks, he concluded by pointing out that the object in view in all such institutions was to do the best possible for the patients during the period of their illness and for their comfort and recreation during convalescence.

Dr. Skinner, Willesden, said it was important that each ward should be large enough to accommodate a sufficient number of patients for a nurse to take charge of. He thought this was a better arrangement than having two smaller wards.

Mr. Morham said he agreed with Dr. Skinner. In a large hospital it was always desirable that the wards should be large enough to give employment to one nurse; but in small hospitals this could not always be done.

An Ideal Workman's Cottage.

Councillor Cooper, Aberdeen, read a paper on "An Ideal Workman's Cottage." His proposal, he said, was of a practical character, relative to the housing problem, as it affected Local Authorities at the present time, and which, if it were carried out, would enable them to remove the necessity for a large section of the workers living in tenement houses, and would also in some measure prevent the overcrowding which manifested itself in every growing centre of population. The Legislature having affirmed the principle that public funds may be employed and the public credit utilised to provide properly equipped sanitary houses for working people, the question confronting them was what particular kind of house or houses might be erected to meet the needs of the case. He thought that real progress was more likely to be attained in dealing with the housing problem by keeping in view the ultimate objects for which sanitary science existed rather than by seeking to satisfy the clamant and immediate wants of any single section in the mere matter of low rents. Neither the block buildings nor the tenement or flat system had been found to answer all that was desired in the interest of the whole community. In Aberdeen, where the popular working-class house took the form of a tenement for six or eight tenants, there were indications that in districts of the city, where streets of such houses had been built, these houses within a short space of time began to reveal most of the features of the slum. Passages became dilapidated, staircases were neglected, and in back-yards filth was allowed to accumulate. The fact was that too many people were crowded together under one roof, and although it might be set down as everybody's business to keep the place in order, it was really nobody's business in particular, and very soon the place wore a broken-down aspect, and would very likely be shortly occupied by a class of tenants more careless than the present ones, and would by and by become a district to be dealt with under a clearance scheme. The Aberdeen Town Council had erected workmen's houses on a piece of unoccupied ground near the centre of the city, the rents of which varied from 5*l.* 5s. to 9*l.*, while additional buildings of a different type were being erected on the remainder of the ground. There could be no hesitation in coming to the conclusion that the ideal scheme was that of cottages on the outskirts of the cities; and in what he had to say he wished it to be kept in mind he was confining himself to local circumstances. It was a point of the greatest importance that the city had now got possession and control of the tramways, and it would not be surprising if the Town Council were to join other cities in coming to the conclusion that to provide cheap means of transit and to use the tramway for the development of the outlying districts of the city, and also to provide cottages with a small garden attached, was the best solution of the housing problem. It would not suit the purpose in view if space was not afforded for a garden, which not only prevented the congestion of air space, but afforded a profitable and healthy recreation to the occupants, and was the best way of stimulating an interest in life and home. They had almost every kind of cottage in the city of Aberdeen, but the cost of building was so great that they were beyond the reach of the working class, renting as they did from 18*l.* to 40*l.* and 50*l.* The plan he had prepared consisted of a single cottage with ground floor and attics, comprising a living room, parlour, and four bedrooms with scullery, bathroom, and a back wing. It was a Scotch custom to prepare and eat food and to sleep all in one apartment, but in his plan the bed in the kitchen was done away with, and a number of small bedrooms, provided after the English type of workmen's houses. After describing various plans in the internal arrangement of the houses, he said he thought that municipalities might with advantage purchase suitable ground and build their cottages in detached blocks of, say, two, three, and four cottages, some of them with and others without a back wing. If this were done some artistic taste could be shown in the laying out of the ground, and a considerable saving effected by reducing the number of exposed gables. As to the cost of these cottages, the figures he could give would be of little value, the cost of building differing so much in different towns and at different periods in the same town. Architects of experience had informed him that the cost in Aberdeen, confined to plain rubble masonry, in workmen's houses, ranged from 4½d. to 5d. per cubic ft. With the lowest of these figures the cost would approximate to 200*l.* without the scullery, and 300*l.* with. These figures were high, and the Act of 1890 would be of little service to them unless the period for repayment were extended to at least 100 years for both the ground and the building. Of course, the cottages referred to would not serve the purpose they had in view if they could not be let for a rent of, say, 10*l.* and 12*l.* respectively. It was not part of their present purpose to discuss the various means by which such an object should be accomplished. He was convinced that in cities which are not overcrowded the authorities would not be doing their duty if they did not take measures to prevent the growth of an evil which had been fraught with such dire results to the physical and moral welfare of humanity.

Mr. Fletcher, London, said he was afraid the problem was one that could not be solved. It was a question of pounds, shillings, and pence, and philanthropy could not enter into it. A

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poor man was not a pauper, and unless a cottage could be provided at a price that a working man could pay, it was perfectly impossible to erect an ideal workman's cottage. The whole thing, so far as he could see, seemed to be bound up in the question of easy and cheap transit.

Alderman Price Lewis, Wolverhampton, said he thought the ideal workman's cottage was such as had been stated by Mr. Cooper. The difficulties were largely financial, and the solution lay more in cheap transit than in anything else. The Government having thrown the burden of responsibility on Municipalities, they ought to grant as long periods as reasonable for the repayment of loans, and even a longer period for the payment of land.

Mr. Dodd, Halifax, thought the question resolved itself pretty much into what a working man could pay. A man with 20s. or 25s. a week, and having a family to maintain, could not pay 5s. or 5s. 6d. a week for rent.

The Chairman said Mr. Cooper had given them an excellent paper, but there were many difficulties connected with the question. He supposed there were in Aberdeen, as well as in other places, a large class who were obliged to live on incomes of about 18s. or 20s. a week. These people could not afford to pay more than 2s. 6d. a week, and he was glad to hear that in Aberdeen handsome buildings were erected at rents as low as 5*l*. The great objection to working people living in the outskirts was that their children would not so easily get employment; but he thought that these cottages would do very well for the better class of workmen, and their removal would make room for the poorest class. It was in regard to the housing of the poorest class that the difficulty was, and he thought the cottages suggested by Councillor Cooper were beyond the reach of the poorest. If people could not pay the rent of such cottages, they ought not to occupy them at the expense of others. Indeed, in dealing with the whole question of the housing of the working classes, there should be none of the pauperising element introduced.

House Drainage.

Mr. Gilbert Thomson, C.E., Glasgow, contributed a paper on the design and testing of house drainage, considered in their relation to each other. He said he was to consider the question entirely from the structural side, and he started from the accepted view that a satisfactory drainage system should allow nothing to escape into the house or into the soil on which the house stood. The most popular test at present was the well-known "smoke test." In many respects it was useful, but it was responsible for a great amount of false security. The statement that a drainage system was proved to be tight by means of the smoke test was scientifically absurd, as such a test could never give proof of the air-tightness of a drainage system. It was often quite as absurd in practice as it always was in theory. A test which was to be of any value as a proof of soundness must give a positive and not a negative result. The only tests in use which gave such a result were the water test and the air test. Each of these showed absolutely that the substance used in testing remained in the system, not merely that it had not been found escaping. The application of the water test was limited, because it was impossible to apply it with uniformity to the different parts of the system. The air test, on the other hand, could be applied more readily than the smoke test, and was applicable wherever the smoke test was applicable. The smoke test went on the principle of assuming that the drainage system was good until it was proved to be bad. The air test assumed that it must be proved either to be good or to be bad, and it supplied a very simple and sensitive method of proving it. It did not show where the leaks were, and was not, therefore, a convenient test for workmen tracing defects; but for an engineer or a sanitary official whose object was to certify that work was satisfactory, or merely to detect it if it was not, the air test was theoretically perfect. The constant experience of two or three years with a very simple appliance (exhibited to the meeting) had proved that the practical difficulties of its application are trifling, and that by its use the high standard of construction, referred to as being a necessary accompaniment of simplified design, could be proved not only to be attainable, but, in any given case, to have been attained. Economy and efficiency combined to demand simplicity of design, and a high standard of construction and testing.

A short discussion followed, taken part in by Mr. Fletcher, London; Mr. Ebbetts, Acton; Mr. Broom, St. Helens; and Mr. Moody, Grimsby.

[We are indebted to the Aberdeen *Free Press* for the above report.]

Correspondence.

To the Editor of THE BUILDER.

ROYAL ARCHITECTURAL MUSEUM.

SIR,—Mr. Adams says this is not neglected and uncared for. He ought to know; but I never saw a place that looked it so much. Even we in Leeds can show nothing like it for general dinginess.

I did not ask for the casts to be restored; but they must be nearly impossible to study from in their present state of grime; and if the place is not neglected, how has it got to its present condition?

Mr. Adams says the collection remains as Scott left it. It certainly looks it, and feels it. Beyond this, I see he does not dispute my statements about the lack of classification or other defects. But as he appeals for public help he must expect public criticism, and I cannot imagine a better way to frighten a subscriber away than to take him for a glimpse at the Museum.

If he or his committee can get it on a proper footing, I feel sure support will not be lacking. My visit and my letter show how useful the institution might be. What Mr. Adams says about the Architectural Association I, as an ordinary member, did not know. But perhaps the long looked-for "new premises" will provide room enough (when we get them!) for the previously declined casts.

I naturally concluded that for information as to Gothic work I should be safe in going to the Museum, but I came away sadder and wiser.

May I call Mr. Adams' attention to the communication "from a correspondent," which appeared in your columns the same day as my first letter. He will see that I am not alone in my dissatisfaction.

FREDK. MUSTO.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

6. Accumulators—Various Types—Methods of Charging—Efficiency—Internal Resistance—Small Accumulators.

ONE of the earliest problems which electricians tried to solve was to find an efficient method of storing electrical energy. The capacity of a central station must be sufficient to take its maximum load, even if that load be only on for a few hours in the whole year. If storage be impossible, then of necessity we must have a considerable fraction of the total plant lying idle for twenty-three hours out of the twenty-four in winter and for several months in the summer. The engines will often be working at uneconomical loads and steam will have to be kept up in some of the boilers even when there is no load on the station. It is not surprising then that inventors have been experimenting with all manners of cells, and that decided progress has been made in improving old forms and inventing new ones.

Theoretically every cell in which the passage of the electric current is accompanied with molecular chemical combinations is a storage battery. If we pass a current through such a cell and then connect its terminals to a resistance, we get a current in the opposite direction to the charging current and the cell is brought back to its initial state. Planté showed in 1860 that lead immersed in acidulated water illustrated this phenomenon perfectly. Other metals show it also, but unfortunately, with the exception of a few whose price makes their commercial use prohibitive, they are all acted on by the electrolyte.

Messrs. Thomson & Houston used sheets of metal coated with lead oxide for the positive plate and sheets of copper for the negative, both being immersed in a solution of copper sulphate. This accumulator is cheap and easy to make, but its capacity is much too small for commercial work and its voltage is only 1·25, as compared to 2 volts for a lead cell. Several inventors also have experimented with lead-zinc cells, lead forming the positive electrode and zinc the negative electrode. The electrolyte used is generally zinc sulphate. Some remarkable figures have been obtained by experimenting on these cells, and their light weight makes them very suitable for traction work. Difficulties, however, generally arise from the dissolving of the zinc by the electrolyte. They sometimes also seem to lose their charge in a mysterious way. None of these cells are yet used in commerce.

The practical storage battery of the present day is a lead cell, and it is divided into two main classes—(1) the Planté, or solid plate class, and (2) the Faure, or pasted plate class. In the Planté type the plates are made of spongy lead and are immersed in dilute sulphuric acid. Various methods of forming these plates are in use, and very different results have been obtained by slightly altering the process of manufacture. Planté put the plates in a bath of nitric acid mixed with an equal volume of water for from twenty-four to forty-eight hours. They were then washed in a 10 per cent. solution of sulphuric acid, and formed by passing a current through the cell first in one direction and then in the other several times. The effect of the pickling in nitric acid was to make the lead more porous and to greatly increase its storage capacity. One of the best known types is the chloride battery, made by the Electric Storage Battery Company, of Philadelphia. In making this battery the lead is first reduced to a fine powder, then it is dissolved in nitric acid and precipitated by hydrochloric acid. After going through several other processes, a pure spongy lead plate results. In the Faure type the plates consist of a lead grid, the holes of which are filled with lead compounds. The Electrical Power Storage Company's cells are of this class. In this cell the grid is made of a lead alloy and is covered with lead oxide, which is kept in position by an envelope which is unaffected by the action of the gases or electrolyte.

In setting up a storage-cell it is first filled with dilute sulphuric acid whose specific gravity is 1·19. This is equivalent to a mixture of four parts of sulphuric acid with twenty-one parts of water. The number of plates connected on to the positive pole of the battery is generally one less than the number of plates connected to the negative pole. To charge the battery the positive pole is connected to the positive pole of the dynamo or the positive main of the supply company, as the case may be, and a current is sent through it in the opposite direction to that in which it will flow when the battery is supplying energy. This current does work in the battery. A small amount of this work is wasted in generating heat, but a very large percentage is stored up chemically. The quantity of work stored up depends on the extent of the surface of the plates exposed to the electrolyte, and hence it increases very considerably with their porosity.

The reasons for the physical and chemical changes that take place during the charge are still unknown. The density of the solution falls at the beginning of the charge, attains a minimum value, and then rises to 1·21 or 1·22 at the end of the charge. Towards the end of the charge gases are given off freely at the plates, and the electrolyte presents a milky appearance. Fig. 1 shows the curious way in which the P.D. between the terminals of the cell changes as the charging proceeds, the charging current being kept constant. It starts at 1·8 volts, and after a few minutes rises to 2·1; it then remains fairly constant until the charging is nearly complete, when it begins to rise more rapidly. Similarly on discharging (fig. 2) it rapidly falls to about 2 volts, and then keeps constant until near the end of the discharge, when it begins to droop rapidly.

Professor Ayrton has recently pointed out the important differences in the results obtained by charging a battery of cells at constant current and at constant pressure. In the first method we start with a low voltage and then increase the voltage as the back E.M.F. of the cells becomes greater, so as to maintain the current at a constant value. This is the usual method of charging cells. The other method is to start with a high voltage, allowing at least 2·5 volts per cell, and keep this pressure constant during the whole time of the charge. In the first method we would keep the current constant and equal to A amperes; in the second method the current might initially be equal to 10 A amperes, but then it rapidly diminishes in value, and before the cells begin to give off gas is generally less than A amperes. We are thus able, by charging at constant pressure, to considerably diminish the time required to charge the battery. For example, a battery that could be charged in nine hours at constant current

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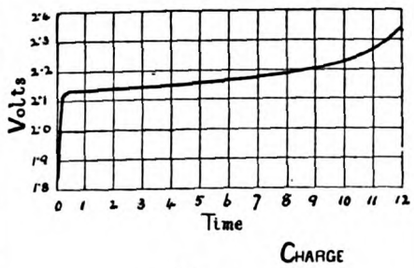

Fig. 1.

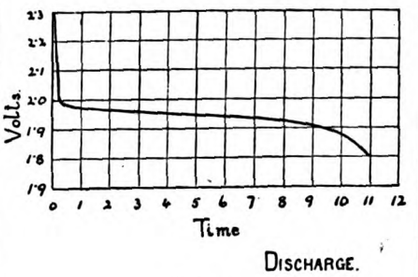

Fig. 2.

could be charged in three hours at constant pressure. Another point is that by charging at constant pressure we are able to put more energy into the battery, although there is a falling-off in its efficiency. The following table illustrates what happens :—

Method of charging.	Watt hours put in.	Watt hours given out.	Percentage efficiency.
Constant current	151·8	123	81
Constant pressure	231·2	163	71

The capacity of a storage cell is generally stated in ampere hours—*i.e.*, the number of amperes it can give out multiplied by the number of hours that elapse before the voltage falls to 1·8. The amount of energy it is giving out is, however, a variable quantity, as its voltage falls from 2·2 to 1·8. Therefore, the energy which is given out being equal to amperes multiplied by volts is a variable quantity if the amperes be kept constant, and drops in the ratio of 22 to 18. In electric lighting, as the voltage of the battery diminishes we switch in more cells, so that at the terminals of the battery we keep up a constant pressure, and hence the capacity of the cells depends on the constant current they can give for a given period—*i.e.*, the ampere hours. For traction work, what we need to consider is the watt hours—*i.e.*, the total energy the cells can give out before their voltage drops to 1·8.

A storage battery has thus two efficiences :—

1. Current efficiency $= \frac{\text{ampere hours taken out}}{\text{ampere hours put in}}$
$= 90$ per cent. (average).

2. Energy efficiency $= \frac{\text{watt hours taken out}}{\text{watt hours put in}}$
$= 80$ per cent. (average).

The current efficiency is what we have to consider when buying cells for electric lighting purposes, whilst weight and energy efficiency are all important for traction cells. Professor Ayrton's figures given above show that for traction work it will be better to charge the cells at constant pressure than at constant current. Not only will the operation take much less time but we are actually able to put 30 per cent. more energy into the battery. The energy per pound of cell is thus increased, and this far more than counterbalances the slight extra cost we have to pay per unit.

In order to keep a battery of storage cells in good working order it is absolutely necessary that the voltage be never allowed to run down below 1·8 volts per cell. Neglect of this precaution has often caused irretrievable damage to batteries. The manufacturers will usually give a guarantee to maintain the cells in good working order for a small cost provided that they are never allowed to discharge at a higher current than their listed discharge current, and are also never allowed to discharge till their voltage falls below 1·8 volts per cell. The second of these limitations to the guarantee is more important than the first. In traction work it is even more important than in lighting work never to let the cells run down too far. It was neglect of this precaution that was the ruin of the first electrical cab company started in London. On the other hand, if cells be well looked after their capacity is found to increase slightly with age.

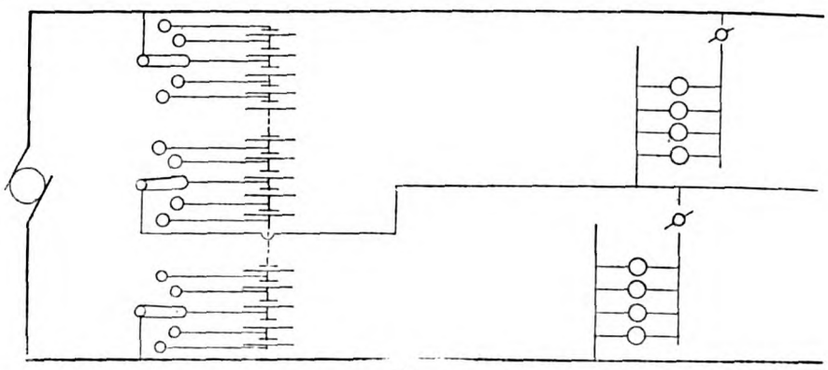

Fig. 3.

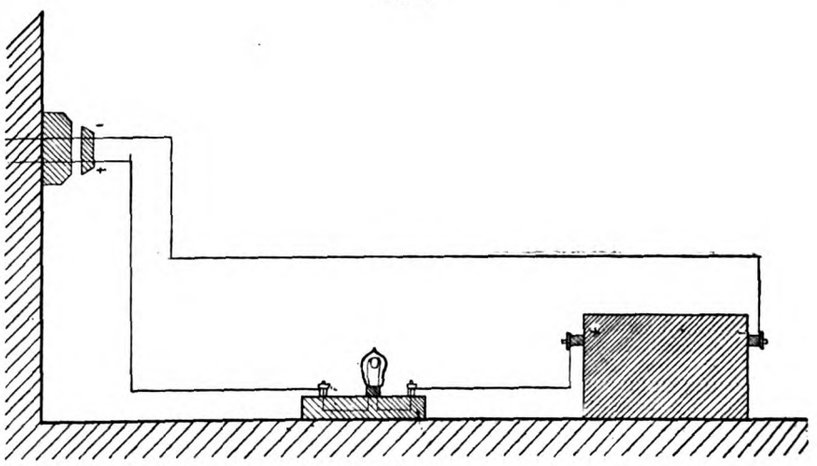

Fig. 4.

Storage cells are extensively used for steadying the electric pressure we get from a dynamo. For example, suppose we have a battery of cells across the terminals of a shunt dynamo which is supplying glow lamps in a house. Then at light load part of the current from the dynamo is charging the cells and part supplying the lamps. When there is a heavy load and the voltage falls, then the battery helps the dynamo to supply the necessary current for the house lamps. They are also used for three-wire systems (fig. 3) in conjunction with a dynamo. The dynamo for example may be giving a pressure of 400 volts and yet by the aid of the battery the pressure between either of the outers and the middle main is only 200. If there is a heavy load between the positive outer and the middle main and no load between the negative outer and the middle main then the half battery between the positive outer and the middle main is helping the dynamo and the other half is being charged. By this arrangement there is a considerable saving in the copper required for the mains, and hence in the initial cost of the installation.

The calculations in connexion with accumulators are very simple.

Let E = the E.M.F. of a battery on open circuit,
V = the P.D. between its terminals,
r = its internal resistance,
And C = the current through it.

Then by Ohm's law, $E - V = Cr$.

Suppose, for example, that the reading of the voltmeter between the terminals of a battery is 110 volts, and that when the battery is giving out ten amperes that it is 105 volts,

Then $110 - 105 = 10r$,

$\therefore r = 0{\cdot}5$ *ohm.*

If there are fifty cells between the terminals of the voltmeter then the average resistance of a cell, including the lead connecting lugs, &c., is 0·01 ohm. It is useful to remember that lead in its solid state has only one-twelfth the conductivity of copper. Professor Ayrton found that the resistance of an E.P.S. cell made in 1888 was only 0·011 ohm per square foot of positive plate at the beginning of its charge, but at the end when the P.D. was 2·4 volts it was five times as great. When discharging its resistance was 0·009 ohm. per square foot of positive plate, and tended to decrease as the current was increased. As the large cells used in central stations have often as many as fifty-three plates, *i.e.*, twenty-six positive and twenty-seven negative, it is quite impossible to measure their internal resistance directly, as it is less than the ten thousandth part of an ohm. In this case Professor Ayrton's rule gives us a useful approximation. These large cells contain nearly a ton weight of lead each, so the price of storage batteries fluctuates considerably with the price of this metal. We may state generally, however, that the price of accumulators is about one-third the cost of the entire plant.

To calculate the number of cells required for a small lighting plant it is only necessary to divide the required voltage at the battery terminals by 1·9. Thus, suppose that the lamp voltage is 200, and that 10 volts are lost in the mains, then the number of cells required is $\frac{210}{1{\cdot}9}$, *i.e.* 110. At first only 100 will be required, but as the volts go down the others can be gradually switched in so as to keep the pressure constant at the lamp terminals.

It is of the greatest importance to keep the battery-room well ventilated, and to keep it as isolated as possible. All the wood-work should be protected by acid-proof paint, and all metal-work should be protected with several coats of shellac varnish, or with vaseline. Copal varnish will be found very useful to protect instruments and terminals from the corrosive acid spray.

As small accumulators are now extensively used for lighting carriage lamps, bicycle lamps, working small motors, for telegraph, telephone, and bell work, &c., a few hints as to charging them may be useful. When a direct current supply is available from the house mains the best method of charging them is as in fig. 4. The positive end of the battery is put in series with a lamp, and connected on to the positive terminal of a wall socket or switch, and the other end to the negative terminal. The maximum charging current is always stated by the makers, and this ought not to be exceeded. Suppose that the charging current is to be 0·6 ampere, then a 16 C.P. 100-volt lamp will give this current on a 100-volt circuit, or a 32 C.P. 200-volt lamp on a 200-volt circuit. As a rough rule, we may say that the current is propor-

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tional to the candle-power at a given voltage, and hence by varying the lamp we can get any required current. It is necessary to be careful not to short circuit the wires where they leave the wall plug. To tell which is the positive wire of the house circuit Ampère's rule and a small "charm" compass are all that is required. Imagine yourself swimming with the current, *i.e.*, from positive to negative, and looking at the compass needle then the north pole will be deflected towards your left hand. If current from the public mains is not available then they can be charged by being put in parallel with dry cells, two dry cells being required for every storage cell. The positive end of the dry cells is connected to the positive pole of the storage battery, and the negative end to the negative pole. For ringing bells, working induction coils, lighting night-lights, &c., they can be left permanently connected up in this manner. Mr. Marconi uses this system to work the induction coil required in wireless telegraphy.

GENERAL BUILDING NEWS.

REPAIR OF BISHOP'S CLEEVE PARISH CHURCH.—This large and interesting church, of many dates and styles, was reopened on the 31st ult., after being under repair for twelve years. It had fallen into neglect and decay; all the walls were in a dangerous condition (due partly to the misdoings of the mediæval builder, who had used stone coffins and other heterogeneous material in their construction), the groining of the beautiful porch was unsafe, and the too daring fan-tracery inside the door still more so; the water soaked into the foundations, and poured freely through the roofs; and the building generally was sinking into hopeless ruin. Under the late rector a move was made to rescue it, and a report was made by the late Professor Middleton in 1888. Since then work has gradually been proceeding. The walls have been underpinned and strengthened, the groining repaired and stirruped up with iron, the water carried off by proper drainage, the roofs repaired and made watertight (except in the transepts, which have yet to be done), the leading of the aisles renewed, and the old stone "slats" replaced on the nave and choir; the chancel has been repaired and refitted, and the curious mixture of plaster and paper removed from the underside of all the roofs. Outside there has been no new "feature" except a large east window. Inside, the old roofs are all now visible, retained as far as possible exactly as they were, though that of the De la Bere Chapel had to be taken down and mended with a good deal of new oak. The beautiful Jacobean gallery is untouched; also a few fifteenth century pews. New altars, triptych, and other fittings were given, and some good glass by Mr. J. Eadie Reid and Messrs. Burlison & Grylls. The church is now for the most part safe and watertight, about 4,000*l.* having been spent so far in making it so; but a good deal more is required to complete the work. The architects are Messrs. Prothero & Phillott, of Cheltenham; the builders, Messrs. Collins & Godfrey, of Tewkesbury.

CHURCH, THORNABY, YORKSHIRE.—The foundation stone has just been laid of a new church at Thornaby, for the parish of St. Luke's. The new church is to be built entirely of stone, with sneck-faced walling inside and out, and dressed stone for windows, doors, pillars, arches, &c. The whole of the wood fittings are to be of pitch pine. The roofs are to have boarded ceilings throughout divided up into panels. The present contract does not include the western portion of church, but when complete sitting accommodation will be provided for 700 adults. The plan comprises nave, aisles, and transepts, chancel, morning chapel, vestries, organ chamber, porches, &c., the total length inside the church being 111 ft., and the width across nave and aisles 55 ft., the full width across transepts being 75 ft. Only the lower portion of the tower is to be built at present, but when complete it will stand 86 ft. high above ground level to top of parapet, and will be suitable for a peal of bells. The first contract, amounting to 4,650*l.*, is let to Mr. Henry Harwood, of Manfield, Darlington. Messrs. Hicks & Charlewood, of Newcastle-on-Tyne, are the architects.

TOWER, PARISH CHURCH, SALTBURN, YORKSHIRE.—On the 7th inst. the foundation stone was laid of a new tower at the Parish Church of Emanuel, Saltburn. The architects are Messrs. Clark & Moscrop, of Darlington.

RESTORATION OF EGLWYS BREWIS CHURCH, GLAMORGANSHIRE.—This church is being restored under the direction of Mr. Wm. Weir. The work consists principally in strengthening the walls, and will cost about 500*l.*

SUNDAY SCHOOLS, READING.—New Sunday schools in connexion with St. Saviour's Church, Coley, Reading, were opened recently. The architect was Mr. Albury, and Mr. Margetts was the builder.

WESLEYAN CHAPEL, WITHERNSEA, YORKSHIRE.—On the 11th inst. the foundation stone of a Wesleyan chapel at Withernsea was laid. Messrs. Gelder & Kitching, of Hull, are the architects.

CHURCH, ELLAND, YORKSHIRE.—On the 11th inst. the memorial stone of a church in Savile-road, Elland, was laid. The architect is Mr. G. H. Fellowes Prynne.

DRILL HALL, GATESHEAD.—A new drill hall for the 2nd battery of the 1st Newcastle Volunteer Artillery was opened at Bensham on the 7th inst. The building is faced with Lowry's pressed bricks, with stone dressings to doorways, windows, &c. The hall is 80 ft. long by 47 ft. 6 in. wide, with an entrance in the centre of the main front in Liddell-terrace. The hall is lighted by rows of windows on east and west sides and on the south end, and has a continuous louvred roof ventilator on the ridge. The roof is open, with stained and varnished boarding. The hall has a pitch pine boarded floor. At the south end are the sergeants' and gunners' mess rooms, yard, &c., and at the north end officers' quarters (with private entrance from Liddell-terrace), orderly office, clothing store, armoury, and harness room, the latter being situated in the parade ground, which is at the north end, and has an entrance to the drill hall by means of an archway under the caretakers' rooms, which occupy the whole of the first floor above the officers' quarters, &c. There is a gallery, the full width of the building, overlooking the hall. The building is enclosed by a low brick wall, with iron palisading and ornamental brick piers. The contractor for the building was Mr. E. T. George, Newcastle, and the architects Messrs. Watson & Curry, Newcastle.

FIRE BRIGADE STATION, DUBLIN.—On the 8th inst. the new district Fire Brigade Station in Buckingham-street, Dublin, was opened by the Lord Mayor. 2,250*l.* was the sum paid by the Corporation for the ground on which the station stands. The station has a frontage of 78 ft. on Lower Buckingham-street, is three stories high, and contains a working department and living accommodation for an officer, seven married firemen with their families, and several unmarried men. The officer's quarters are situated to the right of the entrance door, while, enclosed by a glazed screen on the left, is the watch-room, containing the telephone and fire-alarm switchboard, and apparatus for controlling the entire working of the station, including lighting, heating, and water supply. Opening off the passage is the engine-room, 40 ft. by 28 ft. At the rear is the stable, 28 ft. by 20 ft., for four horses. The engine-room and stables, which are 16 ft. high to pitch pine ceilings, are lined with glazed bricks and are furnished with patent folding doors. There is also a polished sliding pole from the dormitories above, by which the firemen can slip down to the basement without the trouble of using the stairway. On the first floor is a dormitory, 28 ft. by 25 ft.; a recreation-room, 21 ft. by 12 ft., all of which are reached by spiral stairs from the entrance passage below. Quarters for two drivers on the extension of the same floor at the rear are approached from the station yard by an external stairs and balcony. On the upper floor residences for five families are provided in a similar manner. Another sliding pole, placed in a recess off the top balcony, gives ready access down to the engine-room. All the dwellings are isolated. The officer has five apartments, bathroom, and scullery; and, with two exceptions, the men have three rooms, every family having separate bathroom, scullery, and sanitary arrangements. A hose-drying tower, 60 ft. high, heated by steam and hot air; a small steam laundry, 24 ft. by 12 ft.; a workshop, 28 ft. by 11 ft., with engine repairing and testing pit; a harness room, 12 ft. by 11 ft.; and forage loft, 40 ft. by 11 ft., are all entered from the yard, which in itself is large enough for drilling purposes. Against the boundary wall in the yard are coal lockers, sanitary accommodation, and an open fronted shelter shed. In the basement, under the watch room, a small steam boiler, automatically controlled, furnishes hot water for the whole station, steam for the laundry, and will heat the drying tower and portions of the station by means of radiators. The frontage is of red-pressed Portmarnock bricks, with moulded granite bases to the piers. All the building is of fire-resisting construction. The building was erected from the plans of Mr. M'Carthy, City Architect, by Messrs. Pemberton & Son, at a cost of 8,000*l.*

TOWN HALL, KINGSTOWN, DUBLIN.—The interior of the Town Hall at Kingstown has been recently decorated. The work was carried out by Messrs. Sibthorpe, of Dublin, under the supervision of Mr. J. W. Berry, the Town Surveyor.

BUSINESS PREMISES, NEWCASTLE-ON-TYNE.—A block of buildings is about to be erected at the corner of Northumberland-street and New Bridge-street, Newcastle, for the Pearl Life Assurance Company, Limited. The ground floor will consist of shops, including a restaurant. The cost, including the site, will be about 100,000*l.* Mr. William Hope and Mr. J. C. Maxwell, of Newcastle, are the architects.

CATHOLIC HOME, SUNDERLAND.—A building is being erected at High Barns, Sunderland, for the Little Sisters of the Poor. Messrs. W. and T. R. Milburn are the architects, and Mr. D. Ranken is the contractor.

WORKMEN'S DWELLINGS, EAST HAM.—The foundation stone was laid on the 2nd inst. of a block of twelve houses which the East Ham District Council are erecting at North Beckton for the accommodation of persons of the working class. The buildings will be erected under the supervision of the Surveyor, Mr. A. H. Campbell.

LIBRARIES, GRANGETOWN AND ROATH, CARDIFF.—The Mayor of Cardiff (Councillor S. A. Brain) recently laid the memorial stones of the branch libraries which are being erected in the Grangetown and Roath Wards. At Grangetown, at the corner of Clive-street and Penarth-road, the new library is being erected from the design of Mr. E. M. Bruce Vaughan, whose plans were selected in a competition, Mr. H. V. Lanchester being the assessor. The building provides a reading-room, giving accommodation for 150 readers, with special provision for women and for boys. The lending library provides book storage for 7,000 volumes, and can be extended to provide for 12,000. Messrs. D. Thomas & Son are the builders. The Roath branch has been designed by Messrs. Teather & Wilson, of Cardiff, who also secured the work in open competition. The main room of the library is 65 ft. by 27 ft., and 32 ft. high, covered with an open timber roof. It provides accommodation for nearly 200 readers. The building is to be lighted throughout by electricity. The buildings are placed upon the triangular site recently purchased by the Corporation near Clifton-street in such a way that the under portion is retained for future extension. Messrs. J. S. Chubb & Co. are the builders.

BRISTOL UNIVERSITY COLLEGE.—A further addition has been made to the structure of University College, from the plans of Mr. Bligh Bond. The new building is a continuation towards University College-road of the unfinished wing containing the engineering school. It closely adjoins the medical school, terminating towards the road with a gabled end, containing an oriel window. The building, which has been erected at a cost of some 6,000*l.*, contains on the ground floor a library about 46 ft. square, also several classrooms and preparation rooms for biological work. On the upper floor is an examination hall, a room 83 ft. long by 46 ft. wide, and 31 ft. from floor to ceiling. A gallery has been arranged for at one end. The building is approached by an entrance in the main front, and a staircase leads to the first floor, lavatories and cloakrooms being provided. A private staircase of a spiral form is placed in an ornamental stone turret in the front angle of the building. This starts from the library, and communicates with the examination hall and the gallery above. Externally, the building has been designed to harmonise with the portions already constructed. It is built of red pennant stone, with freestone dressings, the style being Tudor.

FIRE STATION, REDCROSS-STREET, CITY.—The foundation-stone was recently laid of a new fire-station for the city, upon the site of the Lady Holles School, Redcross-street. The site has an area of about 4,600 ft. super, with a frontage of 90 ft. The new station will be built to the first-floor level of Portland stone with granite plinth, and above the first-floor level of red brick-work. The engine-room will be 33 ft. by 47 ft., and will be lined with glazed bricks. It will contain standing room for a horsed escape, a steam engine, and a hose cart ready for immediate use, and the chief run out will be exactly opposite Jewin-street. The stabling for six horses will be at the rear of the engine-room, with a "run in" central with the horsed escape. The watch-room will have a floor area of 180 ft., and the recreation-room an area of about 400 ft. super. The staircase over will lead into the engine-room, and the lift will be in the staircase well. A laundry, a battery-room, fourteen coal cellars, a large cellar for the station officer, a workshop, an oil store, storage for wood, and a cellar for steam coal will be in the basement, but the space beneath the steam-engine and the horsed escape will be solid. The first floor will contain officers' quarters, quarters for coachmen, and a common bath-room; whilst the other floors will provide accommodation for the men, with two common bath-rooms, &c.; and the roof over the stables will form a drying-ground and playground. The building, which will be lighted throughout by electricity, is being built under the direction of the Superintending Architect to the L.C.C., Mr. W. E. Riley.

STAFFORDSHIRE "SENTINEL" BUILDINGS, HANLEY.—The proprietors of the *Staffordshire Sentinel* are making further additions to their offices in Foundry-street, Hanley. The buildings now being commenced will form a continuation of the offices built thirteen years back, and will have a frontage to Foundry-street of about 120 ft., and will comprise on the ground floor:—(*a*) Publishing-room; (*b*) a large printing press-room to accommodate six electrically-driven machines. A staircase will be placed in the centre of the frontage, communicating with the first floor, which will be divided up into suites of offices to let off, comprising in all eleven rooms, with lavatory accommodation, and all will be heated with hot water. A floor over these offices will be devoted to store-rooms, &c. The tenders for this new block have just been opened and considered, and that of Mr. J. J. Longden, builder, of Burslem, amounting to 4,045*l.* was accepted, and the work ordered to be commenced forthwith. Messrs. R. Scrivener & Sons are the architects.

MORGUE, DUBLIN.—The City Architect of Dublin is preparing plans for a new morgue to be erected in Store-street. The cost is estimated at 5,000*l.*

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SANITARY AND ENGINEERING NEWS.

Sewerage Scheme, Sherington.—A deputation from the Newport Pagnell Rural District Council have met the Sherington Parish Council, when the schemes of main sewerage, sewage disposal, and water supply were explained by the engineers, Messrs. D. Balfour & Son, of London and Newcastle-on-Tyne. The main sewerage consists in the construction of 12 in., 9 in., 8 in., and 7 in. sewers, with excellent falls, all converging to a site near the River Ouse, where it is proposed to treat the sewage in bacterial tanks, with subsequent land filtration. The water supply is proposed to be obtained from the oolite at a depth of from 50 ft. to 100 ft., and in the first instance it is proposed to have a trial boring put down, with subsequent continuous pumping for a week or more to ascertain the quantity available, and the effect of this pumping in lowering the water level.

Water Supply, Wetherby, Yorkshire.—On the 1st inst. the pumping station of the Wetherby District Water Company was opened. A temporary reservoir has been constructed, but it is proposed to build a permanent reservoir on a site near Brandon Hall, Bardsey, to hold two million gallons The source of supply is a well in the lower millstone grit, and it is expected that a daily average of three-quarters of a million gallons will be pumped. The engineers are Messrs. J. H. Rhodes and G. H. Perryn.

Extension of Aberdeen Joint Railway Station.—In connexion with the plans for these works submitted by Mr. P. M. Barnett, Engineer-in-Chief, Great North of Scotland Railway Company, Mr. R. G. Nicol, Harbour Engineer, Aberdeen, reports that the plans show that the railway companies propose to lift the whole of the existing sidings for goods trains, and to put down forty-one entirely new sidings, five loading banks, and a large goods shed. The two railway accesses at the end of Jamieson's Quay are now to be used by the Caledonian Railway Company instead of the Great North, while the latter company apply for two connexions opposite the end of Commercial-road. Two cart entrances are applied for, one for each company, and Mr. Nicol thinks the companies' proposals are not in excess of what is required for the traffic, and will occasion less delay and congestion of traffic in Market-street.

FOREIGN.

France.—In the architectural section of the competition for the Prix de Rome, the first place has been awarded to M. Paul Bigaux, pupil of MM. André and Laloux; and the second place to M. Joseph Bernard, pupil of M. Pascal. The subject for the competition was "Un Établissement Thermal avec Casino."——The Government has acquired a valuable collection of pre-historic and Gallo-Roman relics collected by Dr. Prunieres, which is to be placed in the Natural History Museum.——An exhibition of works of Russian industrial art, presented to the city of Paris by the Baron de Baye, is being arranged at the Carnavalet Museum.——Three new children's hospitals are in course of erection in Paris, and will be completed by the close of the year. They are situated respectively in the Place du Danube, Rue Michel-Bizot, and Rue Carpeaux. They are being carried out by the official architects of the Department of Assistance Publique.——In the forthcoming session the Municipal Council of Paris will give serious consideration to the subject of the shortness of water during the recent hot season, with a view to providing against this in future. It is proposed not only to tap new sources of water supply, but also to establish a canalisation from the Seine for further utilising for drainage, &c., to economise the pure-water supply.——The Municipality of Oran has voted a sum of 800,000 fr. for the building of a theatre.——The death is announced of M. Etienne Lenoir, a distinguished chemist who also was interested in gas motors and their application to automobile cars, and was largely concerned in promoting their introduction.——M. Ary Renan, the painter, son of Ernest Renan and nephew of Ary Scheffer, has died at the age of forty-two. He was a member of the Société Nationale des Beaux-Arts ("New Salon"), and was the favourite pupil of Puvis de Chavannes. He was also a gifted writer, and author of a book on the art of Gustave Moreau which attracted much attention.

MISCELLANEOUS.

Professional and Business Announcements.—The "Warrington" Bond Iron Syndicate, Limited, have removed to 28, Hyde-road, West Gorton, Manchester.

"Eltonbury" Silk Fibres.—These are self-coloured materials, made in about fifteen different shades, and are intended for use as decorative wall coverings; they are in fact a form of wall-paper, but with a texture rather different from ordinary wall-paper. The colours of the examples sent to us are calculated to be effective as surface colouring for a wall, and two may be used in combination as dado and general surface. These specimens are sent to us by Messrs. Crompton Bros., of London, who we presume are the Patentees, but they are to be obtained from Messrs. Wylie & Lochhead, of London and Glasgow. They are worth the attention of those who wish for a wall-covering material which will give a good effect of subdued colour.

Site of St. George's Church, Liverpool.—The Finance Committee have instructed the City Surveyor to report as soon as possible as to the condition of the site of St. George's Church, and also, after conferring with the City Engineer and the manager of the tramways, as to the best manner in which the site can be treated.

Proposed City Architect for Bradford.—At a meeting of the Finance and General Purposes Committee of the Bradford Corporation on the 9th inst., a suggestion was made that in order to relieve the City Surveyor's department, a City Architect should be appointed at a salary of 400*l.* per annum.

University College, London.—The following students have obtained prizes and certificates in the classes of architecture and construction at this College, under Professor T. Roger Smith:—Donaldson Silver Medal, H. E. Seccombe. Prize, J. G. Johnson. Certificates, W. S. Walker, J. R. Sykes, G. O. Howship. *Second Class*, A. C Russell. *Third Class*, W. A. S. Pettit.—Construction. Donaldson Silver Medal, H. F. Northcote. Prize, G. O. Howship. *Second Class*, J. G. Johnson. *Third Class*, L. C. Lander.—Sketches Prize, Amy K. Walker.——Classes maintained by the Carpenters' Company:—Architectural Drawing Class. 1st Prize, J. H. Davies. 2nd Prize, W. A. S. Pettit.—Structural Drawing Class. 1st Prize, G. H. Wade. 2nd Prize, W. Butcher. *Second Class*, L. H. Lee.—Quantity Surveying. *Advanced*. Prize, H. C. Garland. *Second Class*, T. H. Smith, G. Waghorn. *Third Class*, J. Coutts.—*Elementary*. Prize, E. T. Ferry. *Second Class*, H. E. Goldsmith, S. G. Peartree. *Third Class*, S. C. Barnet, G. J. Sima, G. T. Evans, A. J. Reis, W. F. H. Stevens. The evening class for instruction in building construction and constructional drawing, till now conducted by Mr. R. Elsey Smith, who has become Professor at King's College, will in future be conducted by Mr. A. Buchanan, the instructor in this subject at the Battersea Polytechnic.

St. Mary the Virgin, Soho.—We learn that Mr. A. R. G. Fenning is the architect for the rebuilding at the Church of St. Mary (formerly known as "Les Grecs"), in Charing Cross-road, of which the original south and west walls were recently condemned as "dangerous" by the London County Council. The church, as built in 1677 by the Archbishop of Samos for the Greek congregation, was afterwards taken by the Huguenots, and ultimately, in 1850, for the Church of England, and dedicated to the Virgin. In 1875 the church was enlarged at the east end, after the designs of Messrs. W. Slater & R. H. Carpenter, and a north aisle was subsequently added. The original church, of which nothing now remains, is depicted (but as reversed) in Hogarth's plate of "Noon."

"Old" Aberdeen.—In an ancient city like Aberdeen it is interesting to watch the demolition of old houses and the excavation of foundations for new buildings to take their place. In the course of some alterations making on a house in the Upperkirkgate, the course of the old, though not the oldest, water supply of the dwellers on both sides of the Gallowgate and Broad-street was met with lately. Leaving the loch by a sluice a little below the north end of Drum's-lane, it passed southward in an open track on the east side of Burn Court, crossed the Upperkirkgate by a bridge just outside the port or gate which closed the entrance to the city at this side when danger was apprehended. It passed through a court at the west end of the house undergoing alterations, and a stone lintel covering it may be seen from the street in the bottom of a wall. Running open it reached Flourmill Brae, where it drove a mill within the memory of many citizens. It then passed under St. Nicholas-street, under the houses on the west side, under Union-street, between No. 78 on the north side and No. 81 on the south. Here, before the houses on the south side of Union-street were built, it drove a glass-cutter's wheel in an arch under the street. Under the name of Putachie it crossed the site of the market, and, driving Tarnty Mill at the foot of Market-street, ended its course at the harbour.—*Aberdeen Free Press.*

Street Improvements, Glasgow.—The St. George's-road and Woodlands-road, Glasgow, are to be widened, and a block of buildings is to be erected at the junction of the two roads. The buildings will consist of shops on the ground floor, with warehouses at the back, the upper floors to consist of dwelling houses. Messrs. Frank Burnett & Boston are the architects.

CAPITAL AND LABOUR.

Dundee Joiners' Strike.—Acting on the decision come to by the operative joiners to strike rather than submit to a reduction of wages, a section of the men came out on the 8th inst. The dispute only affects the men employed by the associated employers, as most of the non-associated masters, to the number of about twenty, have intimated that they intend to continue to pay the old rate of wages. There are twenty-five associated firms, and they include, with two exceptions, all the larger employers of labour. Altogether, there are about 250 men still working, and the strike-roll already contains nearly 220 names.

Working Rules, Bristol Building Trade.—Reference has been made from time to time to the negotiations which have passed between the Bristol Master Builders' Association and the various operatives in the building trade, and it is gratifying to know that everything is now settled, and copies of the new working rules are being issued to the parties interested. The rule as to disputes is as follows:—"Should a dispute at any time take place between any department of the building trade and their employers, on any question of disputed interpretation or infringement of these rules that cannot be mutually arranged between the parties affected, a Board of Conciliation shall be formed, composed of four employers and four members of the trade affected, to whom all questions shall be referred. The decision of the majority of such board shall be binding on parties concerned. Such Conciliation Board shall meet within thirty-six hours of the information being laid. That in case of an equal division, each body shall appoint an arbitrator, and the two arbitrators shall themselves, in case of disagreement, appoint an umpire. The decision of such arbitrators, if unanimous, or of the umpire, to be final, binding, and conclusive."—*Western Press.*

LEGAL.

LIGHT AND AIR DISPUTE.

The case of Limburg *v.* Daniels came before Mr. Justice Farwell in the Vacation Court on the 15th inst., on a motion by the plaintiff to restrain the defendant from building so as to obstruct the plaintiff's light and air.

Mr. Alexander, Q.C., on the case being called on, said that he, on behalf of the plaintiff, had only had the defendant's affidavits put into his hands that morning, and he should ask for an adjournment of a week in order to answer them. He thought, however, that the defendant ought to give some undertaking. It was a case in which there was a very serious diminution of light. The defendant said he had built as high as he wanted to.

His Lordship asked Mr. Grantham, counsel for the defendant, if the defendant had built as high as he intended to.

Mr. Grantham: Yes, I am instructed so.

His Lordship: If you do not mean to go further it does not hurt you to say you will not.

Mr. Grantham: The wall is built, but I cannot say whether the roof is finished or not. It is a serious matter to leave the roof off.

Mr. Alexander said the defendant might put a top on the building. His lordship knew there was a great difficulty in getting a building down once it was complete. They all knew from experience that there was a great reluctance in the Courts to pull a completed building down.

His Lordship: Do you want to do anything for a week, Mr. Grantham?

Mr. Grantham: Well, we want to put on the tiles. We have been building since February, and the plaintiff did not issue his writ for an injunction till August 7.

Mr. Alexander said that directly the defendant began building the plaintiff protested, and then the defendant proceeded to modify his plans. So long as the defendant built according to modified plans the plaintiff did not object, but instead of doing that he had brought forward his wall, and that had only just been done.

His Lordship: That is done. I shall not deal with that. It is only a question of putting tiles on the roof. On the facts, as far as I can make out, the wall is finished and the roof is ready to be put on.

His Lordship, after some further discussion, said he did not think it worth while to impose terms on the defendant as the adjournment was for such a short time.

The case accordingly stood over for one week.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

7,746.—Apparatus for Use in Moulding Bricks: *F. Kay, J. Lobley, and H. Bunkall.*—By this contrivance the bricks are sprayed with oil or some other lubricant on their way from the cutting-table or mould to the finishing-press. The lubricant is fed from a main cistern, which is funnel-shaped, into a supply pipe whose lower end is bent inside the nozzle of a pipe through which a fan, or some equivalent appliance, forces hot or cold air or steam. To the press's cross-head is joined a cranked rod which automatically moves a cut-off slide, having an orifice or port, upon a double-headed pin that loosely passes through a lifting-spring beneath it; the spring holds up the slide in a raised and opened position until a bent arm touches the lower pin's head. A small supply cistern having a side or window of glass is also provided for purposes of inspection.

7,780.—Manufacture of Plaster Board, &c.: *Sackett Wall Board Company.*—The invention is for adding water to cement, plaster of Paris, and so on, during the manufacture of plaster board and similar materials. An even layer of plaster in a quiescent state is moved through a liquid bath, in order that

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it may become quite saturated, by means of a carrier band through a long tank beneath a depressing-roller, the plaster being charged on to the band from a hopper and passing under an adjustable inlet or gate, and being removed with a scraper when saturated.

7,801.—PROCESS OF MOULDING BRICKS: *R. T. Hughes.*—Weighted levers force the plungers inwards in order to press the brick and form frogs or indents in opposite faces. The plungers which work through the open sides of a mould, after the kind specified in No. 6,239 of 1895, have passages for the escape of air. Upon a continuously-turning shaft is a cam which withdraws the plungers out of action, a weighted lever, moved by another cam, pushes under inclined ribs of the table a block or cover which closes the mould; a cam, a vertical connecting rod (to be raised against the cam by a spring) and a lever mounted upon a horizontal pivot operate the lower or ejecting plunger. The press is made in a duplicate form, so that a pressed brick is thrown out from one side of the machine, whilst another brick is being pressed at the other side.

7,815.—WINDOW FASTENERS: *F. J. Lowery & F. E. Billings.*—The sash, raised automatically by the pressing of a push-button, is held in place by a locking-slide; upon a vertical slide of the sash is seated a rack-bar, to be engaged with the teeth of a cog-wheel, moved by a spring, which is placed within a recess of the casing. The button's slanted edge engages in an aperture made in a spring-pressed sliding-plate, whose forked end engages with the rack-bar and is guided by slots in the window-casing. When the button is pressed, the plate's forked end becomes freed from the rack so that the sash may be lowered or raised. The engagement of a projection upon the plate with the teeth of the cog-wheel prevents the cog-wheel from being unwound when the sash is taken out.

7,836.—FLUSHING APPARATUS AND WASTE-WATER PREVENTER: *J. A. Reid.*—A storage of water is provided by means of a closed cistern from which extends, downwards, a pipe having an enlarged bore; when a flush is needed, a hand valve at the end of the down pipe is opened, or the valve may be linked to the supply-cock so that when the one is open the other is shut.

7,861.—CHIMNEY CLEANING: *J. J. H. Dansard.*—Falling soot is collected in a drawer which is placed inside a housing at the bottom of a vertical chimney or flue, the drawer being secured with a screw that passes through its knob to the container or housing.

7,878.—BRICKS AND BUILDING BLOCKS: *H. Rossing.*—The articles are fashioned and moulded out of a composition of sand, slate-dust, ashes, and certain silicious substances mixed with half-slaked lime and a certain quantity of water for rendering the composition plastic; they are exposed to the action of steam under pressure in boilers, so that the material becomes converted into a hard silicate of lime. For ore briquettes, some finely-powdered ore or furnace dust is added to the admixture first described.

7,917.—PIPE JOINTS FOR CLOSETS, SINKS, &C.: *T. Robinson.*—The invention is an improvement of that specified under No. 9,564 of 1894. A double spigot-and-socket joint, which comprises, in part, a socket upon the metal soil-pipe lined with a ring of earthenware, joins the closet, sink, or other outlet to the soil-pipe, and clips that are bolted on to a disc-shaped flange serve to hold the socket in its place. By another arrangement an earthenware ring, fitted at the soil-pipe's end, forms a spigot. For purposes of ventilation a half-round ventilating horn is made upon the trap at its remoter end, so that a current of air inwards shall be promoted by the flow of the water.

7,965.—STONE-CUTTERS' MAULS: *J. A. Tulloch and J. G. Harris.*—The striking-faces of the mauls are made of two different substances, for instance, of wood and leather, &c., and their heads are similarly built up of the two substances, placed in alternate sections and layers, cemented together, and secured with plates and rivets; a cone-shaped wedge beneath the cap expands the handle in its place, and an air vent is made through the cap, in order that the head may be rendered more solid where it is compressed. The edges of the component sections and layers are bevelled.

7,983.—SWIVELLING PIPE JOINTS: *C. H. Weaver & L. H. Houghton.*—For forming a connexion between flexible pipes, two couplings are employed to which the pipe-ends are joined respectively; one coupling has a connecting-piece, on to which a washer is fitted, and it is screwed into the other coupling. Into the former coupling is screwed a recessed cap which contains a spring that forces a spider on to its seatings in the connecting piece. Several joints, set at right angles to one another, can be fitted on the pipes.

7,992.—PLANNING AND CONSTRUCTION OF BATH-ROOMS: *J. Kane.*—The inventor's arrangements concern the planning and construction of bath-rooms whereby he provides for separated bath-rooms and dressing-rooms which corridors divide from one another. According to one plan, a set of bath-rooms, a corridor, a set of dressing-rooms, and an outer corridor lie along each side of the building's middle line, the line dividing the two sets of bath-rooms thus planned. Each of the dressing-rooms, which are ranged between the inner and outer corridors, has two doors that give access to the two corridors respectively, the inner door being placed opposite the entrance into the bath-room. In a variation of the planning the bath-rooms are grouped together upon one part of the floor, and the dressing-rooms upon that floor's other part. Along the outer walls of the inner corridors are shafts and passages having side openings for the supply of warm air, and short vertical pipes that lead into the various rooms and thence into main pipes or passages serve for the exhaustion of air.

8,084.—PROCESS OF CASTING BUILDING BLOCKS OR PAVING SLABS: *W. H. Baker.*—The mould for casting slabs or blocks of cement or concrete has a perforated bottom with detachable angle-iron sides clamped on to a rectangular frame, which is loosely mounted upon the eccentric portion of a shaft to be turned by hand for rocking the mould. When the filled mould is rocked the frame bumps upon anti-friction rollers pivoted to another frame, and causes the cement to settle evenly. When the cement is well set the side lever is turned away, the mould is inverted, and its sides are unclamped, whereupon the block or slab is gently deposited upon the trolley's inclined table.

8,111.—ROAD SCARIFIERS: *H. C. E. Hulands & L. S. Hulands.*—The axle of the engine's wheel carries a U-shaped frame, to the end of which the picks are attached. The frame, which is adjusted by passing a sleeve upon one leg over the axle's end and then bolting the two parts of the sleeve around the axle, is lowered and lifted by means of a screw shaft that passes through a nut which is pivoted in brackets upon a girder connected to the tender. A bar bolted to a bridge piece is recessed for the turning therein of the shaft's head.

8,145-6.—LADDERS: *F. S. Seagrave.*—At the ladder's foot is fastened, with pins or cottars, an extended beam or base, to whose underside is affixed a metal plate, whilst the ends of the beam have channelled feet of cast-metal; between the ends of the beam and the castings wooden wedges or blocks are inserted. In the latter invention the base or beam consists of two parts, which are hinged together and slide in guides attached to the ladder; the hinge pin also slides within a slotted bar at the middle of the ladder and is attached to the bar with a cam ring, which is pivoted at the pin's end and presses against the eyes of the hinge; the movement of the beams within the guides is limited by shoulders, and slipping of the beams is prevented by serrated shoes upon their ends.

8,210.—MANUFACTURE OF PORTLAND CEMENT: *W. E. Hopps.*—Chalk, sand, sodium carbonate and gypsum are ground to a very fine powder, and are then mixed together in the respective parts of 123, 26, 5, and 4. When the materials have been passed through a brick-making machine the bricks are kiln-burned and the clinker is crushed and finely pulverised.

8,280.—TROUGH CLOSETS: *W. Oates.*—By this contrivance a channel is formed in one piece with the trough so that the customary loose bend at the end of the flushing-pipe can be discarded; a socket takes the lower end of the flushing pipe.

8,323.—CANS FOR PAINTS: *J. A. V. Bourgeois.*—For hermetically closing and sealing the can is provided a ringed collar with an extending flange, the cover—also flanged—fits over the ringed collar, and is held in place with either loose or hinged clips. A clip may be extended so as to be available for prising the cover open, and the ends of a cord or wire, which is inserted through holes in the flanges of the cover and collar, are to be sealed with lead.

MEETINGS.

FRIDAY, AUGUST 17.

Institution of Junior Engineers Summer Meeting at Newcastle-on-Tyne (concluded).—Visit to the Allhusen Works of the United Alkali Works Company; the preliminary Works of the Corporation's Electric Tramway Undertaking; summer dinner in the evening at the County Hotel, the President, the Hon. Charles A. Parsons, F.R.S., in the chair.

SATURDAY, AUGUST 18.

Architectural Association.—Summer Visit to Mereworth House, near Wateringbury, Kent.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 1.—By MORRIS, SONS, & PEARD (at Bridgwater).

Woolavington, Somerset.—Morses Farm, 144 a. 1 r. 0 p., f. (in lots)	£4,713

By Messrs. GIBSON (at Northampton).

Thornby, &c., Northants.—The Thornby Grange Estate, 294 a. 2 r. 11 p., f.	4,100

August 3.—By WESTLEY & SON (at Isleham).

Isleham, Cambs.—Various enclosures, 65 a. 3 r. 29 p., f.	560
Freehold Fen Farm, 135 a. 3 r. 3 p.	735

By W. W. READ & CO.

Southwark.—58 and 59, St. Margaret's-court, u.t. 20 yrs., g.r. 20*l.*	105

By WEATHERALL & GREEN.

Regent's Park.—137, 161, 163, and 165, Albany-st., u.t. 15 yrs., g.r. 67*l.* 10s., r. 205*l.* 15s.	945
Redhill-st.—L.g.r's 59*l.* 19s., u.t. 15 yrs., g.r. 16*l.* 16s. 8d.	510

By RICHARD AUSTIN.

Weymouth, Dorset.—The Gloucester Hotel, area 0 a. 2 r. 15 p., f.	10,300

August 7.—By Messrs. COBB (at Rochester).

Hoo St. Werburgh, Kent.—Enclosure of meadow land, 2 a. 0 r. 2 p., f.	£170
Grain, Kent.—Little West Field, 5 a. 0 r. 35 p., f.	220

August 8.—By FAREBROTHER, ELLIS, & CO.

Kronberg, &c., Germany.—The goodwill, stock, plant, buildings, and 50 acres of land, belonging to the Kronthal Company (as a going concern), f.	5,000
St. Pancras.—175, Euston-rd., u.t. 7¼ yrs., g.r. 16*l.* 16s., e.r. 75*l.*	150

By FRANKLIN & SON.

Moreton, Essex.—Southend or New House Estate, 158a. 2r. 17p., f.	2,700
Nether Hall Estate, 216 a. 0r. 32 p., f.	3,250
The Hill Farm, 42 a. 1r. 2p., f.	750
Shelley, Essex.—Four enclosures of meadow land, 10 a. 2 r. 16 p., c.	330
Fyfield, Essex.—Norwood End Farm, 20 a. 0 r. 1 p., c.	290
Moreton, Essex.—The Manor of Bouchers Hall, with fines, heriots, &c.	260

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	s.	d.		
Hard Stocks	34	0	per thousand	alongside, in river.
Rough Stocks and Grizzles	30	0	,, ,,	,, ,,
Smooth Bright Facing Stocks..	58	0	,, ,,	,, ,,
Shippers	42	0	,, ,,	,, ,,
Flettons.....	29	6	,, ,,	at railway depôt.
Red Wire Cuts ..	34	0	,, ,,	,, ,,
Best Fareham Red	71	6	,, ,,	,, ,,
Best Blue Pressed Staffordshire ..	87	0	,, ,,	,, ,,
Do., Bullnose	92	0	,, ,,	,, ,,
Best Stourbridge Fire Bricks	84	6	,, ,,	,, ,,
Best White Glazed Stretchers.....	260	0	,, ,,	,, ,,
Headers	240	0	,, ,,	,, ,,
Quoins and Bull-nose	340	0	,, ,,	,, ,,
Double Headers..	320	0	,, ,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	,, ,,	,, ,,
Quoins and Bull-nose	280	0	,, ,,	,, ,,
Double Headers..	280	0	per thousand	at railway depôt.
Seconds Quality White and Dipped Salt Glazed	40	0	per thousand	less than best.

	s.	d.	
Thames and Pit Sand	8	0	per yard, delivered.
Thames Ballast	6	9	,, ,,
Best Portland Cement	36	0	per ton ,,
Best Ground Blue Lias Lime..	23	6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks,	32s. 6d. per ton at rly. dpt.

STONE.

		s.	d.		
Ancaster in blocks	2	0	per ft. cube,	deld. rly.	depôt
Bath ,, ...	1	7	,,	,,	
Beer ,, ...	1	6½	,,	,,	
Grinshill ,, ...	1	10	,,	,,	
Brown Portland in blocks	2	2	,,	,,	
Darley Dale ,,	2	1½	,,	,,	
Red Corsehill ,,	2	5	,,	,,	
Red Mansfield ,,	2	4½	,,	,,	
Hard York ,,	2	10	,,	,,	
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	7	per ft. super.		
,, ,, 6 in. Rubbed Ditto..	2	10½	,,	at rly. depôt.	
,, ,, 3 in. sawn both sides slabs (random sizes)	1	3	,,	,,	
,, ,, 3 in. self-faced Ditto	0	9	,,	,,	

SLATES.

in.	in.	£	s.	d.	
20	10 best blue Bangor..	11	5	0	per 1000 of 1200 at ry. dep.
,,	best seconds ,,	10	15	0	,, ,,
16	8 best ,,	6	2	6	,, ,,
20	10 best blue Portma-doc	10	18	0	,, ,,
16	8 ,, ,,	6	0	0	,, ,,
20	10 best Eureka un-fading green.....	11	2	6	,, ,,
16	8 ,, ,,	6	15	0	,, ,,
20	10 Permanent green and Sedan green	10	0	0	,, ,,
16	8 ,, ,,	5	12	6	,, ,,

TILES.

	s.	d.		
Best plain red roofing tiles..	41	6	per 1,000	at rly. depôt.
Hip and valley tiles....	3	7	per doz.	,, ,,
Best Broseley tiles	48	6	per 1,000	,, ,,
Hip and valley tiles....	4	0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000	,, ,,
Do. ornamental Do.	60	0	,,	,, ,,
Hip tiles.....	4	0	per doz.	,, ,,
Valley tiles.....	3	9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000	,, ,,
Hip tiles	4	1	per doz.	,, ,,
Valley tiles.....	3	8	,,	,, ,,

[*See also page 163.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Municipal Buildings	South Shields Town Council	200*l.*, 100*l.*, and 50*l.	Oct. 30
*Harbour Offices	Swansea Harbour Trustees	100*l.* and 50*l.*	Nov. 30

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Steel Gasholder Tank and Concrete Foundations	York United Gas Company	T. Newbigging & Son, Engineers, 5, Norfolk-street, Manchester	Aug. 21
Additions to Schools, Lincoln-street	Kingston School Board	Gelder & Kitchen, Architects, 76, Lowgate, Hull	do.
Electricity Station, Bloom-street	Manchester Corporation	F. E. Hughes, Town Hall	do.
Schools, Camelon	Falkirk Parish School Board	J. Strang, Architect, Vicar-street, Falkirk	do.
Laundry, &c., Bishop's Garden, Londonderry		J. G. Ferguson & Son, Architects, 20, Pump-street, Londonderry	do.
Filter Beds, &c., Hapton Reservoir (Contract No. 1)	Bury (Lancs.) Corporation	J. Cartwright, Civil Engineer, Town Hall, Bury	do.
Sewers, &c.	Brighouse Corporation	A. M. Fowler, Civil Engineer, 1, St. Peter's-square, Manchester	do.
Excavations at Hospital, Stobhill, Springburn	Glasgow Parish Council	Thomson & Sandilands, Architects, 241, West George-st., Glasgow	Aug. 22
Wall, &c., Pentre Tesa, Broughton	Wrexham R.D.C.	J. P. Evans, Engineer, Argyle Chambers, Wrexham	do.
Offices, &c., Stockton-on-Tees	South Durham Steel & Iron Co. Ld	J. J. Wilson, Architect, West Hartlepool	do.
Entrance Gate, &c., at Cemetery	Arnside Parish Council	G. L. Hoggarth, Architect, Kendal	do.
Warehouse, Whitehale-road, Leeds		Smith & Tweedale, Architects, 12, South-parade, Leeds	do.
Altering Two Cottages into Shops, Morley		Mr. Slack, 46, Gilroyd-parade, Morley	do.
*Sinking a Cast-iron Cylinder Well	Littlehampton U.D.C.	Surveyor, Town Office, Littlehampton	do.
Additions to Woodgate Farm, Stratford St. Mary		R. T. Hookway & Son, Archts., 12, Bridgeland-street, Bideford	Aug. 23
Stabling, &c., Trimgate-street, Navan	Mr. T. J. McQuillan	E. Lowe, Architect, Navan	do.
Additions to House at Gasworks	Bakewell U.D.C.	W. Redfearn, Town Surveyor, Bakewell	do.
Additions to Schools	Caythorpe, nr. Grantham, Sch. Bd	T. White, School Board Offices, Caythorpe	do.
Annexe at Infirmary	Hambledon, nr. Guildford, Gdns.	E. L. Lunn, Architect, 36, High-street, Guildford	do.
Church, Avonmouth		G. H. Oatley, Architect, Baldwin-street, Bristol	do.
*Engine and Boiler Houses, &c.	War Department	Royal Engineer's Office, Tidworth House, Tidworth	Aug. 24
Offices, &c.	Southmoor Colliery Co., Ltd.	J. W. Rousthwaite, Archt., 13, Mosley-street, Newcastle-on-Tyne	do.
Four Houses, Brunton-place, Carlisle		G. Armstrong, Architect, 24, Bank-street, Carlisle	do.
Sewers, &c., Ludworth	Durham R.D.C.	G. Gregson, Surveyor, Eastwood, Western Hill, Durham	do.
House, Helen's Bay, Belfast		V. Craig, Architect, 5, Lombard-street, Belfast	Aug. 25
Brickwork at Workhouse	West Bromwich Guardians	T. Rollason, Architect, High-street, West Bromwich	do.
Additions to Schools	Blugham (Notts.) School Board	J. P. Dixon, Architect, Wheeler Gate, Nottingham	do.
Vestries, Lymm (Warrington) Parish Church		Wright & Sons, Surveyors, Lancaster	do.
Arcade, &c., Kirkgate, Wakefield		G. E. Bolshaw, Architect, 189, Lord-street, Southport	do.
Academy	Linlithgow Parish School Board	J. G. Fairley, Architect, India Buildings, Edinburgh	do.
*Granite and Gravel	Barnet U.D.C.		Aug. 27
*Electricity Supply Works	Worksop U.D.C.	Surveyor's Office, Town Hall, Worksop	do.
Warehouse, Ely Paper Works, Cardiff	Messrs. T. Owen & Co., Ltd.	J. W. Rodger, Architect, 14, High-street, Cardiff	do.
Two Houses and Stable, Kent-street, Ford, Devonport	Mr. Robertshaw	H. G. Luff, Architect, 64, Chapel-street, Devonport	do.
Additions to Board Room at Workhouse	Basford Guardians	W. V. Betts, Architect, Radford-road, Old Basford	do.
Public Library, Commercial-road, Limehouse	Commissioners of Public Library	Messrs. Clarkson, Architects, 136, High-street, Poplar	do.
Sewers, &c.	West Ham County Council	Borough Engineer, Town Hall, West Ham, E.	do.
Reservoir, New Pool Hollow	Church, Stretton (Salop) WaterCo.	Taylor, Sons, & Santo Crimp, C.E., 27, Great George-street	Aug. 23
Windows, &c., Marland Hospital	Rochdale Corporation	J. Leach, Town Hall, Rochdale	do.
*Waiting Room	Shoreditch Vestry	Vestry Clerk, Town Hall, Old-street, E.C.	do.
Sewers, Woolwich-road	Lee Board of Works	G. Whale, Board of Works Offices, Old Charlton, London	Aug. 29
*Ward at Angleton Asylum, Bridgend, Glamorgan	Brightlingsea U.D.C.	See Advertisement	Aug. 30
Steel Works, Silcott-road, &c.	H.M. Office of Works	W. L. Osborne, Foresters' Hall, Brightlingsea	do.
*Post Office at Aldershot	Committee	Postmaster, Aldershot	Aug. 31
Hospital, Belfast		W. H. Stephens & Sons, Architects, 13, Donegall-sq. North, Belfast	do.
Boiler House, Laundry, &c., at Lincoln	Bristol County Council	W. Watkins & Son, Architects, St. Edmond's Chambers, Lincoln	do.
*Foundations, &c.	Camberwell Vestry	H. Williams, Architect, 24, Clare-street, Bristol	Sept. 4
Offices, Stables, &c.	Audenshaw, Lancs., U.D.C.	Surveyor's Office, Vestry Hall, Camberwell	Sept. 6
Sewers, &c.	Walsall School Board	J. P. Wilkinson, C.E., 47, Arcade-chambers, Manchester	Sept. 8
House at Schools, Palfrey	Richmond Guardians	Bailey & McConnal, Architects, Bridge-street, Walsall	Sept. 10
*Infirmary Buildings and Nurses' Home	Tynemouth Corporation	See Advertisement	Sept. 17
*Storage Reservoir, &c.		See Advertisement	Sept. 18
Restoration of Church, Deighton, near Northallerton		Hicks & Charlewood, Architects, 67, Westgate-road, Newcastle	No date
Forty-eight Cottages, Tinsley Park Collieries, Sheffield		P. B. Houfton, Architect, Furnival Chambers, Chesterfield	do.
Twelve Houses, Ashdown-road, Sandal		W. N. Wynn, C.E., 10, Livingstone-street, Roundhay-rd., Leeds	do.
Reconstruction of Bridge, Houghal Burn	Tanfield U.D.C.	R. Heslop, Surveyor, Burnopfield	do.
Hotel (The Swan) Truro	Messrs. W. H. Mallett & Co.	W. Swift, Architect, 38, Lemon-street, Truro	do.
Residence, West Deeping, Lincs.		J. C. Traylen, Architect, 15, Broad-street, Stamford	do.
Water Supply Works, Welbeck	His Grace the Duke of Portland	G. & F. W. Hodson, Engineers, Loughborough	do.
Road Works, Railway and Hope Streets	Dukinfield Corporation	S. Hague, Borough Surveyor, Dukinfield	do.
Granite Setts, &c., Southampton		F. Osman, Fourposts, Southampton	do.
Alterations, &c., to the Irwin Arms Inn, Leeds	Leeds Tradesmen's Benev. Instn.	A. D. Kaye, Architect, 71, Albion-street, Leeds	do.
Additions to 41, Park-square	do.	Butler, Wilson, & Oglesby, Architects, 12, East Parade, Leeds	do.
Three Shops and Business Premises, Park-lane	Messrs. F. R. Spark & Son	do.	do.
Additions to Printing Works, Cookridge-st., Leeds	Worthing Corporation	do.	do.
*Electric Generating Station		Borough Surveyor, Town Hall, Worthing	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Surveyor and Inspector of Nuisances	Waltham Holy Cross U.D.C.	275*l.* per annum	Aug. 22
*Clerk of Works	Coventry Corporation	3*l.* 10*s.* per week	do.
*Assistants	do.		do.
*Clerk of Works	Stafford Guardians		Aug. 24
*Assistant	Chelmsford Corporation	2*l.* 2*s.* per week	Aug. 25
*Clerk of Works	Richmond Guardians	4*l.* per week	Sept. 12

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv, vi, viii, x, & xxi. Public Appointments, pp. xviii, xix, & xxi.

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PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15 10 0	16 10 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 5 0	4 10 0
Seconds	3 17 6	4 5 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	4 0 0	4 10

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
" " 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	17 10 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	24 0 0	25 0 0
Do. 3 in. by 9 in.	21 0 0	22 0 0
Battens	16 0 0	17 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0	19 10 0
Do. 3 in. by 9 in.	16 10 0	17 10 0
Battens	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in.	14 10 0	15 10 0
Do. 3 in. by 9 in.	13 10 0	14 10 0
Battens	12 0 0	13 0 0
White Sea and Petersburg: —		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
" " " 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 10 0	12 10 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
" " " 3 in. by 9 in.	12 10 0	13 10 0
" " battens	10 10 0	11 10 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	29 0 0	31 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small " "	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 6	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders " "	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Fitch Plates	12 0 0	- - -

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	10 5 0	10 15 0
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0
Staffordshire "Marked Bars"	13 5 0	- - -
Hoop Iron, basis price	11 5 0	11 15 0
" " galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 10 0	- - -
" " to 24 g.	12 15 0	- - -
" " to 26 g.	13 15 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. by 3 ft. to 20 g.	14 15 0	- - -
" " 22 g. and 24 g.	15 5 0	- - -
" " 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 10 0	- - -
" " 22 g. and 24 g.	19 0 0	- - -
" " 26 g.	20 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft 20 g.	14 0 0	14 15 0
" " 20 g. and 24 g.	14 15 0	15 10 0
Cut nails, 3 in. to 6 in.	11 10 0	- - -
(Under 3 in. usual trade extras.)		

PRICES CURRENT (*Continued*).

	£ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
COPPER—		
Strong per lb.	0 1 0	- - -
Thin "	0 1 2	- - -
Copper nails "	0 1 3	- - -
TIN—English Ingots "	0 1 7	- - -
SOLDER—Plumbers' "	0 0 8	- - -
Tinmen's "	0 0 10	- - -
Blowpipe "	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3½d. " "
" " fourths	3d. " "
26 oz. thirds	4¼d. " "
" " fourths	4d. " "
32 oz. thirds	5¼d. " "
" " fourths	5d. " "
Fluted sheet, 15 oz.	3½d. " "
" " 21 "	4¾d. " "
⅛ Hartley's Rolled Plate	3d. " "
⅛ " " "	3½d. " "
¼ " " "	4d. " "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
" " " in barrels "	0 3 2
" " " in drums "	0 3 4
Boiled " in pipes "	0 3 4
" " " in barrels "	0 3 5
" " " in drums "	0 3 7
Turpentine, in barrels "	0 2 11
" in drums "	0 3 2
Genuine Ground English White Lead per ton	27 10 0
Red Lead, Dry "	25 0 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 6
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

H. C. (Amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BILSTON.—For extensions to St. Martin's Schools, Bradley. Mr. R. J. Rowe, architect, Crescent, Bilston. Quantities by architect:—

Field	£1,287 0 0	Cave	£967 0 0
Herbert	1,065 0 0	Gough	925 0 0
Skett	1,000 0 0	Morrell Bros., Bilston*	870 0 0
Hallett	998 9 8		

BRAMLEY.—For alterations and additions to National schools. Mr. W. G. Lower, architect, 12A, High-street, Guildford:—

J. W. Humphreys	£970 0 0	S. Ellis, Bramley*	£815 0 0
Drowley & Co.	904 0 0	Bunning & Son	810 0 0
Tribe & Robinson	900 0 0	F. Parsons	807 9 3
F. Milton	816 0 0	P. C. May (Executors of)	798 0 0

CHATHAM.—For alterations and additions to St. Bartholomew's Hospital, Chatham. Mr. Edwin T. Hall, architect, 57, Moorgate-street, London, E.C.:—

Holland & Hannen	£14,903	J. H. Harris	£12,929
Lawrence & Sons	14,695	C. E. Skinner	12,598
Holloway Bros.	13,950	Wallis & Sons	12,520
Foster & Dickson	12,945	West Bros.	12,249

Plumbing Work, &c.

Doulton & Co., Ltd.	£1,177	Dent & Hellyer	£1,074
G. Jennings	1,148		

COVENTRY.—For additions to schools, Exhall, for the School Board. Mr. T. F. Tickner, architect, 7A, Bishop-street, Coventry:—

T. Wright	£399 17 6	Shortridge & Denyer	£332 12 10
T. Gibson	395 0 0	H. Goode	325 0 0
T. G. Golby	380 0 0	J. Goode, Exhall*	298 10 0
L. Bunney	339 0 0		
Kelley & Son	335 0 0		
Watts & Edmonds	334 13 8		

FETCHAM PARK, LEATHERHEAD (Surrey).—For drainage works, for Mr. J. Barnard Hankey. Mr. A. J. Hardwick, surveyor, Eagle Chambers, Kingston-on-Thames. Quantities by Mr. Ernest R. Babbs, 48, Bishopsgate-street Within, E.C.:—

	Sewage disposal works.	Sewers.	Total.
Steven Kavanagh	£502 11 0	£791 7 6	£1,293 18 6
Ross, Wilks, & Crabtree, Shipley, Yorks*	427 12 6	673 19 0	1,101 12 6

HULL.—For the erection of three blocks of dwellings, Great Passage-street, for the Corporation. Mr. J. H. Hirst, City Architect, Town Hall, Hull:—

Jackson & Sons	£11,858	F. Beilby	£10,300
H. Kaye	10,767	G. Houlton	9,960
C. Greenwood	10,694	M. Harper	9,874
H. Moody	10,113	T. Goates*	9,750
	[All of Hull.]		

HULL.—For pulling down premises and erecting larder, meat, and other store buildings at the workhouse. Messrs. Freeman, Son, & Gaskell, architects, 11, Carr-lane, Hull:—

J. Morrell & Sons, Hull† £1,119

HULL.—For painting Hull Workhouse. Messrs. Freeman, Son, & Gaskell, architects, Hull:—

Lightowler & Son, Hull* £270

KINGSTON-ON-THAMES.—For repairs and alterations to Clydesdale, for the Hon. Geo. Savile. Mr. A. J. Hardwick, architect, Kingston:—

Offer & Sons	£393	E. Tomkins	£359
Lane & Son	380	Gaze & Sons*	349
G. J. Havell	370		

LEICESTER.—For the erection of a chimney-shaft and refuse-destructor buildings, West Humberstone, for the Corporation. Mr. E. G. Mawbey, C.E., Town Hall, Leicester:—

Contract No. 1.—Chimney Shaft.

Needham Bros.	£2,399 5 0	Moss & Son, Ltd.	£1,814 13 4
Bradshaw Bros.	2,380 4 6	Thomas Herbert	1,756 0 0
Myles & Warner	2,173 6 1	Leicester Builders, Ltd.	1,746 0 0
A. & W. Chambers	2,000 0 0	Johnson & Son	1,649 0 0
Williamson & Co.	1,876 11 11	Thos. Smart, Nottingham*	1,500 0 0
Herbert & Sons	1,850 16 10		
Main, Kendall, & Main	1,823 10 0		

Contract No. 2.—Destructor Buildings.

Geo. Duxbury	£5,353 10 3	Johnson & Son	£4,726 11 4
Bradshaw Bros.	4,981 0 0	Needham Bros.	4,609 11 0
Leicester Builders, Ltd.	4,951 0 0	Herbert & Sons	4,549 15 8
A. E. Tilley	4,914 17 8	Williamson & Co.	4,463 13 9
Thos. Herbert	4,900 0 0	Moss & Son, Ltd., Loughborough*	4,440 15 11
Main, Kendall, & Main	4,895 7 0		

LLWYNPIA.—For the erection of a house, for Messrs. A. & N. Meredith. Messrs. Griffiths & Jones, architects, Tonypandy:—

Jonathan Jones, Coedpenmaen, Pontypridd* £410 10

[Boundary walls and plumbers' work not included.]

LONDON.—For heating the Gideon-road school, for the School Board for London:—

Wippell Bros. & Row	£550
Oldroyd & Co., Ltd.	529
Turner & Co.	495
Cannon & Sons	489
Brightside Foundry & Engineering Co., Ltd.	445
G. Davis	435
Williams & Sons, Ltd.	399
Bates & Sons*	385

[*See also next page.*

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NORTHFLEET.—For the erection of new schools at Old Dover-road, Northfleet, for the Northfleet School Board. Mr. S. I. Adams, architect, Weston-chambers, Southend-on-Sea :—

	Schools.	Pavings, &c.	Caretaker's House.	Total.
Messrs. Foster	£10,148 0 0	£4,760 0 0	£947 0 0	£15,855 0 0
Messrs. Beal & Hubbard	8,242 5 4	3,692 2 3	728 19 3	12,573 6 10
Messrs. Davis & Leaney	8,100 0 0‡	3,700 0 0	—	11,800 0 0
Messrs. Davey Brothers	8,075 0 0‡	2,955 0 0	—	11,030 0 0
Messrs. Dupont & Co.	7,263 10 0	2,862 0 0	661 10 0	10,787 0 0
Messrs. Multon & Wallis	7,321 0 0†	1,026 0 0	634 0 0	10,795 0 0
		931 0 0†		
		329 0 0†		
		554 0 0†		
		2,840 0 0		

Messrs. Multon & Wallis's tender has been accepted, for schools, £7,321 †; boundary walls, £931 †; latrines, £329 †; drainage and filtering tanks, £554 †; total, £9,135.
‡ This includes caretaker's house.

LONDON.—For repairs and decorations, The Albion, public-house, Stoke Newington. Messrs. Foulsham & Herbert Riches, architects, 3, Crooked-lane, King William-street, E.C., and Bromley-by-Bow, E. :—

J. & W. Inkpen	£645	Sheffield Bros.	£540
Fisher, Finn, & Co.	607	T. Dartnall*	530

ROEHAMPTON.—For residence. Mr. A. J. Hardwick, architect. Quantities by Mr. E. R. Babbs, 48, Bishopsgate-street Within, E.C. :—

Marriage & Witherington	£1,475	W. H. Lorden	£1,288
Gare & Son	1,386	Kelsey & Sons, Chessington*	1,146

SOUTHBOROUGH. — For the erection of school buildings, High Brooms. Messrs. H. H. & E. Cronk, architects, 4, Mount Ephraim-road, Tunbridge Wells :—

Bowman & Sons	£1,920 0	Strange & Sons	£1,720 18
J. Jarvis	1,821 14	J. N. Jeffery	1,682 0
Martin & Co.	1,805 0		

STONEHAVEN, N.B.—For the erection of a villa on Slug-road, for Mr. A. E. P. Gardner. Mr. J. Augustus Souttar, architect, 41, Bishopsgate-street Within, London, E.C. Quantities by architect :—

Masonry.—Smith & Co., Stonehaven*	£558 0 0
Carpentering.—Thomson & Sons, Stonehaven*	484 10 0
Slating.—R. Burness, Stonehaven*	70 18 6
Plumbing.—J. Worling, Aberdeen*	150 0 0
Plastering.—A Stephen, Stonehaven*	76 17 0
Painting and Glazing.—E. Copland, Aberdeen*	75 15 0
	£1,416 0 6

SUTTON (Surrey). — For additions to Foxbury, Worcester-road, for Mr. A. Emslie. Mr. J. Augustus Souttar, architect, 41, Bishopsgate-street Within, London, E.C. :—

F. J. Shopland, Sutton* £359

SWANSEA.—For the erection of ice factory and cold stores, Swansea; other work to be done to additional contracts. Messrs. Freeman, Son, & Gaskell, architects, Hull :—

Lloyd Bros., Swansea £3,681 7 5

THAMES DITTON (Surrey).—For cottage in Ashley, road, for Mr. J. Hart. Mr. A. J. Hardwick, architect. Eagle Chambers, Kingston-on-Thames. Quantities by Mr. E. R. Babbs, 48, Bishopsgate-street Within, E.C. :—

E. D. Hobbs* £683 10 0

TUNBRIDGE WELLS. — For the erection of two cottages at sewage farm, for the Town Council. Mr. W. H. Maxwell, Borough Surveyor, Town Hall, Tunbridge Wells :—

J. Marshall	£793 0 0	F. Skinner	£727 17 10
Crates & Son	790 0 0	J. N. Jeffery	717 0 0

WEST HARTLEPOOL.—For the erection of banking premises, Church and Lynn streets, for the Yorkshire Penny Bank. Mr. J. Garry, architect, 47, Church-street, West Hartlepool. Quantities by Mr. Geo. Bell, 13, Westgate-road, Newcastle :—

Leeder & Son	£6,223	Watt Bros., West Hartlepool‡	£4,896
Howe & Co.	5,039		

‡ Accepted, exclusive of fittings, which are of polished teak.

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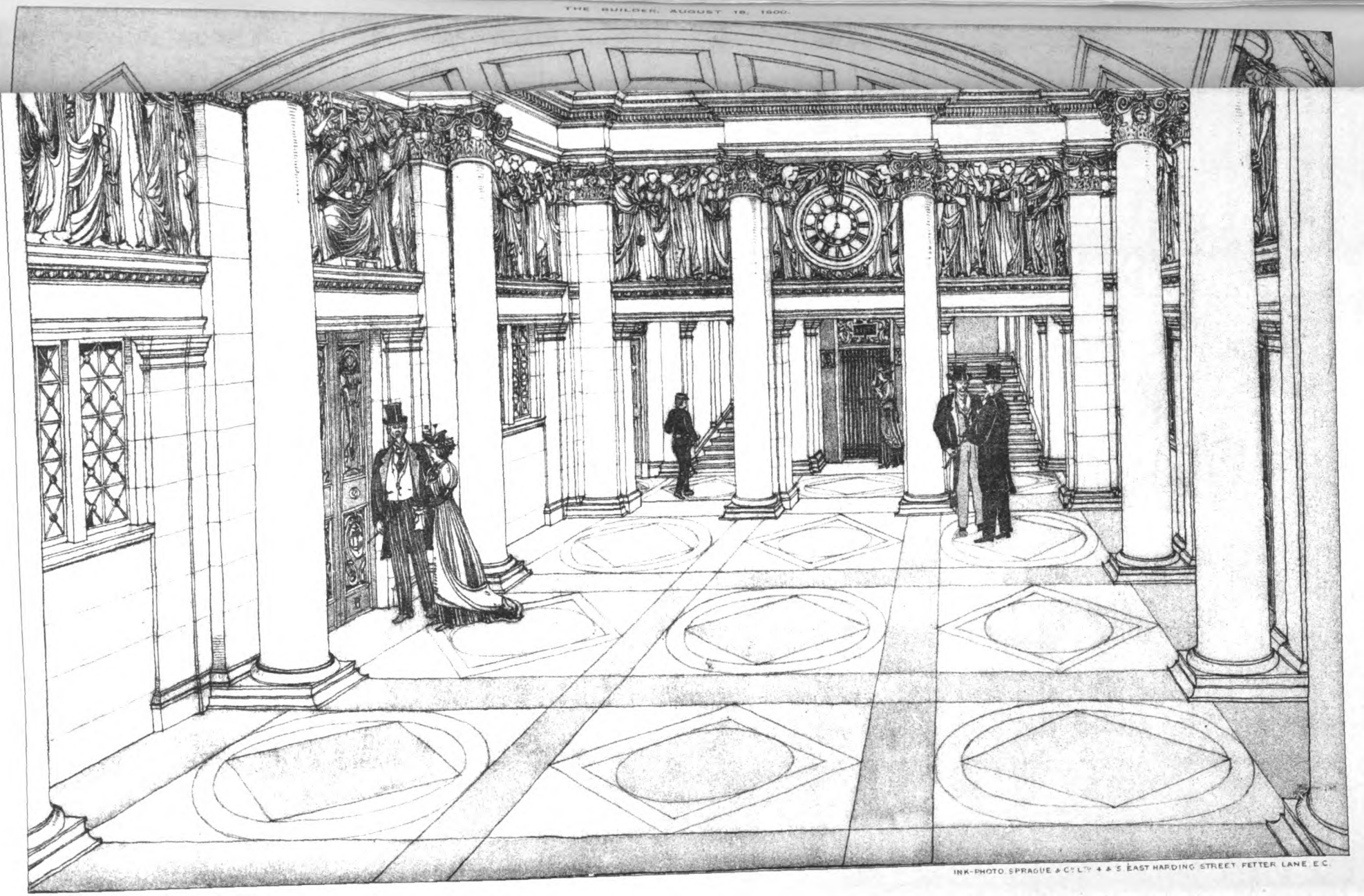

NEW BUILDINGS FOR THE EASTERN TELEGRAPH COMPANY: VIEW OF MAIN ENTRANCE.—Mr. J. Belcher, A.R.A., Architect.

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The Builder.

VOL. LXXIX., No. 3003. AUGUST 25 1900

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Railways and Bridges at the Paris Exhibition.

ONE effect of the Paris Exhibition has undoubtedly been to stimulate the construction of works having for their object the multiplication of means of rapid transport and the improvement of communications generally. Some of the undertakings which we now propose to mention are of a temporary character, being intended solely for the convenience of visitors to the Exhibition, but others will remain as permanent additions to the public services of the French capital.

The efforts made by the Compagnie des Chemins de Fer de l'Ouest are worthy of special commendation. Considerable works have been undertaken by this company for the extension of its system and for the establishment of connexions between its various lines in Paris. As our readers are probably aware, a junction has existed for some time near Grenelle station, linking the Ceinture railway and the Moulineaux line. Communication between Saint Lazare and the Champ de Mars was thus possible, although not particularly convenient; but the directors of the Western Railway Company decided upon the construction of a new line, leaving the existing track at Courcelles, doubling the Ceinture line as far as the Trocadéro station, then branching to the left hand towards the river, and finally reaching the Gare du Champ de Mars. No appreciable change is caused in the appearance of the boulevards by the additional metals. From the Courcelles station to that of Neuilly the necessary space is provided to the right and left of the old permament way. Vertical retaining walls have now been constructed on either side along the boulevard Pereire, and other roads crossing the railway are carried on metallic platforms supported by columns. A short distance beyond the Trocadéro station the down track passes beneath the Auteuil line to join the up track. These two sets of metals, after having run in separate tunnels for a distance of about 220 mètres, enter together a double tunnel 340 mètres long, which ends in the station of Boulainvilliers, established in an open cutting. Beyond this point the railway follows an underground course for about 275 mètres, emerging into the open air near the Quai de Passy, and passes over two consecutive bridges crossing the river about the middle of the Ile des Cygnes. The larger or navigable channel is traversed at an angle of 60 deg., and the smaller arm at an angle of 45 deg.

With regard to the more important of the two bridges it may be remarked that an essential condition for observance was that navigation of the Seine should not be impeded by the presence of piers. After considering several types of bridge suitable for spanning a distance of from 80 mètres to 100 mètres, the engineer decided upon the construction of a viaduct similar to that adopted at Grunenthal, on the Kiel Canal. Between massive abutments of masonry two latticed arches with vertical and diagonal bracing spring from one side of the river to the other, the starting point at each abutment being considerably below the level of the roadway. These arcs and the roadway intersect a short distance from the abutments, and between the points of intersection the roadway is suspended by rods of 10 cm. diameter and spaced about 4 mètres apart.

The bridge over the smaller arm of the river includes three metal arches springing from masonry piers, and supporting the lower girders which are connected by steel ties with those carrying the roadway. In the upper masonry of the pier are refuges for railway employees, and about halfway up each pier is a bull's-eye, in which a signal light is placed for the guidance of navigators. These lights are so situated that they do not interfere with signals used on the railway above. On the left bank of the river the new line joins that from Moulineaux, and the four lines of metal continue to the Gare du Champ de Mars, but the main line branches to the left after traversing the Boulevard de Grenelle, and runs on to the new terminus at the Esplanade des Invalides. On the river bank the railway is in an open cutting, but this is temporarily covered for such part of its length as passes through the Exhibition. The walls of the cutting are not more than 4 in. thick, and are composed of a steel framework covered by wood and cement. The platform covering the line is formed of concrete, strengthened by iron bars and bands. This temporary tunnel is lighted by openings at the sides and top. As some of the Exhibition buildings are immediately above this fragile work, independent provision was, of course, necessary for their support. In addition to the terminus there are two stations on the new line within the Exhibition grounds—one at the Avenue de la Bourdonnais and the other at the Place de l'Alma.

The Gare des Invalides occupies the space between the Rue de Constantine and the Rue Fabert. The lines and platforms are entirely below ground level, and cover a trapezium of 220 mètres in length by 120 mètres average width, whilst the superficial area of the station is about 25,000 square mètres. There are seven platforms, about 170 mètres long, and fifteen lines of rail, converging into two at the commencement of the tunnel. A considerable area of the underground station is covered by a roof carried on cast-iron columns, supported on metal foundations. The roof framework is built of steel girders and ties, into which lozenge-shaped panes of glass are inserted. Steel pivots and cushions are arranged beneath the girders so as to permit of expansion and contraction, and the ends of the girders, occurring at alternate columns, are about 1½ in. apart. Considerable care was necessary during the construction of the station owing to the proximity of a large siphon carrying sewage beneath the river. As a matter of fact, we believe this conduit was damaged in the early building operations, but the precautions then taken prevented the occurrence of any subsequent mishap. That part of the station-covering which is beneath the esplanade is some-

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what higher than the original level as, owing to constructional details connected with the Alexandre III. bridge, it was found necessary to raise the quay level by nearly 2 mètres. In the gardens covering this part of the station the openings necessary for ventilation are hidden from view. The superstructure has a façade of 95 mètres in length, and is 23 mètres deep. A spacious booking hall, at the level of the street, extends the whole width of the platforms, and there are six staircases arranged alternately with booking offices. An excellent characteristic of this station is the provision of separate departments for dealing with luggage, parcels, &c., so that passengers may not be subjected to the inconvenience and danger present in most of our large stations in London.

Electric traction has been adopted on the line between the Champs de Mars and the Invalides, and the company proposes further to inaugurate an important extension of the system before long. With this object in view a large generating station is being equipped at Billancourt. This establishment will ultimately contain nine generators, although only six are included in present arrangements. The generators are 800 K.W. tri-phase 5,000-volt revolving field alternators; the field is 14 ft. diameter and has thirty-eight poles. The engines, made by Dujardin et Cie, of Lille, are of the triple-expansion four-cylinder type, and indicate 1,500 h.-p. with steam at 150 lbs. pressure. Westinghouse engines have been adopted for driving the exciters, each unit being intended to furnish current for three generators at 125 volts. These engines run at about 290 revolutions per minute, under steam at 150 lbs. pressure. Ten boilers by Meunier, of Lille, are installed in the adjoining boiler-house. During the continuance of the Exhibition this station furnishes power for the *plate-forme mobile* and the circular electric railway, in addition to the new line of the Western system, but ultimately it is to constitute the main power-station of the Compagnie de l'Ouest.

Other extensions of the Western Railway system will prove of the greatest value. For instance, trains leaving the Invalides will not only be able to reach other parts of Paris and the suburbs, but services will also be established giving direct communication with all the lines of Brittany and Normandy. The company will be in possession of a new terminus in an extremely convenient and central position, and, on the conclusion of the Exhibition, the greater part of Gare du Champ de Mars will become available for use as a goods station.

Although only about half the size of the station at the Invalides, the new terminus of the Orléans line, near the Pont de Solférino, on the Quai d'Orsay, will constitute a great improvement, and traffic will be considerably facilitated by the fact that the two stations are not more than 700 mètres apart. On the extension of the Orléans line electric traction will also be introduced.

We have previously described the general course and conditions of the Paris Metropolitan Railway, but a few particulars as to the working may be of interest. For working its first system the company has provided 161 carriages, nearly two-thirds second-class, one-third first-class, and the remainder of composite character. Electric traction is, of course, employed, and the current is conveyed by a third rail to motors of 100 h.-p. attached beneath certain of the cars, and not forming part of a separate locomotive as in the South London and Central London Railways. The vehicles are not particularly roomy and are a long way behind the spacious cars to which we are now becoming accustomed in this country. Moreover, the design adopted is by no means calculated to facilitate the clearance of trains at the various stations. When all the rolling stock has been furnished the management propose to establish a two-minute service in the busiest times of the day, and at other periods the service will be regulated according to requirements. It was estimated that the total cost of the present installation would not exceed twenty-two millions of francs, including administrative buildings, workshops, generating depôt, and the sub-station at the Place de l'Etoile. Considering recent advances in the price of materials and wages, especially in Paris, the sum mentioned appears to be very reasonable, but we believe it has been somewhat exceeded. Although the opening of the line was known to comparatively few people, no fewer than 30,000 tickets were sold on the first day between the hours of 1 p.m. and 8 p.m. The Metropolitan system will ultimately be extended to other parts of the city, and the complete scheme includes the construction of 48½ miles of double track, the total cost being estimated at 232,000,000 fr.

If the *plate-forme mobile* at the Exhibition were seen and not heard it would be an even more popular institution than it is at present. This contrivance, which serves in some measure to link together the scattered portions of the Exhibition, is 3,370 mètres in length, and the period of time occupied in one circuit is abour half-an-hour. One portion of the platform, 2 mètres wide, has a speed of 8·5 kilomètres an hour, and the other, with a width of ·85 mètre, moves at the rate of 4·25 kilomètres an hour. The height of the moving way above ground level is about 7 mètres, but variations occur at different parts of the route. As a general rule, the gradients do not exceed 3 to 4 per cent. Timber scaffolding on concrete foundations serves to support the platform and its auxiliary appliances. Above the timber standards are two longitudinal box girders built of angle bars and plates, and on these are laid transverse timbers supporting timbers which in turn carry rails for the small flanged wheels at each side of the platform. Each platform may be said to constitute a series of trucks, the front end of each being rounded so as to fit a complementary curve in the back end of the adjoining truck. By means of suitable castors running on iron guides fixed underneath the deck, swivelling joints are formed so that corners may be turned without difficulty; and there are also hinged joints permitting a certain degree of vertical deviation when gradients are encountered. The platforms are fitted with rails running on wheels, some of which are idle whilst others are driven by small dynamos. All these wheels are carried by iron brackets of which one end is supported by a rod bolted to the timber framing and the other by a transverse steel spring hanging from vertical rods. By this arrangement the motor wheels are relieved of unnecessary weight; a certain degree of resiliency is imparted to the platform, and the propulsion is entirely of a frictional and rolling character. The electrical equipment consists of 172 double-reduction 5 h.-p. motors made by the French Westinghouse Company. These motors are carried in the manner described above and power is transmitted by suitable gear to the driving wheels. Shafts with universal joints are provided so that oscillation of the platform shall not interfere with the efficiency of the driving apparatus. Either platform may be driven separately if so desired. The motors are of series type, and a current of 500 volts is transmitted by cables of 100 mm. cross section; copper feeder-bars of large section are run on insulators carried on the framework, where they are easy of access but cannot be reached by passengers. Smaller leads are used for lighting purposes. At full speed the motors run at 275 revolutions and the driving wheels at seventy-three revolutions per minute. The lower casings of the motor are perforated to ensure ventilation, whilst the upper casings are contrived so as to protect the apparatus from the weather. It is stated that the average consumption of energy is 300 K.W. per hour, with a speed of 5 kilomètres per hour and a load of about 25,000 passengers. The viaduct of the platform has absorbed timber representing a cube of 1,500 mètres; more than 1,500 tonnes (1,476·3 tons avoirdupois) of steel have been used, and the electric cables weigh altogether 50,000 kilogrammes. The *plate-forme* was constructed by the Compagnie des Transports Electriques, under the superintendence of M. Maréchal, ingénieur des Ponts et Chaussées.

The *chemin de fer électrique* circulates round a course almost identical with that pursued by the *plate-forme mobile* although the cars run in the opposite direction. This line, having a gauge of 1 mètre, is laid as far as possible on the ground level, but on part of the track viaducts are required, and at the Pont de l'Alma and at Porte Rapp cuttings are employed. As a precautionary measure the power rail is situated on the side of the line furthest removed from the passenger platforms, and it is of the same weight (25 kilogrammes per mètre) as those used for the running track. Electrical connexion between the rails is made by copper bonds rivetted in position, and as the running lines are used for the return current they are similarly bonded. The rolling stock consists of ten cars fitted with motors and eighteen ordinary cars; each train consists of three cars, one of the former and two of the latter class, with a total capacity of about 200 passengers. The number of trains varies according to circumstances, but if required the company can maintain a one and a-half minute service and a speed of ten to eleven miles an hour, including stoppages. Four Westinghouse 500 volt motors of 30 h.-p. are fitted to each motor car, which is also complete with air and hand brakes. The railway was constructed by the Compagnie des Transports Electriques.

Prominent amongst the permanent aids to locomotion is the Pont Alexandre III., the architectural features of which we have considered in a previous article. In the execution of this important work some little trouble was occasioned by the stipulation that a clear passage of 50 mètres should be left open for navigation of the river during construction. Consequently a temporary

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bridge serving as a working platform was erected over the site of the new bridge. This temporary structure, weighing some 300 tons, was made in two sections, being put together on platforms supported by piles. The two portions, each about 90 mètres in length, were drawn to the desired positions by steel cables, and then bolted together. Hoisting gear was provided for the purpose of assisting in the work of fixing the heavy steel girders and other members of the permanent bridge. Another condition imposed (as already noted) was that the roadway of the bridge should be level with adjoining thoroughfares, and that no obstruction should be offered to the view of buildings at either side of the river. The engineers, MM. Résal and Alby, have admirably complied with all essential requirements, and in this work the principle of the three-hinged arch is successfully exemplified. Having a total length of 180 mètres, the bridge crosses the river in a single span of 107·50 mètres; the roadway is 60 mètres wide and 8 mètres above the normal water-level of the river. If a steel arch were rigidly connected to the abutments considerable strain would be evidenced both in the centre and at the ends as the metal expanded under the influence of temperature. The general practice is, therefore, to hinge or pivot the ends to the abutments and a bridge so constructed exemplifies what is termed the two-hinged arch, in which the ends are relieved from unnecessary strain, but the centre, where bending moment attains its maximum has no such relief. This disadvantage is here removed by the application of a third pivot at the centre, constituting the three-hinged arch, a system of construction proposed in the year 1861 by M. Mantion.

As the Alexandre III. bridge includes some 7,000 tons of steel it is evident that some care was necessary in connexion with the building of the abutments. These are formed of granite blocks from the Vosges, cemented together, and the pressure exerted upon them is estimated at 50 kilogrammes per square centimètre. In order to secure a firm foundation the constructors were obliged to excavate to the depth of 18·75 mètres on the right bank and 19·50 on the left. Caissons of sheet iron were employed for the purpose and they were afterwards filled with concrete and granite. Securely bedded in the abutments at either end is a series of fifteen massive steel castings, and on the projecting part of each there is a horizontal groove of semicircular section, designed to receive half of the pin upon which the arch is pivotted. The other half of the pin fits into a corresponding groove in one of the main girder ends, which are spaced 3·60 mètres apart. These girders are built of separate steel castings, sometimes designated in traditional and inappropriate phraseology as "wedge-stones." A sample casting may be seen just outside the Creusot dome on the Quai D'Orsay. Each outer girder weighs 167 tons, and the others 144 tons; in some cases the castings were bolted together on movable platforms supported on piles, and the connected section was then pushed into place by jacks, but towards the middle of the river the castings were lowered separately from the working bridge and bolted in position. Where the longitudinal girders meet at the centre of the bridge there is another series of pivots somewhat similar to those at the abutments. The platform carrying the roadway is supported by vertical members connected to the longitudinal girders, and all are diagonally braced except the last rows, which are stayed at the top by portal-like arches. The platform is extended over the quay at each end, being carried there by masonry arches. A novel arrangement has been adopted in connexion with the footpath curbs, which are separated from the paths by spiral springs placed at short intervals apart, and are intended to provide an elastic cushion for protection of the curb, and perhaps also of vehicles. Those who are interested in constructive works of the kind will find it easy to examine the hinging of the bridge from the lower quay level at each side of the river, and the central pivots can be inspected by taking a trip in one of the steamboats plying in this section of the river. The amount of play permitted by the castings around the pivotting pins may seem at first sight to be very small, but it should be remembered that very little movement is to be expected at the abutments. At the time of our last visit the upper faces of the castings enclosing the pins were not more than ½ in. apart, and the gap across the roadway and footpaths above was probably less than 1¼ in. wide between the sliding plate and the asphalt. MM. Schneider et Cie, of Creusot, were the contractors for the erection of the bridge.

Connecting the Quai de Billy with the Palais des Armées de Terre et de Mer on the opposite bank is a new footbridge or "Passerelle," in which the pathway is suspended from a large central arch, springing from masonry piers a little distance from each side of the river. Support is also furnished by arcs springing from the piers to the buildings at each end. The voussoirs are box girders up to the points of intersection with the footpath, above which the upper and lower plates are connected by diagonal and vertical bracing. Halfway along the end arcs gussets are bolted to the upper plates, and from these long ties extend to the centre of the main arch. The footway is carried on sections built of angle bars, braced with vertical and transverse ties, and similar members connect the two sides of the arches. Columns are used for supporting the ends of the bridge, which continue up to, but do not abut on, the buildings.

The Pont d'Iéna, as already noticed, has been entirely disguised. The stone balustrades are removed, and the footpaths on each side are widened to the extent of about 3 mètres by the addition of transverse plate girders 5 mètres long. These are carried at their outer ends by longitudinal members, supported by cantilevers secured to the masonry piers of the structure. Vertical wings are provided to which uprights are bolted for fixing steel balustrades.

Two other temporary footbridges have been built, one of three spans close to the Pont de l'Alma, and the other of four spans adjoining the Pont des Invalides. Both these bridges are of similar type, being supported by piers of piles driven into the river bed and connected by cross timbers. Longitudinal girders are attached to each pier frame and joined by transverse girders. These footbridges possess no particularly interesting features beyond their usefulness to visitors.

In addition to encroaching upon the river front the Exhibition authorities have boldly annexed portions of the public thoroughfares in some places, the most important of which are the Quai de Billy and the Cours la Reine. To provide for traffic along the former of these the way has been altered so as to pass beneath a bridge in front of the Pont d'Iéna, and along which the Versailles steam tramway service continues. Over this road several timber footbridges of rudimentary construction afford access from one part to another of the Exhibition, and the level bridge above mentioned is an erection of armed cement, which it would certainly be unwise to use for anything heavier than pedestrian traffic. To replace the tramway lines removed from the Cours la Reine a new road has been made at a lower level along the Quai de la Conférence, commencing at the Pont des Invalides, and rejoining the original route beyond the Entrée Monumentale. This road passes beneath the Alexandre III. bridge, and we presume is intended to become a permanent institution. A fairly large number of small footbridges have been built over various thoroughfares intersecting the Exhibition. Nearly all these erections are of timber, perhaps because all the available engineering firms were fully occupied by more important work. Speaking generally, these bridges appear to be of substantial though clumsy proportions—in an engineering sense that is, though they are mostly of picturesque appearance.

AN IMPORTANT POINT AS TO RIGHT OF LIGHT.

THE practical difficulties which arise from the absence of a code of English law are usually most marked in plain applications of legal principles to every-day life. This absence causes, from time to time, complications and judicial contradictions which would not exist were the main principles of law on the leading branches of English jurisprudence defined in a code. The present state o affairs is all very well for lawyers, but over and over again it is a cause of inconvenience and expense to laymen. A very glaring instance of this is shown by an interesting and important judgment of Mr. Justice Wright, recently delivered in the case ot Warren *v.* Brown.

At the present time the law of light is engaging more than usual professional attention, and, therefore, it appears desirable to comment on the curious conflict of judicial decision which is evident in a particular branch of the law of light. It is well known that the owner of the dominant tenement is entitled as a general principle to such an amount of light as is sufficient for all ordinary purposes—that is to say, he is not to have his dwelling-house made substantially less comfortable or his place of business substantially less useful. This implies that if some work is being carried on in a building which does not require a special amount of light, yet that the owner of it is not on that account to be deprived of a reasonable and substantial amount if he has a prescriptive right to it. It implies also that the owner of a dominant tenement is not entitled to what may be called an extraordinary amount if enough is left by the owner of the servient tenement for all the ordinary purposes of light. But this does

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not settle the question whether the owner of a dominant tenement is entitled to an extraordinary amount for an extraordinary purpose. It is on this point—one becoming more and more important—that judicial decisions are opposed.

In 1867 Vice-Chancellor Malins, in Lanfranchi *v.* Mackenzie, decided that the owner of a dominant tenement who required an extraordinary amount of light for a special purpose—sampling silk—was not entitled to it because he had not used it for the full period of twenty years. He suggested, however, that if it had been used for twenty years he might be entitled to it. Coming to the year 1897 we find Mr. Justice Kekewich deciding exactly the contrary, and giving judgment in Lazarus *v.* The Artistic Photographic Company in favour of a photographer who required an extraordinary amount of light for a special purpose. "It seems to me to be incorrect to say," he said, "that the plaintiff cannot claim light for the extraordinary purpose of photography because he has not photographed in those premises for the whole period of twenty years." In the case of Wharton *v.* Brown, decided by Mr. Justice Wright shortly before the rising of the Court for the Long Vacation, the Judge came to a directly opposite conclusion. "The plaintiff has during some years, not much less than twenty years, carried on in the premises a manufacture of hosiery by means of machinery which requires a very exceptional quantity and quality of light for the continued and accurate adjustment of filament to fine needles, moving at speed in bundles of some hundreds." The Judge found also that this extraordinary amount of light had been diminished by the defendant, but that there was a substantial amount left. There was "an abundance of light left for all ordinary purposes of inhabitancy or business," and therefore that the plaintiff was not entitled to proceed. Here, therefore, we have a clear and direct conflict of modern judicial decisions on a practical and important point of law which must be coming up almost daily. It is strange that the question has not been settled before, but such is the present state of affairs. To discuss elaborately the legal bases of these decisions would be suitable in a legal publication; here it is desirable to regard practical reasons. We agree entirely with this judgment of Mr. Justice Wright. "Unless," he said, at the conclusion of it, "there is some limitation of the right to light for ancient windows, it is difficult to see how the ordinary extensions and improvements of towns could be carried on. If every house which has existed for twenty years is entitled to have all, or substantially all, the same light come to its windows as during the twenty years, no new houses could be built opposite to old ones unless at a distance which would impose on servient tenements an unreasonable burden, and might involve grave public inconveniences." As a matter of fact, this is exactly what does occur, and new houses are built after what at recent meetings of the Institute of Architects and of the Surveyors' Institution was called "the payment of blackmail." Common sense is obviously in favour of Mr. Justice Wright's decision. For if Mr. Justice Kekewich is right a photographer might prevent to-day the erection of an important and well-planned building because it interferes with his special light: in its place might be one dwarfed and unsymmetrical. Yet a year hence he might remove to another place, the house might be occupied for other purposes, for which, had the house on the servient tenement been erected as planned, there would have been a substantial amount of light left. Even supposing the photographer, if the building on the servient tenement were allowed to be erected, was prevented from carrying on his work, still he can move. Men in business and ordinary tenants of houses are obliged to move from time to time by causes which inconvenience them. Why, we may fairly ask, is a person in a special trade to have this special protection? Really it is the *reductio ad absurdum* of the right of a dominant tenement to light over a servient tenement. It is high time that the point was settled by the Court of Appeal, and that if the decision of this tribunal proves adverse to the ends of modern communities, that the subject should be put into a proper legal state by legislation. But to have important rights such as these depend not on a fixed principle of law but upon chance, upon whether the case is brought before Mr. Justice A or Mr. Justice B, is a positive legal scandal. For there cannot be a doubt that Mr. Justice Kekewich would have given a different decision to Mr. Justice Wright had the case which came before the latter have been tried by him, and that Mr. Justice Wright would not allow photographers to prevent the erection of buildings which, though they may diminish the light, yet leave a reasonable and substantial amount.

NOTES.

Awards to British Architects, Paris Exhibition.

The following is the official list of awards to British architects in the Fine Arts Section of the Paris Exhibition:—Gold Medals: J. Belcher, A.R.A., T. E. Collcutt, W. Emerson, P.R.I.B.A., E. L. Lutyens, Aston Webb, A.R.A. (Rappel). Silver Medals: Austin & Paley, J. J. Burnett, A.R.S.A. (Rappel), W. D. Caröe, C. Clowes, H. Field, W. Leiper, R.S.A., E. J. May, E. W. Mountford, L. Stokes. Bronze Medals: B. Champneys, Lanchester, Stewart, & Rickards, A. Mitchell, A. B. Pite. The following are among the awards to sculptors:—Medals of Honour: T. Brock, R.A., G. Frampton, A.R.A., H. Thornycroft, R.A. Gold Medals: C. J. Allen, A. Drury, A.R.A., W. Goscombe John, A.R.A., A. C. Lucchesi, J. M. Swan, A.R.A. Silver Medals: F. Bowcher, W. R. Cotton, H. C. Fehr, F. L. Jenkins, E. R. Mullins (Rappel), H. A. Pegram, F. W. Pomeroy. Bronze Medals: A. Toft. Honourable Mention: G. Bayes, D. B. McGill, P. Macgillivray, A.R.S.A.

Charing Cross Station.

It is one thing to obtain Parliamentary powers to undertake work; it is quite another to execute it. From the address of the Chairman at the recent meeting of the South-Eastern Railway Company it appears that for the present this company has given up its intention of enlarging Charing Cross station. This decision is placed to the account of bad times. Parenthetically the Chairman stated that the same decision had been arrived at in the case of Ashford and Tonbridge stations, though he was careful to state that these works were really necessary. It may be doubted whether, even when times are bad, it is sound policy to abstain from executing works which are admittedly necessary for the purpose of public convenience and even safety. Such works may not at first sight seem as paying as new extensions which tap fresh sources of traffic, but on the other hand they help to accommodate larger numbers of passengers, to attract others; they make a line more convenient and enable more trains to be run. There is another thing to be said—passengers keep increasing in number, and if railways do not undertake works which are admittedly necessary, they do not appear to be carrying out the compact with the community which they have undertaken.

Whitgift's Hospital, Croydon.

We gather that the project is revived of removing the old buildings for the purpose of widening the roadway at the corner of George-street and North-end. Fourteen years ago the proposal to take the hospital site for the new Town Hall met with such strenuous opposition that it was relinquished, and a strong feeling exists in the borough that the almshouses should not be sacrificed. They were founded by Archbishop Whitgift for thirty—a number since increased to forty—poor brethren and sisters. The buildings, forming a quadrangle on plan, were begun in 1596 and completed in 1599, five years before the Archbishop's death. Amongst the Lambeth Palace MSS. are preserved the building accounts, January 17, 1596—February 28, 1599, showing the total cost amounted to 2,716*l.* 11s. 11d., including 49*l.* 2s. for the glass in the hall window. For the fittings and furniture a stringent economy was observed; the chapel seats were made of the roughest knotted oak timber, which, it seems, could serve no other purpose. Sixteen years ago was discovered in some old chests in one of the hospital rooms a highly interesting and valuable collection of about two hundred legal and other documents relating to the history of the hospital and its property, amongst them being a deed of 30 Edward III., concerning an estate which it still owns, with some bearing the founder's signatures and seals, and one which shows that on the hospital's site stood The Checquers Inn, for whose site he paid 200*l.*, besides 30*l.* for a house and 80*l.* for the stay-cross and an adjoining plot of ground. There were also found some curious old drinking-bowls for those "above the salt" and those "below the salt." The foundation of the Hospital of the Holy Trinity is now managed under a scheme made by the Charity Commissioners in 1880-1; the additional charities originally endowed by Whitgift had been extended ten years previously by the building of the new Grammar School and an enlargement of the Middle School; at the same time some of the old school buildings in George-street were pulled down. The hospital has remained in nearly its pristine state; some repairs and sundry additions were made about fifty years ago. The building, which is of brick, is somewhat similar to Archbishop Abbott's Hospital at Guildford, where, however, the architectural detail is richer; the chapel, partly panelled, is on the court's southern side; some of the ancient glass is preserved in the hall; in the warden's room is a finely carved mantelpiece. Most of the timber used for the fabric was obtained from

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Lingfield and from the Archbishop's park at Croydon; the sand for mortar from Duppas, formerly Dubbers, Hill. The labels, of moulded red bricks, over the windows in the quadrangle should be noticed; the rooms are upon two floors, with an upper story in the gables. The Crown Inn opposite, at the corner of Crown Hill, is cited in the building accounts, February 4, 1596.

Wooden and Half-Timber Dwelling-Houses.

IN our issue of July 7 we gave some particulars of the exhibition of works in wood to be held at Carpenters' Hall in June next. It appears that a competition for wooden and half-timbered dwelling-houses is also to take place in connexion with the exhibition, and that prizes are to be awarded for those models of dwelling-houses built chiefly of wood. The first and second prizes in Class I. (4*l.* and 3*l.* respectively) will be for a detached labourers' cottage of one story; in Class II. the subject is a detached labourers' cottage, two stories high (first prize 4*l.*, second prize 3*l.*); in Class III. a small dwelling-house fit for a head gardener or farm bailiff to occupy (first prize 5*l.*, second prize 3*l.*); and in Class IV. plans of cottages—designs, including working drawings, specifications, and approximate estimate, with or without perspective sketch, for a detached labourer's cottage similar either to Class I. or II. (first prize, the Gold Medal of the Carpenters' Company; second prize, their Silver Medal.) Models are to be constructed to a scale not less than ½ in. to 1 ft., or more than ¾ in. to 1 ft. The roof must be capable of being taken off, and if there are two stories, the upper floor must also be removable; fittings such as a dresser or press are to be shown, but not furniture. In all cases there must be a dwarf wall for a foundation not less than 6 in. above ground level, and the fire-places and chimneys must be in brick or stone. Above the dwarf wall, half-timbered or wholly-timbered work must be mainly employed. The chief objections raised against houses of wood are (1) danger of fire; (2) liability to harbour vermin (insects); (3) the expense of painting. The attention of competitors is drawn to these so that they may make provision or suggestions for overcoming them. The main objects are health and economy; but it is desired that the building, though simple, shall have a pleasing appearance. They are not for town building, but might be erected in country places, and where timber is plentiful. Competitors can obtain all information from Mr. Stanton W. Preston, Carpenter's Hall, London Wall.

Cement Testing.

THE current issue of the *Journal* of the Society of Chemical Industry contains an abstract of a paper upon cement testing recently communicated to the New York section of that society by Messrs. Klein and Peckham. The authors consider that the sample to be tested should be analysed precisely as it is brought into the laboratory, and should not be dried either at a low or a high temperature before analysis. The active constituents of a cement are said to be wholly soluble in 10 per cent. hydrochloric acid, and to consist of soluble silica, lime, alumina, and iron. The results obtained from two cements are discussed. A large amount of water, volatile at a red heat, some of which would have been expelled and lost in drying, was present. One sample also contained 12 per cent. of carbon dioxide, which is equivalent to 27·276 per cent. of carbonate of lime or unburned limestone. As the total lime present amounted to 58·16 per cent., only 42·884 per cent. of lime could have been present in combination with, or with the power of entering into combination with, the silica, alumina, and iron. As the cement contained altogether 39 per cent. inert matter (including the carbonate of lime) only 61 per cent. could be regarded as true cement. Such a cement, say the authors, would be expected to stand fairly well on a seven days' neat test, and to nearly or quite fail on a seven days' mortar test. The mixture is 61 to 39 to begin with, and when 300 more parts of sand are added it becomes 61 to 339, or 1 to more than 5. We fail to find any novel observations of importance in the contents of the paper, and see no reason why the water expelled at 212 deg. Fahr., and the loss on ignition, should not, with suitable precautions, be estimated from separate portions of the sample. The paper is, however, not without interest for those concerned with cement testing.

Electricity at Glasgow.

THE Glasgow Corporation are to be congratulated on the working of their electricity supply undertaking during the past year. Although out of a gross revenue of some 60,000*l.* there was only 40*l.* to be placed to the credit of the reserve fund, yet, owing to the large amount of interest that had to be paid on money borrowed for new works during the last year, which are not yet working, this represents a very satisfactory statement of accounts. The number of consumers connected has increased 50 per cent. during the year, and the energy consumed has also increased in the same proportion. The Corporation took over the undertaking of the Kelvinside Electricity Supply Company last year, and already they are putting 1,000 horse-power of new plant in the Kelvinside Station to meet the rapidly growing demand in that district. The Committee has drawn up a very elaborate scale of charges for the coming year which, if approved by the Corporation, will induce consumers to enter on elaborate arithmetical calculations to find out which is the cheapest scale for them to choose. In the first system of charging a maximum demand indicator is used as at Brighton, and the tariff is 6d. for the first hour and 2½d., 2d., or 1½d. per unit for all energy consumed in excess of this at pressures of 100, 200, or 250 volts respectively. They are supplying consumers at three different pressures, and hence they offer substantial inducements to get them to accept the higher pressures. In the second system of charging a fixed sum is charged for each lamp installed. If the pressure is at 250 volts then the sum is 4s. per annum per eight candle-power lamp fixed, and 1½d. per unit consumed as recorded by the meter. The third system of charging applies only to those who take a supply for an equivalent of five hours per day or more, and is 2½d. per unit for 100 volts, 2d. per unit for 200 volts, and 1½d. per unit for 250 volts. The Glasgow Corporation have approved of special cheap rates for electricity for domestic and motive power purposes. It will be seen that cases may easily arise where consumers will have considerable difficulty in choosing the system on which they elect to be charged, and an error in judgment may make a large difference in their year's bill. With the 250 volt service at Glasgow the middle main is put to "earth," so that the maximum possible shock obtainable is not greater than 250 volts. It seems highly probable that the Board of Trade will insist on the middle wire being earthed on high-pressure supply systems. This will prevent some of the older supply networks in London from changing over to the higher pressures.

The Sewers of Southampton.

A REPORT by Mr. W. C. Tyndale, M.Inst.C.E., has just been presented to the Corporation of Southampton, and throws a lurid light on the "sanitary" condition of the sewers. If a list were made of all the defects which can occur in sewers, nearly every one would be found at Southampton; insufficient gradients, badly-constructed manholes, lack of ventilation, inaccessibility, irregularity of inverts and alignment, unjointed pipes, influx of tidal waters, antiquated street gullies, are among the defects existing at Southampton. Mr. Tyndale can find scarcely a single redeeming feature. In the words of Alderman Pearce, "the whole system was rotten, and the more they patched it the worse it became." Truly a lamentable confession for an important town like Southampton to make in the last year of the nineteenth century. It is to the credit of the Special Committee that, although Mr. Tyndale's Report was only received on Saturday, August 11, his suggestion that "a comprehensive scheme" of sewerage be at once prepared was endorsed by the Committee on the following Wednesday morning; and it is to the credit of the Corporation that the Committee's recommendation was adopted the same evening, notwithstanding a protest from a benighted Councillor that due notice had not been given by the Committee.

The Architectural Association Curriculum.

THE curriculum of the Architectural Association for the new session has just been issued, from which it appears that the excellent educational facilities for architectural students, which we have referred to in previous years, are again offered to students The work of last session is to be carried on by the same lecturers and instructors, with the following exceptions, *i.e.*, Mr. F. T. Baggallay succeeds Professor R. Elsey Smith as lecturer on Greek and Roman architecture, Division I., and Mr. P. L. Forbes takes the water-colour class in place of Mr. A. W. Weedon. The list of Visitors to the School of Design and Handicraft consists of many of the most accomplished architects of the day, and students are fortunate in having such an opportunity for working under their guidance. The preliminary meeting of the School of Design will be held on October 9, when Messrs. Aston Webb and Beresford Pite will be the Visitors. The Chairman of the Discussion Section for this session is Mr. C. H. Strange and an interesting syllabus has been prepared; the opening meeting will be on October 12.

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The Architectural Association Lectures.

THE opening meeting of session 1900-1901 of the Architectural Association will be held on Friday, October 5, when the President, Mr. W. H. Seth-Smith, will deliver an address and distribute the prizes. On October 19 the annual conversazione will be given. The lectures to be delivered at the succeeding ordinary general meetings are likely to be specially interesting, as will be seen from the following list:—"French and English Cathedrals," by Mr. Francis Bond, M.A.; "The Legal Position of the Architect," by Mr. L. L. Macassey; "The Use of Rolled Joists in Construction," by Mr. A. T. Walmisley; "Colour in Architecture Seen through an Artist's Glasses," by Mr. A. Wallace Rimington; "Hints on the Preparation of Studentship Drawings," by Messrs. Beresford Pite and R. N. Schultz; "Flats," by Mr. Edwin T. Hall; "Cretan Architecture," by Mr. D. T. Fyfe; "Gothic Architecture and the Basis of its Beauty," by Mr. E. S. Prior; "The Paris Exhibition," by Mr. E. W. M. Wonnacott; "Rowton Houses," by Mr. H. B. Measures; "Small Suburban Houses," by Messrs. H. D. Searles-Wood and H. R. Appelbee. The list is not quite complete at present, but, judging from the above, the meetings ought to be well attended and the discussions useful and interesting.

THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.

THIS Association held its annual gathering at Merthyr Tydvil during the week commencing the 13th inst., under the presidency of Lord Aberdare. Though by no means an ideal rendezvous for archæologists, Merthyr possessed claims upon the Cambrian Association which could not be gainsaid, and as the antiquities of the neighbourhood had been practically unvisited by any one of the present generation, its selection was fully justified.

A late start was made on the 14th inst., the route lying to the north of the town, and involving a toilsome ascent of the steep hill that closes in the upper portion of the Merthyr valley. Morlais Castle was the first place visited. The ruins are those of a small but strong defensive post, erected by one of the Norman conquerors of Glamorgan to keep in check the constantly-recurring incursions of the Welsh hill-tribesmen. The country around is broken up into hills and valleys, and must have been exceedingly difficult for military operations during the Middle Ages. These, indeed, must have taken the form of predatory forays and desperate encounters of brave but untrained men rather than of stoutly-contested fights conducted under primitive rules of warfare. Morlais Castle could never have been held by more than a handful of men, for the sufficient reason that there was no room for them, but so strongly is the fortress posted upon a spur of limestone that a very small garrison would be sufficient to hold it against large numbers. The form of the castle was an irregular oval, the walls following the configuration of the ground. The keep was built at the southernmost corner, on the highest point of the space enclosed by the walls, and another strong tower occupied the northern corner, where the ground falls sharply away to the valley below. One side of the oval was defended by a deep moat, but the abrupt descent on the Brecknockshire side of the hill did not call for any such defence. The general features of the castle can be clearly made out, though it has suffered considerably since Buck paid it a visit, as his drawing shows the keep as then standing. A paper was read upon the spot by a local antiquary. Mr. G. T. Clark, in a paper upon the castle, written almost half a century ago and reprinted in his "Mediæval Military Architecture," refers to the recorded account of a quarrel that broke out between Gilbert de Clare, Earl of Gloucester and Hertford and Lord of Glamorgan, and Humphrey de Bohun, Earl of Hereford and Essex, at the close of the thirteenth century, the cause of trouble being the seizure by the former of a border castle which was claimed by the latter as belonging to his lordship of Brecknock. The *locus a quo* is supposed to be Morlais Castle, but this is by no means certain; and, indeed, the claims of another stronghold was on a subsequent day advocated by one of the ablest of Cambrian antiquaries, Colonel W. L. Morgan, R.E. It would have been desirable, therefore, to have had researches made into the public records, which are vastly more accessible at the present day than they were when Mr. Clark wrote. As Wales became pacified Morlais Castle became unnecessary, and its remoteness was against its transformation into a mediæval residence. It accordingly fell into disrepair, and in Leland's time was "in ruin." Mr. Clark found it difficult to refer it to any precise date, but conjectured, apparently more from the general plan of the building than from any other evidence, that it belonged to "the latter period of the Early English style;" and this conclusion may be safely accepted. It may, however, be additionally suggested that historical records will probably be found to show that it was dismantled after the suppression of a serious revolt of a Welsh chieftain in the year 1316.

The party next undertook a long drive along the ridge called Cefn Gelligaer, which divides the Rhymney valley from that of Merthyr. A halt was called at a lonely spot where is a tiny chapel called Capel Brithdir. Here, no doubt, existed from very early times a small ecclesiastical edifice, but of such a building not the faintest trace exists. The present chapel was built upon the site, and no doubt upon the foundations of the earlier edifice, by the present Marquis of Bute. It seems somewhat like looking a gift horse in the mouth to express a regret that while expending money in the complete rebuilding of the ancient little chapel his lordship did not think it proper to make the new edifice a little less barnlike than it actually is. A few yards from the church is a famous inscribed stone commemorating an early Briton who bore the Latinised name of Tegernacus—the Welsh Teyrnog, "kingly," or, perhaps, "of royal race." The stone should be removed into the church, or in some way protected from the pick of the ubiquitous miner or the more gentle but no less destructive agencies of Nature.

The next item upon the programme was Capel Gwladys, of which it was said that "the foundations of this chapel, consisting of west tower, nave, and chancel, within an enclosure, are still visible." Time, however, did not permit of a visit, and the party were left lamenting that the opportunity of connecting this monastic outpost with one of the great foundations of the Vale of Glamorgan had been lost. Considering that ecclesiastical buildings, especially those which might be supposed to mark the site of early monastic foundations, are not numerous in the district, it is unfortunate that the ever-lengthening delays compelled the omission of one or two items from the programme of each day's work. It was, however, necessary at all costs to push on to Gelligaer, a small village on the brow of an eminence commanding the Taff valley. Here, there unquestionably had existed a Roman camp. The site is about midway between Cardiff, where recent excavations abundantly prove the presence of an important Roman station, and Y Gaer, near Brecon, an equally well authenticated Roman camp. At Gelligaer, the Merthyr party were met by a body of members of the Cardiff Naturalist Society, by whom the present excavations are being conducted. The remains were very lucidly explained by Mr. John Ward, the curator of the Cardiff public museum, who had also thoughtfully provided a plan brought quite up to date. The camp, which is as nearly as possible a square of 350 ft., was evidently hurriedly constructed, but certain features seem to show that it was intended for lengthened occupation. Its situation in the Silurian district would lead us to regard it as having been established during the campaign which resulted in the fall of the British chieftain whom we have latterly been taught to call Caratacos, or in the operations subsequent to that British disaster. We know that they retired to their fastnesses after the capture of their leader, and that in the guerilla fighting which ensued they surprised and cut off two cohorts of auxiliaries. Directly the camps at Cardiff and Y Gaer were decided upon, an intermediate station would be necessary; and Gelligaer, without doubt, occupies the site of this stationary camp. The portions at present excavated are the four gates and a section of the northern corner of the camp. The agger consisted of the earth which had been thrown up from the ditch beyond, the earthen rampart being strengthened by retaining walls on both its inner and outer faces. Guard chambers existed on either side of the four portals, and towers, probably very squat, crowned each angle and rose intermediately between the angles and the gateways. The raised sill of the south-west portal is still in situ, and shows the hollows worn by the chariot wheels and the sockets in which the pivots of the great doors turned. Strange to say, the finds have otherwise proved most disappointing, and no trace of an inscription has been met with. It would seem that the camp had been rapidly constructed and as hurriedly deserted, though it may have been again occupied in the latter days of the Roman power in this island. The main reason for its existence would be removed by the pacification of the tribes who dwelt in the district, and as there is no record of their having given trouble to their conquerors after their early subjugation, the above conclusion would seem to be warranted by the silence of history. Of Gelligaer Church it suffices to state that it possesses internally no feature of interest to the antiquary. It has a battlemented tower of two stages containing two small lights dating from the fourteenth century. Not far from the village of Gelligaer the carriages drew up for the inspection of a stone called Maen Cattwg, the stone of Cattwg, anent which a heated controversy is raging in the local prints. The stone, a sandstone boulder, bears no inscription, but has on its surface a cluster of cup-shaped holes of various depths, and the point at issue is whether these depressions are the work of man or of Nature. The visitors were as divided as the local controversialists. The writer of the present notice inclines to the side of the sceptics, but it should be stated that so competent an authority as Col. W. E. Morgan, R.E., late of the Ordnance Survey Department, was strongly of opinion that the cavities had been artificially made, but their purpose could not be conjectured. On the return journey a much too brief visit was paid to Llancaiach House, a fine specimen of a country gentleman's residence built at the opening of the seventeenth century. The builder was a Prichard, a cadet branch of the great Welsh house of the Lewises of Van. This family was intensely loyal to the Stuarts, and it is said on the authority of the Iter Carolinum that Charles I. was sheltered in this mansion in the year 1645. The king's bedroom is, of course, pointed out. Externally the house has been subjected to no alteration, and the substantial manner in which it was constructed has enabled it to withstand the influences of time so successfully as to leave it an interesting study to the student of domestic architecture. The internal arrangements are not so perfect, though there are little, if any, signs of structural alterations. But the timber, especially the old oaken staircase, has been sadly neglected, and is now for the most part past praying for. The domestic appointments were also unusually complete and interesting, and the whole building and its contents would well repay careful description as an admirable survival of the house and home of a country gentleman of moderate estate three hundred years ago. A paper upon the family of Prichard of Llancaiach had been prepared by Mr. Charles Wilkins, F.G.S., and was to have been read upon the site of their greatness, but the indisposition of the author and the flight of time unfortunately compelled its postponement. At the evening meeting, Lord Aberdare, in his Presidential address, dealt with the career of the late Mr. G. T. Clark as railway engineer and, later, as a pioneer of the iron industry of South Wales. With Mr. Clark's important contributions to history and archæology his lordship told his audience that he was not competent to deal. A paper on Llantrissant Castle by Mr. J. S. Corbett was followed by one upon the historic house and family of Van, written by the same gentleman.

On Wednesday the parish church of Merthyr, dedicated to St. Tydvil the Martyr, was visited. Whatever may be the true inwardness of the Welsh traditions respecting the planting and spread of Christianity, the three holy families of Britain, and a host of other ecclesiological and hagiological puzzles, of the truth of which it is advisable to express no doubt whilst in Wales, there can be little question that a church, probably a small oratory at commence-

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ment, was founded on the site of or near the present parish church of Merthyr long before the adjacent parts of the predominant partner had thought of forsaking their heathen ways. The vicissitudes of that tiny church have not been recorded. We do know, however, that about twenty years ago the parish church of Merthyr was a poor, mean, dilapidated structure. Then came a new rector (the present), who called in the late Mr. Pearson, and the building was restored to its present state. An ancient inscribed stone is built upside down in one of the outer walls, and you are gravely assured by inhabitants of ancient days and long memories that the parish church of Merthyr always occupied that site, a statement corroborated by the presence of a squalid churchyard; but a visitor without these evidences might well determine to look for memorials of St. Tydvil elsewhere than upon the site of her second martyrdom. The party went off by train to Pontypridd, and thence by cars to Llantrissant. This little town, which, with Cowbridge and Cardiff, returns a member to the Imperial Parliament, is built upon the first range of hills that rises from the low-lying district of the shire. It may be well here to state that Glamorgan naturally divides itself into the hill country and the plain. The first is termed in Welsh the "blaenau," and the latter the "bro." This geographical conformation has impressed itself upon the social and political history of the county. The plain is the land of the Normans, of the monasteries and of the wealthy homesteads; the "bro" is the land of the Welshman, of the mediæval freebooter, of the minerals. The castles are dotted about here and there, just where the Norman barons found they were wanted in order to keep the Welsh in check. Llantrissant was one of the most southerly of these castles. It is represented to-day by no more than a fragment of its keep, but enough is left to enable us to ascribe its erection to the latter half of the thirteenth century. In Leland's time it was a ruin and a convenient quarry. The history of the borough would probably reveal many points of interest, but it has hitherto only been nibbled at. The earliest extant borough charter dates from A.D. 1346, and an illustration of how, in this country, the old is oftentimes found side by side with the modern is afforded by the fact that until the year 1886 the custom of electing a portreeve of the town was annually carried out by the constable of the castle. The church of Llantrissant consists of a nave and chancel of five arcades. It underwent alteration in the Late Decorated period, and again within recent years. The tower is low, of two stages, and battlemented, and was rebuilt for the greater part of its height in the fifteenth century. A comparatively modern pit for casting the bells has been discovered in the basement of the tower. Built into the north wall of the interior is an effigy which produced some controversy. It is traditionally regarded as the counterfeit presentment of Cadwgan Vawr, sixth in descent from Einion ap Collwyn, one of the Welsh tribal chieftains of about the time of the conquest of William I. The opinion of the visitors, however, was that the effigy represented a palmer, though the figure is girt with a short sword, and has none of the accompaniments of the vagabond class of mediæval England. The figure is dressed in a long robe encircled by a girdle and falling below the knee, where it was fastened A defaced head resting upon a square cushion has been built in above the trunk in such a manner as to lead some of the party to consider the connexion between the parts as purely accidental. At all events, the effigy calls for careful drawing and examination. The font, which is of the thirteenth century, has been adequately described and delineated in *Arch. Cambrensis*, Fifth Series, Vol. XIII., p. 269. An interesting slab, now built into the external wall on the north side, bears a cross the top of which is circular, having the arms of the cross extended to the circumference of the circle and with two smaller crosses, one on each side of the extended arm. The foot of the larger cross has itself been made into a cross by a short lateral cut about two inches from its termination. The whole has an appearance of antiquity which we do not feel sure careful examination would not dissipate. The next halt was at what was termed in the programme St. Cawrdaf's Monastery, but the character of the remains seems to have occasioned considerable local disagreement. One antiquary, while remaining dubious of the nature of the building now in ruins, suspects it to occupy the site of a Roman building, some of the foundations and all the stones of which were used in the construction of the present ruins. Another considers the existing walls to mark the site of deserted cowsheds, and the only point clear to the visitors was that Glamorganshire antiquaries had taken no trouble to settle the fundamental question what manner of building was represented by the few walls and mounds of earth scattered about on a little hill above Miskyn. Whatever may be the evidence for a Roman building, there has evidently, at one time, existed at this spot a small religious house. The church occupied the northern side of the establishment. It seems to have had no transepts, but at the south side of the eastern end was what appeared to be a side chapel, still retaining in its southern wall the remains of a deeply-splayed Early English single light. The cloister situated upon the southern side of the church was so small in area as to occasion doubts of its character. On the northern side of the cloister an entrance leads into the southern aisle of the church, and on its eastern side, at the north-eastern angle, seemed to be an entrance into the chapel already spoken of, which ran behind that side of the cloister. Westward of the cloister was a building which was probably the dwelling-place of the inmates, but this, from the location of the building, is no more than conjecture. Heaps of ruins lie around, especially to the south and west of the structures just described, but time would not admit of their inspection. Sufficient, however, was apparent to show that there exist at this spot traces of buildings which call for careful examination by experts. It is impossible not to speculate upon the character and history of the monastic establishment settled in this beautiful, but retired, situation. Its dedication to St. Cawrdaf —if this can be relied upon, for neither the name nor the site is marked upon the old 1-in. Ordnance map — points to a Welsh foundation erected "before the base laws of servitude began," and there are indications that some of the great monastic houses of the plain country, notably Margam, were born of much humbler parentage in the "bro."

The party hurried away to see the Marquis of Bute's restoration of Castell Coch, in order to do which Castell-y-Mynach House was hurried through and the Llaniltern inscribed stone omitted altogether. Castell Coch, so called from the red tint of its materials, is the southernmost of the fortresses built by the Normano-English barons, it being no more than seven or eight miles from Cardiff. Included with the lordship of Glamorgan, it passed into the possession of the Herberts, and through them to the Butes. It may be described as consisting of three towers, placed as though it had been intended to have had four in the form of a square, but having had one omitted. In the curtain between two of the towers was the hall of the castle, commanding a lovely prospect of the winding Taff on its way to the sea. From the tower at the south-eastern angle, where was the entrance to the tower at the north-eastern angle, the curtain consisted of a solid wall carrying a rampart, but encumbered by no buildings. There is no tower at the north-western angle, the wall being continued upon a curve until it meets the south-western tower; the exterior face of this wall is about 80 ft. in length, and the chord of the arc about 60 ft. Mr. Clark thinks this wall was found to be of insufficient breadth for the use of military engines, and a parallel wall was accordingly built within and against it. The platforms communicated with the various towers, the hall, and the courtyard. The whole has been restored by the present Marquis of Bute in strict accordance, we are told, with what has been ascertained of the original structure. The towers are now capped with dwarf spires covered by red tiles, so that the structure has now the appearance of Moselle Castle dropped down upon the banks of the Taff. We read, however, that before its restoration the tower at the south-western angle was flat-roofed, as were no doubt the other towers, so that the present foreign appearance of the building is a concession to the picturesque. The interior rooms, though following their original lines, as, indeed, they could not well refrain from doing, have been decorated with a lavishness and taste that, to say the least, are somewhat out of harmony with the massive severity and business-like character of the external structure. Time did not permit of the examination of the outer defences, if any now exist. No guide described the fortress, and no one seemed to know anything more about it than the small modicum of information contained in the programme.

Thursday was devoted to the hilly district lying to the north of Merthyr, which forms the southern part of the county of Brecon. A stop was made three miles west of Merthyr to visit a cross cut in the turf upon the hill-side. The guide-book stated that it may mark the grave of an early Goidelic Christian, and in favour of this hypothesis is its name of Bedd-y-Gwyddel. But if a Goidelic Christian was buried here, it is much more likely that his tribesmen would have perpetuated his memory by the more usual method of an inscribed stone. One of the latter was seen a little further on, at a charming residence called Y Vedw Hir, bearing a cross on one of its faces, and ogam notches on one of its angles. The latter are said to represent the letters Gluvoca, which in modern Welsh would take the form of Glywog. A long drive took the party to the ruins of another Castell Coch. At the apex of a diamond-shaped piece of ground above the rivers Lliw and Dringarth, which rendered it practically impregnable on two of its sides, had been built a small castle, the history of which, the visitors were informed by Colonel Morgan, R.E., was a complete blank. It comprised a small tower, an inner ward, another tower at the edge of the scarp, a ditch upon the landward side, and an outer ward defended by a dyke upon the northern side, which was open to direct attack. The principal tower had been vaulted, but the masonry was throughout inferior. Colonel Morgan thought it had been a forest castle, possibly erected by the Humphrey de Bohun, Earl of Brecknock, of A.D. 1295, to safeguard his immense forest of Brecknock, which stretched away for miles to the northward from this point. He was inclined to think the occasion of the quarrel between De Clare and De Bohun, to which allusion has already been made, was the seizure of this post rather than Morlais Castle, which had been visited a couple of days previously.

The party next went on to a stone called Maen Madoc. The stone lies about a mile from the very rough road running from Brecon to Merthyr, along the line of an undoubtedly ancient trackway, said to be Roman in origin. The stone is an immense monolith, bearing an inscription commemorative of one Dervacus. No doubt exists as to the reading, and the party walked back along the Roman roadway to the carriages. Ystradfellte, where lunch was laid in the open air, is a village of two inns and about four houses. It also possesses a church, which, in turn, possesses no feature of interest to archæologists. On the return journey a halt was made at Aberpergwm, in the beautiful vale of Neath, a house famed in Welsh literary annals of the first half of the present century for the able and patriotic men and women who dwelt therein. The owner possesses a very fair collection of armour.

The final excursion was to Cardiff, and upon arrival there a move was at once made to the castle. The present residence of the Marquises of Bute occupies one corner of a quadrangle which has long been regarded as having formed a Roman castrum. Two sides and portion of a third side of the quadrangle still remain in the external form of immense banks of earth; the remaining portion of the third side is taken up with the mediæval castle wall, which has been restored by the present Marquis of Bute; and the fourth or western side is occupied by the range of buildings constituting the modern residence. Very briefly, the history of Cardiff Castle is as follows:—After the departure of the Romans the district seems to have been harried by predatory Gaels, intrusive Teutons, and piratical Scandinavians. Hordes belonging to some of those races, perhaps to all of them in succession, probably occupied the strong defensive position left by the Romans. One body of strangers piled a big bank of earth upon what remained of the stone rampart of the Romans, threw up a mound, and erected a fortalice in the north-western corner of the ancient camp. The Norman, when he came, continued the same practical policy. A stone keep took the place of the stockade upon the mound, whence it still overshadows the grassy enclosure beneath it. The earthern walls on the south and east, and on the north to the point of junction with the keep at the north-western corner, were still further raised

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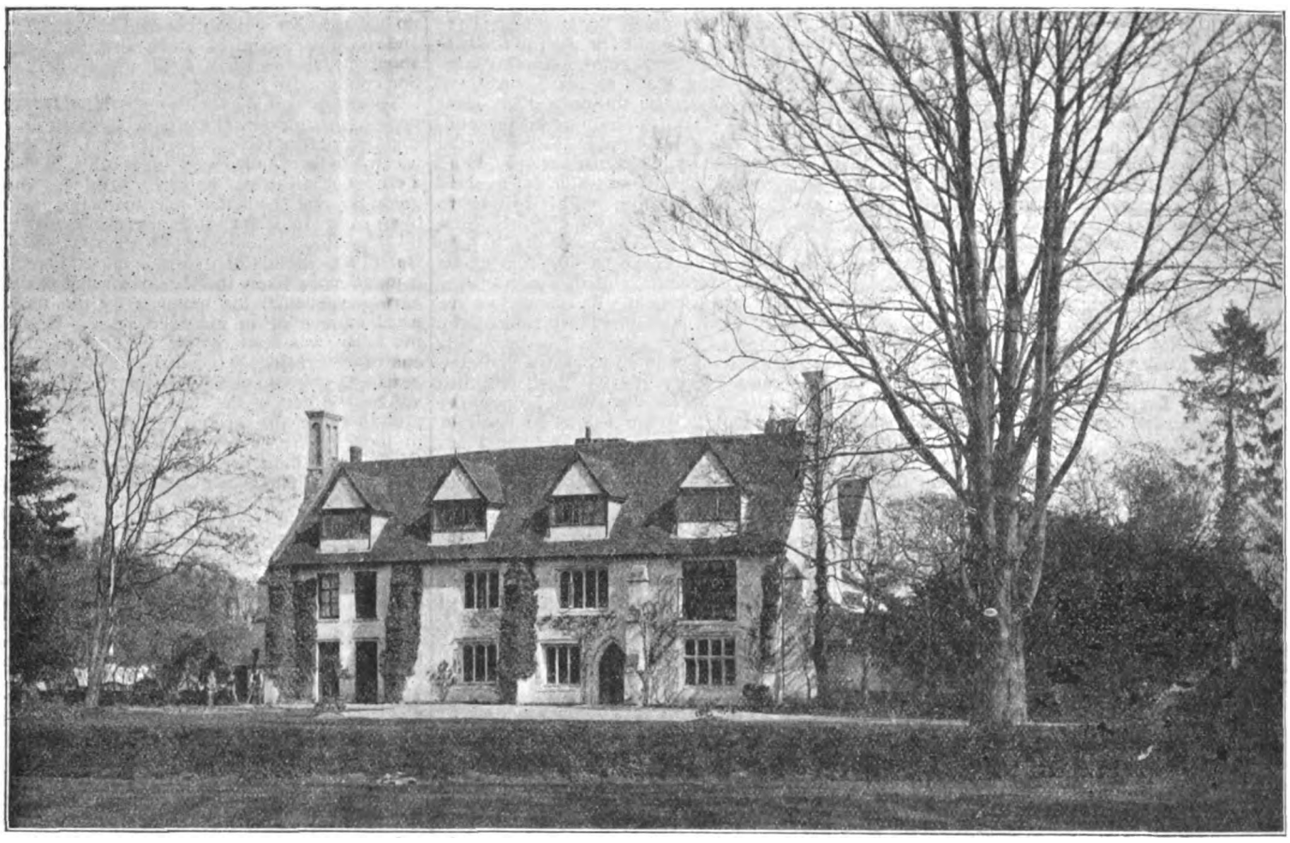

Clare Priory, Suffolk.

the earth being obtained by the re-excavation of the Roman ditch. The enclosed area was divided into two unequal parts by a stout wall which extended from the approach to the new keep to the middle of the southern rampart. In the smaller area thus formed the mediæval dwellings were constructed, and upon its western side stands the modern mansion. The Norman wall has been removed, thus leaving the centre of the enclosure free of buildings, and materially assisting the imaginary construction of the original Roman encampment. The most important discoveries have been made upon the northern side of the camp, where the north gate has been uncovered. This is said to be the most perfect Roman gateway yet brought to light in this country. It was polygonal in shape, and was constructed upon a rounded foundation. The immense mound of earth thrown up upon it after its partial destruction was faced by a strong wall built by the Normans above the Roman masonry. With the exception of the point in the northern rampart where stood this fine gateway, the earthen banks have been suffered to remain, but a gallery has been pierced through almost their entire length the exterior wall of which consists of the restored Norman walling. Beneath lies the Roman work. In course of tracing the line of the mediæval curtain the bastions of the older camp were discovered at intervals; these Mr. Ward, of Cardiff, considers formed no part of the original plan of the camp. After a lucid explanation of the work from Mr. Ward, the party were conducted through the modern house, and a few examined the Norman keep, of which the shell only remains.

A move was next made to the site of a house of Dominican Friars, which is situated within the modern castle grounds. The church and its attendant buildings had practically disappeared, but their several positions have been recovered upon excavation conducted by Mr. C. B. Fowler, F.R.I.B.A. To mark the site in an unmistakable manner, the turf that had gathered over it has been replaced by red tiles, which cover the ground area of the different buildings. The piers of the nave arcade within the church are represented by hollow squares of brickwork, which are contrived "a double debt to pay," inasmuch as they also form exaggerated flower-pots. Many of the tiles bear heraldic designs, said to have been reproduced from the fragments obtained during the excavations, and with the arms of the present Marquis introduced here and there. Later on it was elicited that the site of a Franciscan friary of considerable historic importance, where excavations are in progress, was being treated in a similar manner. It remained unvisited. No effort appears to have been made to trace the history of these religious establishments from public or private records, and consequently all manner of improbable stories are gravely related of them. The house of the Black Friars is stated to have perished during the Glendower troubles, that premature Cromwell having rased it to the ground. It may be that the house was burnt at some time or other, for Mr. Fowler found traces of fire in the ruins; but the names of its inmates at the time of its seizure by King Henry VIII. show it to have been fairly flourishing and to have been a thoroughly Welsh establishment.

A few of the party afterwards visited Llandaff Cathedral, whilst a large number proceeded to Caerphilly Castle. Both bands reunited at Merthyr, where, at a meeting in the evening, the usual complimentary votes of thanks to the local officials were tendered, and passed with acclamation.

It is impossible to speak of the Merthyr meeting of the Cambrian Archæological Association as having proved an unqualified success. The attendance was below the average, the extent of country covered by the excursions was too extensive, the arrangements might have been better, and very little was known of most of the objects visited. The latter, again, comprised no single item of first-class importance with the exception of the Roman work at Cardiff Castle, and of those of minor interest several have been irretrievably spoiled for the antiquary.

ELECTRIC LIGHT, BATTERSEA.—The foundation-stone of a new central electric light generating station, which is to be erected in Lombard-road, Battersea, at a cost of 57,000*l*, was laid on Saturday last by Mr. W. Matthews, chairman of the local vestry. Professor Kennedy is the electrical engineer, and Mr. Stanley Peach the architect of the buildings. It is proposed at the commencement to erect 240 arc lamps, which will be distributed over a distance of 13 miles. The work of laying the mains began on February 5, and out of 13 miles 11 have been completed. All the work is being done by direct employment. If required, it is intended to introduce the light to private houses, and it is hoped to place it within reach of the poorer inhabitants by supplying fittings without prepayment. Commencing with a charge of 5½d. per unit, it is hoped to reduce it to 5d.

CLARE PRIORY, SUFFOLK.

THE illustration of this pleasing old country house was made to accompany our report of the Architectural Association Excursion; but though it was on the line of route and the President and one or two members called at the house, it was not actually visited by the excursion party as a whole, and as we were pressed for space that week we omitted it.

It makes so pretty a picture, however, of "an English home," that it is worth giving independently of the occasion for which it was originally prepared.

The illustration is from a photograph by Mr. T. Stokoe, of Clare.

STOWE HOUSE, BUCKINGHAM.

STOWE HOUSE, near Buckingham, was recently visited by a party of the Architectural Association in an all-day visit. The distance, about sixty miles from town, made the visit necessarily somewhat brief in spite of the late hour at which the party reached London on their return. Thanks to the kindness of the agent, who conducted the party through the house and grounds, the members were able to see everything that time permitted them to visit in detail, as a leisurely pace was adopted which was as delightful as it is unusual in the case of show-places.

The feature at Stowe, besides the great size of the house, is the extent of the pleasure grounds, which may perhaps be best described as a glorified Kew Gardens, with many and more substantial temples dotted about. To visit all these would be a day's work if one lived on the spot, while the task of determining the rightful architect of each might fill up a summer holiday.

There would seem to be a specially large amount of confusion in the accounts of Stowe, and, though the party were in anything but a critical mood, the difference between the front and back façades of the house sufficed to give rise to some suspicions as to the unity of the design. It appears, in fact, from a comparison of Seeley's account of 1769 with that by Britton and Brayley of 1801 that the whole south front is a mask added on to the older house at apparently the later date. The quadrant corridors of the north or entrance front may also well be of the same period, leaving a core of old house of a recognisable eighteenth-century character.

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The great length of Stowe is one of its main features; it is usually given as 916 ft., but, architecturally speaking, the garden façade would not appear to be more than 450 ft. at the outside, so that the rest must be made up in offices and courtyard walls, &c. This great length would appear to be the result of additions, of which the drawings in Seeley show traces. The garden front in 1769 was a broken-up, possibly picturesque, group having a central portico, flanked by two towers, a feature repeated on a smaller scale at either end.

If the grand façade is only of 1801, it is a remarkably good piece of work for that date. It is bolder in character than Adam work, with which it has some affinities, while the mouldings and details are more carefully executed than would be usual with Wyatt, whose name has been mentioned in connexion with the design. In this uncertainty one authority gives the credit to the noble client, but the disbeliever in amateur architects may reflect that some Italians were there to help.

Thus, Signor Borra is mentioned in the account of 1769 as adding to Kent's work, while Signor Valdre appears in that of 1801. To the latter is assigned the great oval saloon, with its frieze after a Roman triumph surmounted by a top-lighted dome that exhibits the working-out of an interesting geometrical problem, arising from the adjustment of a true oval skylight on to a truncated dome, presumably of a different curvature on plan. The entrance hall behind this central saloon, an apartment 36 ft. by 22 ft. 9 in., has a painted and coved ceiling, certainly of Kent's work, as it resembles work of his such as that which we see at Kensington Palace.

A much greater man, Sir John Vanbrugh, is mentioned as the author of some of the garden temples, but nothing was seen that looked very characteristic of him, unless it were the two bold pavilions, each about 28 ft. square, and large in scale for their design, placed on the main or Oxford avenue up to the house. One of these is the agent's house, being now in two stories, obtained possibly by the insertion of a floor. They would seem originally to have been connected by a gateway, designed by Kent, but cleared away by Signor Borra, who is said to have altered the pavilions, but in what way is not clear, unless he inserted the floors, and perhaps added the quadrangular dome with circular lantern over, which now crowns each block. The temples of Bacchus and Venus are also ascribed to Vanbrugh. The first is a rusticated temple about 20 ft. by 18 ft. inside measure. The rustication extends into the spandrel of the pediment, ignoring the cornice below, which is a strange feature of the design. This structure is flanked by some picturesquely sculptured terms. Of the temple of Venus the party could only notice the grouping at a distance. It has a raised centre with quadrant arms and boldly advanced wing blocks, having pediments on four faces. It attracted attention because whereas the weakness of the great south façade is the want of a stronger centre, and this little design shows just that sense of grouping and outline on which the fame of Vanbrugh will always depend, and which excuses the thousand and one defects of detail in his work that are so easy to point out.

The buildings in the gardens are of very varied merit, some being poor and amateurish in design, but that one which is now used as a museum was particularly noticed, as an elegant classical composition, with a point or two in the treatment of its detail that showed a close study of the problems of design in that style. It consisted of a domed centre with quadrant colonnades to the wings. This might be a work of Sir W. Chambers (?).

The interior of the house naturally excited the greatest interest. Owing, however, to the various changes, the names of the apartments are differently given, rendering the descriptions somewhat difficult to follow. A general idea of the great suite of rooms embraced by the grand southern façade of about 450 ft. in length may, however, be given as follows:—On the extreme left a state bedroom (or crimson drawing-room ?), Greek cross in plan, with closets in the angles. This apartment is hung with crimson damask and ornamented with gilded Corinthian columns, and has on the ceiling the Garter, in relief and in heraldic colouring, as a centre-piece. Needless to say, this is a masterpiece of bad taste on the part of the amiable Kent. Signor Borra is reported as completing the work.

Next is a tapestry-room, illustrating the Siege of Liege, leading into a gallery 70 ft. by 25 ft., also called the State dining-room. This apartment is hung with Brussels tapestries and has two marble mantelpieces with wood carvings by Grinling Gibbons, treated as bronze panels. There are seven windows in the length, and it forms the curtain block between the raised wings and the centre mass of the façade. The latter comprises the great oval saloon (60 ft. by 43 ft. by 56 ft. 6 in. high), fronted by the hexastyle Corinthian portico, and flanked on either side by the State drawing-room and the music-room. Each of these is 50 ft. by 32 ft. by 22 ft. high, and is end lit towards the south with semicircular apsidal recesses at the back.

The corresponding curtain block on the right of centre is the great library, book-cased to the ceiling on three sides, with a light gallery at half the height along the cases. The ceiling has a cove sunk with octagonal coffering, the centre flat being richly ornamented in running bands of plaster-work relief.

The end block comprises three apartments, the blue and green drawing-rooms and a State bedroom (?).

The exigences of the old building doubtless account for the many blank windows, skilfully disguised, however, in the masking façade. The treatment is in two orders, the major Corinthian and the minor Ionic, both standing on a rusticated basement. There are thus thirty-one steps in two great flights up to the central portico of six columns of 3 ft. 7 in. diameter. They are advanced one bay of the intercolumniation, while the back wall is also well recessed, so that a grand effect of space within the portico is produced, and as the oval saloon behind is solely top lit, there are no windows to break up the background of the order; there is only a lofty door in the centre giving access to that apartment.

The line of the wide-spreading steps and of the portico is kept by a balustrade with copper vases on its dies, the space within, along the whole front on either side, being laid out formally with gravel paths between the box-clipped borders of the geometrically patterned beds.

It is interesting to recollect the impressions of this great house recorded by Sir Gilbert Scott, who was a native of Gawcott, about four miles from Stowe. After mentioning that to the great house the family made an annual pilgrimage each June, he goes on to say: "To us the approach was from the garden front, which is the great architectural façade, and looks south. Here the entrance is by an octastyle (*sic*) Corinthian portico, approached by a lofty flight of steps rising the height of a basement story. I well remember the kind of awe with which this stately approach inspired me, and how vast it appeared to my young imagination." And in another place: "the House was in point of fact a palace of delight, a wilderness of vertu and magnificence, of which upon the whole I have not seen an equal." He sums up his recollections by speaking of the noble owner of that day as falling under the curse of the man who lays field to field, ruining himself in purchasing estates with borrowed money, the interest of which exceeded the rental.

This brief article hardly conveys the extent and variety of Stowe even in its present condition. It is a subject that might be taken up in detail, in the absence of drawings and definite information, as to the exact architectural development of this great mansion.

HOUSES FOR AGRICULTURAL LABOURERS.—At the Wirral and Birkenhead Agricultural Show, the President, Mr. W. H. Lever, in the course of his address, remarked that, although the landowners and farmers were paying every attention to machinery and the production of crop, very little had been done towards providing the agricultural labourer with proper houses. To show what could be done in this direction, he was prepared to hand over to the committee a sum of 50*l.* a year for three years to be offered as premiums for the best plans or models of cottages suitable for that purpose.

BUILDING REGULATIONS IN THE SPEN VALLEY.—The Cleckheaton District Council met on the 14th inst., when the General Purposes Committee reported that they had instructed the clerk to call the attention of the Local Government Board to the disadvantage suffered by the town owing to the variation of building by-laws as between this and adjoining districts, with special reference to the building of back-to-back houses, and to suggest that the by-laws of the several districts should be identical. The resolution embodying this instruction had received the unanimous assent of the committee, and the minute was duly confirmed by the Council.

BUILDING TRADES GIFT TO THE NATION:

HOMES FOR DISABLED SOLDIERS.

WE are asked to announce the following further list of contributions to the Building Trades Gift to the Nation:—

	£	s.	d.
The Birmingham Master Builders Association (first instalment) (per Mr. W. Sapcote)	200	0	0
Workmen of Messrs. Perry & Co.	33	2	7
Mr. Paul Rhodes (Leeds)	9	14	6
Messrs. S. Goodall & Son	5	5	0
Workmen of Messrs. T. & W. Ide (per Mr. J. McMullon)	5	1	0
Workmen of Messrs. Perry & Co.	4	8	11
Employees of Messrs. S. Goodall & Son	4	8	0
Messrs. Harrison & Spooner and Workmen	3	18	0
Workmen of Messrs. Battley, Sons, & Holness	2	16	10
Mr. John Radford and Fellow-Workmen	2	16	0
Mr. J. F. Collinson and Workmen (Teddington)	2	12	0
Mr. Henry Child and Workmen	2	8	1
Workmen of Messrs. Matthew Bros. (per Mr. J. H. Perkins)	2	7	6
Workmen of Mr. A. Bothwell	2	2	0
Employees of Messrs. Lancaster & Co.	2	2	0
Mr. S. Spencer and Workmen	2	2	0
Messrs. F. Nicholls & Son	1	8	0
Mr. W. H. Quarterman and Workmen	1	7	6
Workmen of Messrs. Brown & Sweetland, New Southgate	1	5	6
The Cadogan Ironworks and Men	1	5	0
Employees of Mr. W. Banks	1	0	0
Mr. Wishey and Employees (per Mr. J. M. Hillam)	1	0	0
Mr. J. McLean, Canada	1	0	0
Mrs. McLean, Canada	1	0	0
Mr. Arthur Webb and Workmen, Stratford		17	0
Workmen of Mr. J. W. Heeps		7	0
Mr. W. A. Osborn		5	0
Workmen of Mr. T. Jones, Putney		4	0
Workmen of Mr. E. Haydn, Ryde		3	6

INTERNATIONAL HEALTH CONGRESS, PARIS.

THIS Congress began its sittings at the École de Médecine on August 10 and concluded them on Friday last week. About 2,000 members and delegates were present, among the principal Honorary Presidents being the President of the Council, M. Waldeck-Rousseau; the Minister of Commerce, M. Millerand; the leading Government and Municipal officials of the Department of the Seine and the City of Paris, Dr. Bergeron, M. Emile Trelat, Professor Corfield (Great Britain), Dr. Bartolette (U.S.A.), Dr. Kohler (Germany), Dr. Pagliani (Italy), &c. The President of the Congress was Professor Brouardel, and among the Vice-Presidents were M. Bechmann, Chief Engineer of Roads and Bridges, Dr. Cornil, Dr. Lande, Dr. A. J. Martin (General Secretary), &c. On the opening day two sittings were held, a morning one at which Dr. Martin gave details of the programme of proceedings as finally fixed, and the sittings of the sections, which were all held in various halls and lecture-rooms of the School of Medicine; and an afternoon sitting formally to inaugurate the Congress and to give a welcome to the delegates. The delegates were also invited to a State reception held in the afternoon at the Elysée, when the President of the Republic and Mme. Loubet received in State the Shah of Persia and his entourage and a large number of other distinguished visitors, with several thousands of the delegates to other congresses being simultaneously held in Paris.

The first sittings of the sections of the Health Congress, which numbered eight, were held on Saturday, the busiest section, and one of the most important, No. 3, occupying itself with questions of salubrity and the sciences of the architect and engineer applied to sanitation. In other sections bacteriology; insanitary houses; cremation; military, naval, and Colonial hygiene; sanitary legislation, administrative and international; hygiene of ships, railway trains, and other modes of transport; and finally, health statistics (demography) were questions discussed.

Water Supply of Towns.

Of the third section, one of the most numerously attended, M. Bechmann was President, and M. Félix Launay (Engineer of the Sanitation Works of the Seine) Secretary, the latter reading the first paper on "The Protection and Purification of the Sources of Water Supply

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of Towns," which formed the basis of several days' discussions.

M. Launay presented the various points to be considered in a long paper. He said the question of legislation for the protection of sources of water supply was studied in England from 1866 to 1876, the Rivers Pollution Prevention Act of the latter year being the outcome of that study, which prescribed heavy fines for infractions of the Act.

In France the matter was much less advanced, the towns which had taken up the question of the purification of sewage being extremely few. M. Launay declared his opinion that the cases were very rare in which the refuse water of factories or the contents of sewers could be tolerated in streams. With regard to methods of sewage treatment, M. Launay declared his preference for irrigation systems where local circumstances permitted, but the systems of Mr Dibdin, and of Messrs. Cameron, Martin, & Co., which appeared to have given good results in England, might be substituted with the notable advantage that they avoided the difficulty of accumulations of sludge. Other methods of treatment were passed briefly under review.

With regard to the question of protection of sources of supply, he said it was not sufficient to have captured pure water; means must be found to keep up its purity. Legislation for the purpose of protecting sources of supply could not be too much insisted upon. The protection given should include as extensive an area as possible round the head of supply, and a sufficiently large protected zone should be regarded as a *sine quâ non* by Municipalities. The conclusions of a commission appointed to study this matter had demanded that a body of analysts and geologists should be organised to study chemical analyses and bacteriological reports of such sources, the State to bear all preliminary charges. A Bill would be submitted to the Chambers shortly to accomplish this purpose. The proposed Bill provides that when the deaths in a district exceed 22 per 1,000 the fact must be called to the attention of the administrators of the Department by the communal authorities, and the former must institute an inquiry into the sanitary condition of the district. Some experts go so far as to declare that it is impossible to reach perfection in providing great towns with a source of supply by the ordinary methods, and this desideratum will only be certainly attained when water for drinking purposes is manufactured artificially or is purified by chemical processes. It is in this direction that the sterilisation in bulk, of water for alimentary purposes has been suggested, either by utilising the oxydising properties of ozone or those of chloric peroxide. But it would, under such systems, have to be first settled whether they would do well to destroy only the pathogenic microbes and whether it would not be useful to leave inoffensive microbes. Would it not be better to endeavour to procure the purest possible source of natural supply and then to protect it from every kind of contamination? In summarising the paper at its conclusion, M. Launay suggested that the Congress should adopt a resolution, to be forwarded to the authorities, tending to procure the passing of the proposed Bill by Parliament with a double object: (*a*) the purification of rivers, the sanitation of town by treatment of sewage, and the utilisation of the contents of sewers; (*b*) for the supply of towns and rural districts with water for drinking purposes.

The propositions when formulated were discussed at a combined meeting of Sections I. and III., held on Thursday, August 16. Many of the speakers in the discussion were in favour of adding a third clause requiring that water at the point of delivery to the consumer should be sterilised. Eventually the resolution formulated as under was adopted. The Congress expresses the desire that Government should promulgate and apply effectively legislative measures (1) for the protection of streams against the refuse water of towns and factories; (2) for the defence and the preservation of the purity of waters utilised for the supply of towns, and if the water supply be suspected, or the water be contaminable, it ought to be sterilised.

The most important subject discussed in this section on Monday was the sanitation of the interior of houses connected with the public sewer; necessary regulations and appliances to secure efficient inspection and observation; reports being presented on the subject by MM. Lacau and Masson (Paris), and Mr. Alfred Roechling (Sanitary Engineer, Leicester). M. Lacau (Architect and Vice-President of the Society of Sanitary Engineers and Architects of France) and M. Louis Masson (Engineer of the Paris Sewerage Works) held that all sanitarians are now agreed that pure water, pure air, and abundant light are the three essential, indispensable factors in the salubrity of the house. The first preoccupation of the sanitary engineer and architect ought therefore to be, how to supply pure water and salubrious air throughout a dwelling-house. Admitting that the question of a pure supply has been solved, it remains to ascertain whether there is not some risk of contamination from contact with sources of impurity. It is necessary to get rid as rapidly as possible of all refuse matters, whether from the kitchen, the bath, or the closet. Ventilation was intended to supply pure air in abundance, and it had been amply treated by Sir Douglas Galton, of London, and M. Emile Trelat, of Paris, in previous congresses, but their salutary teaching had not produced sufficient practical application in the habitation, which still remained, to a great extent, unendowed in this respect.

With regard to the disposal of house refuse, the method of burning it on the spot was preferred, for which these experts say it is only necessary to have a furnace of special design in the kitchen to permit of the rapid cremation of the detritus without smell or emanations. The conclusions of the report generally agreed with the opinions of the most advanced experts in England, but the reporters' views upon the merits of the disconnecting trap will hardly be accepted by English sanitarians. They regard the direct connexion of the house drains and pipes with the public sewer as preferable to the disconnecting system, which they thought had been adopted in England on account of the defective form of English drains. It was admitted that if sewer air is considered as the vehicle of infectious germs the employment of disconnecting devices gives the greatest security, but this was declared incompatible with our present knowledge of the principles of the propagation of diseases, and they claimed that security can be obtained by means which have not the inconveniences of the disconnecting system. An old experiment at the Sanitary Institute was cited to prove that from 20 to 60 per cent. of matters from a water-closet may remain in the trap, the average being about 30 per cent. Powerful flushes which imply a great waste of water are necessary where the trap is used. The conclusion was arrived at that the disconnecting trap ought to be suppressed, and that to ensure proper ventilation in the pipes and house drains the prolongation of rain and other pipes will suffice if the orifice is left free. The air will thus constantly circulate through the conduits of the house, and the public sewer, and the oxygen present will burn the noxious microbes as they are produced.

In the discussion which followed, the disconnecting trap was defended by Mr. Alfred Roechling (Leicester), Mr. A. Smith (London), and other speakers. Mr. Roechling said it had been stated in the paper that the sewers in England were poorly constructed, a good deal of gas forming in them in consequence of their defects. He maintained that it was not so, and took a strong objection to the statement. There were a few cases, especially in the older parts of London, where the sewers were not so good as they might wish to see them, but where newer they were more scientifically carried out. As a rule the sewers in England were as good as they could be made, and they were managed as efficiently, if not better, than in other countries. It had been stated that in experiments made at the Sanitary Institute as much as 50 per cent. of foul matters had remained in the disconnecting trap, but it had not been stated that these experiments were connected with a water-closet, which was equivalent to a water-closet placed in a cellar. If we in England had houses of five or six stories high as in Paris, inhabited by from sixty to 100 people, and each person supplied with 60 gallons of water per day, the flush would be more than sufficient to clear away all deposits in the disconnecting trap. It was clear that if in the actual conditions under which the experiments were made only 50 per cent. of deposit remained in the trap, nothing at all would remain in it under ordinary circumstances. The experiments referred to might with greater justice be cited as an argument in favour of the adoption of the disconnecting trap as in England.

Mr. Adolphe Smith cited a case occurring at Maidstone during the late outbreak of typhoid in that town as an illustration of the danger of connecting the system of conduits in the house directly with the public sewer, as recommended in the report of Messrs. Lacau and Masson. If sewer air was not the direct vehicle in the propagation of disease, the breathing of impure air was a predisposing cause of disease, particularly when it took place in sleep, as appeared to have been the case in the instance of the propagation of typhoid referred to as occurring at Maidstone.

In the paper on the same subject subsequently read by Mr. Alfred Roechling, which was in French, the author laid down two rules as essential to ensure in a house the best sanitary conditions—first, to exclude all sewer gas; and second, to run as rapidly as possible into the public sewer all fæcal matters and refuse water produced in the house. The last of a series of conclusions proposed to make it obligatory on the part of Local Authorities, who prohibited the use of disconnecting traps, to ensure the proper condition and effective working of all the conduits in a house by undertaking the inspection and the cleansing of such conduits. The conclusions proposed were not adopted by the Section on the ground that they were either already generally admitted or were not of proved utility.

At the third sitting of the Section three important papers were discussed, each based upon the report of experts selected for the purpose by the Committee of Organisation. They were M. Emile Trelat, on the principles of road and street regulations in towns; M. Armand Gauthier and Professor Gréhant on the salubrity of the atmosphere in towns (smoke, dust, and noxious gas prevention); and M. Pucey on the distribution, aëration, and decoration of the interiors of dwelling-houses. A long and animated discussion was evoked by the report of Messrs. Armand Gauthier and Gréhant, in which M. Lacau, architect, &c., Dr. Berthod, Mynheer Symons (Holland), Mr. Adolphe Smith (London), M. Vaillant, Dr. Zahor (Prague), and several other speakers took part. The history and results of experiments, made principally in France and England, bearing upon the subject of combustion, were presented, the list ending with those found by a committee appointed to examine and report upon the smoke-consuming apparatus exhibited at South Kensington in 1882. These experiments were conducted by Professor Chandler Roberts, whose researches enabled the Committee to classify the different apparatus shown according to their smoke-consuming efficiency. The subsequent experiments made by M. Armand Gauthier on the atmosphere of Paris, the phenomena observed in the vicinity of the high furnaces of Cleator Moor, near Whitehaven, the experiments of Claude Bernard and of Professor Gréhant on the effects upon the blood, of breathing oxide of carbon and the gas in mines, were discussed in the report. The chief conclusion was that the insalubrity produced in the atmosphere of towns was much less redoubtable than might have been supposed *a priori*, but local causes might cause a dangerous accumulation of certain gases in certain quarters and certain houses near great factories or in densely populated places. The penalties imposed by the English laws on smoke abatement were generally approved by those who took part in the discussion. The Section eventually adopted the following resolution, proposed by M. Lacau:—"All the rooms of a dwelling ought to be perfectly ventilated. The air in it ought to be continually renewed, in winter as well as in summer, by the various means adopted for different climates, on the sole condition that no injury shall result from it to the health of the occupants."

At the last sitting of the Section, held on Friday, August 17, a large number of communications, written and oral, were considered. Among them was a proposal from M. Sormani recommending that in hospitals built on the pavilion principle, the longer axis of the buildings should be from north to south, in order to give the greatest amount of sunlight. M. Pütz eys (Belgium) said that in Belgium no such general proposition would be accepted, because it was necessary to take into consideration the prevailing direction of the wind which differed in different localities

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Dr. Mansel Howe presented a communication on the importance of good plumbers' work in maintaining sanitary conditions in dwelling-houses, and concluded with a resolution that only plumbers possessing certificates of competency from some properly constituted body of experts should be entrusted with the execution of plumbing work in connexion with the sanitary arrangements of houses. This was adopted by the Section, after incorporating an amendment, proposed by Professor Corfield (Vice-President of the Congress), providing that plumbers possessing such certificates of competency should execute plumbing work of the kind under the direction of competent professional men (such as architects, engineers, or other experts). A communication from Mr. S. H. Adams, of York, upon the bacterial treatment of sewage according to various English systems, a resumé of which was given in French by Mr. Adams, was listened to with great interest by the Section. The communication was illustrated by photographic views showing types of bacteria beds in England; of the Dibdin one-acre filter at Barking; of the Sutton beds of double contact type, the Hampton Works of triple contact type; and the author's own automatic apparatus for operating such beds. One of the views illustrated Colonel Ducat's aerating filters as working at Hendon. A cordial vote of thanks was tendered to Mr. Adams by the Section, which soon after concluded its sittings with a vote of thanks to M. Bechmann for his conduct in the chair, which was proposed by M. Emile Trélat, and seconded by Dr. Conrad, one of the delegates for Holland.

At the closing meeting of the Congress, held on Friday afternoon, all the presidents, vice-presidents, and secretaries of Sections assembled in general meeting under the presidency of Professor Brouardel, when the resolutions of the Sections were passed in review, and in one or two cases were modified before being confirmed. The final act of the Congress was the selection of Brussels for the meeting of the next Congress in 1903, a proposal which was warmly acclaimed and assented to, M. Pützeys acknowledging the honour on behalf of the King of the Belgians and his government.

THE BRITISH FIRE PREVENTION COMMITTEE:

TESTING OPERATIONS, 1899-1900.

WITH the close of the British Fire Prevention Committee's summer session the Chairman, Mr. Edwin O. Sachs, makes the following announcement regarding the fire tests carried out under the auspices of that body:—Since the Committee's incorporation, *i.e.*, during a period of eighteen months, there have been twelve tests with fire-resisting floors and two with ceilings, and there have been nine tests with fire-resisting partitions. There have been no less than twenty-three tests with different forms of wood and iron doors, and eight with various forms of glazing. Besides this there have been several odd tests with treated wood, with fire curtains, fire blinds, girder coverings, and safes. Altogether the tests number sixty-three. The reports on these sixty-three tests are embodied in forty-four publications, many of which are illustrated.

An analysis of the attendance at tests shows that, including the representatives of the Council, Executive, the various sub-committees, and the deputies of the general body of members, the attendance averaged at about forty. The working members of the Council were primarily Sir John Taylor, K.C.B. (H.M. Office of Works); Mr. Arthur Cates (lately Crown Surveyor), and Major-General Festing, F.R.S. (South Kensington Museum). Speaking generally, the testing station required the attendance of the Executive or its sub-committees practically once a week throughout the year, and the heaviest work fell on the shoulders of Messrs. Max Clarke, Hammond, Marsland, and Goad; whilst Mr. F. R. Farrow assisted on behalf of the commercial section on almost every occasion. Throughout the work the Executive has been ably assisted by their superintendent, Mr. Thomas Kissack, and by Mr. Taylor, the assistant secretary. As has already been announced the Committee has had to move its plant to new premises owing to the site on which they are now located at Regent's Park being taken up for railway purposes.

Correspondence.

To the Editor of THE BUILDER.

A HOUSE BY GIBBS IN LEICESTER-FIELDS.

SIR,—Can any one of your readers fix the situation of the house which James Gibbs (1682-1754) built in Leicester-fields for Sir Phillip Parker Long? Long's-court, until recently, was entered from the south-west angle of Green-street, Leicester-square, and from St. Martin's-street, lying around the north and east sides of the house, now No. 35, St. Martin's-street, which Sir Isaac Newton occupied from 1710 to 1725. That house in 1709 formed the Danish Embassy. Gibbs was in Italy in 1707, and, it seems, first settled in London in 1709 or 1710. I gather that he built the house for Sir Phillip Long in or about 1730. D. M.

THE ROYAL ARCHITECTURAL MUSEUM.

SIR,—For every good reason criticisms as to the present condition and future possibilities of this valuable institution are to be welcomed, and while it has been necessary to correct some erroneous statements which have appeared of late in the public press, I am sure the Council will be quite prepared to give their best consideration to any practical suggestions tending towards the improvement and increased utility of the Royal Architectural Museum.

It would exceed my duties to anticipate in any degree the work of the Council, but I may say that in the near future, after the vacation, it is hoped, when the Council meetings are resumed, some practical proposals may be determined on with a view of furthering their much desired object. The purport of this letter is to solicit opinions and proposals from architects and non-subscribers on the lines indicated.

No one can have been associated with the maintenance of this great collection of Gothic art without realising the need of its development on the one hand, and the lack of interest displayed in its welfare by the majority of the profession on the other. That these conditions are essentially inimical goes without saying.

To ask, however, for monetary aid during the period when the institution was in financial difficulties was quite hopeless, and any chance of augmenting the collection was then equally out of the question. The Museum is no longer hampered by debt, and the current expenses of the School of Art are more than covered by its income.

Architects and others are not invited to assist in a lifeless project or interest themselves in a dead cause. Whatever may have been the failings and shortcomings of the Gothic revival, it would indeed be a sorry day for the architecture of the future should students cease to make themselves acquainted with the best work of past periods and styles, particularly with the national style of Gothic, as represented by the masterpieces of architectural art got together with so much disinterested and loving zeal by the founders of this Museum for the sole purpose of facilitating such an intimate study of old work.

To meet contemporary needs it is clearly necessary to bring the collection more up to date and more in line with the types of design more currently in use. No doubt, had it been possible, it would have been a good thing to have supplemented the mediæval examples with specimens of Classic work and Renaissance detail some years ago. It was not possible under the circumstances, seeing that space, money, and the co-operation of architects and others were all in turn wanting, when for a good while every available effort had to be made to prevent the collection from being broken up and the premises closed entirely.

We are now free of that danger, but it must be admitted that the Museum is not realising in so complete a way as it might the special intentions of its foundation. With the affiliation of the Museum with the Royal Institute of British Architects and with the Architectural Association it ought to be relatively easy to vastly enhance its utility. At least such a project might form the basis of a central University of Architecture, for it remains a subject of much regret that architects have no such premises as the Institution of Civil Engineers or the Surveyors' Institution.

To those whose professional careers were more or less inspired by the enthusiasm of the Gothic revival it should be hardly necessary to recall the reality and thoroughness with which those who took part in that movement were animated. There is no need now to recount the history of the Gothic revival, in the origin of which the hopes of the future seemed to be centred in a rekindling of mediævalism. The thoroughness of those days, however, must be ever associated with the aspirations and principles so ably represented by Pugin, Scott, Burges, Street, and Butterfield. The best work of to-day is done by men in some degree actuated by the influence exercised by these enthusiastic workers, and for the evidence of the truth of this assertion instances scarcely need be quoted.

Drawings and plastic copies of old work may be cynically described as "the dry bones of architecture," but by the very nature of things they serve as the grammar of the art, without a knowledge of which no articulate expression or individually developed work is ever likely to be produced.

Such a collection as that already to be seen at Tufton-street must consequently have its uses at least as an index for reference. Those who love their art and realise therefore a keen pleasure in its development will, I am persuaded, afford a helping hand in thus making the Royal Architectural Museum worthy of its aim, a credit to the profession, and as useful as comprehensiveness can make it. A building ennobled by good sculpture obtains a charm secured by no other means. The inclusion of such names as our new President, Mr. Wm. Emerson, P.R.I.B.A., and Messrs. Aston Webb, A.R.A., John Belcher, A.R.A., G. F. Bodley, A.R.A., and George Frampton, A.R.A., among the Vice-Presidents should be an assurance of the Council's desire to perfect the Museum for the good of the greatest number and for art especially.

MAURICE B. ADAMS, *Hon. Sec.*

ACETYLENE *v.* GAS.

SIR,—In your issue of the 4th inst. you refer to the misleading statements of the makers of acetylene generators who represent that acetylene gives a light fifteen times greater than that obtained from coal gas.

As representative of the Giffre Electro-Chemical Company, Limited, an English company owning certainly the largest carbide works in Europe, I have had some little experience of acetylene, and should be obliged if you would spare me space to point out that the said makers do not overstate their case so very much.

Taking the figures recently published by Professor Vivian Lewes, Chief Gas Examiner to the City of London—and I take them, because I have noticed that Professor Lewes does not certainly show any undue bias in favour of acetylene as compared with coal gas—we find the following results of photometric tests:—

Flat-flame Burners for Coal Gas.

		Candles per Cubic ft.
Batswing Burner	No. 7 yields	2·44
„ „	No. 6 „	2·15
„ „	No. 5 „	1·87
„ „	No. 4 „	1·74

The same authority gives the following figures for acetylene:—

Bilwiller burner.	No. 5	of 76 c.p.,	yields	38	candles per ft.
	No. 4	48 „	„	49	„ „
	No. 3	28 „	„	37·3	„ „
Billwiller all steatite.	No. 5	36 „	„	36	„ „
	No. 4	30 „	„	37·5	„ „
	No. 3	30 „	„	40	„ „
	No. 2	20 „	„	33	„ „
Schwarz half-moon type.	No. 5	34 „	„	37·7	„ „
	No. 4	36 „	„	36	„ „
	No. 3	30 „	„	30	„ „
	No. 2	18 „	„	36	„ „

Professor Lewes is careful to point out himself that "he is perfectly aware that these results are in many cases far lower than the results claimed," and I may mention that I have before me the figures for a very large installation in Germany (using acetylene generated on proper principles and properly purified), showing better results from burners which had been in use a year and a half without cleaning. Even Professor Lewes's figures show, however, that the smaller (No. 2) acetylene burners give over fourteen times as much light per cubic foot as the largest coal-gas burner. If we take further Professor Lewes's figures for the Union Jet coal-gas burner, largest size (No. 7), giving 2·09 candles per cubic foot, the comparison in favour of the No. 2 acetylene burner is as about 16½ to 1.

Now, as to incandescent mantles. The same authority states on page 508 of his recently-published work that the Welsbach large mantle gives 16·6 candles per foot of coal gas of 16 candles *measured horizontally*. In these last two words lies the pith of the whole matter, for, except in the laboratory or the shops of the Welsbach Company, the incandescent mantle is practically never placed so as to be on a level with the object it has chiefly to illuminate; on the contrary, it is nearly always much nearer a position vertically above the object—at any rate, for domestic uses.

Professor Lewes himself states that in domestic use "the illumination shed upon our book or writing is derived from a source at from 40 deg. to 90 deg. above it," and he gives the following results to show how the candle-power goes down as the object illuminated is placed more and more beneath the horizontal:—

Horizontal—Welsbach	16·6 c.	Acetylene	40 c.	per ft
Angle of 20 deg.	„ 16·0 „	„	40	„
„ 40 deg.	„ 11·1 „	„	38	„
„ 60 deg.	„ 2 „	„	30	„
„ 70 deg.	„ (unreadable)	„	26	„
„ 80 deg.	„ „	„	20	„
„ 90 deg.	„ „	„	5	„

From this table it is evident that at an angle of 60 deg., the angle probably most used for domestic purposes, acetylene gives fifteen times as much ligh

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as a Welsbach mantle; as a matter of fact, the proportion is much more in favour of acetylene, as the following will show.

The 166 candles per foot for the Welsbach mantle are emitted by new mantles only. Fähndrich, manager of the Vienna gasworks, states that the depreciation is as follows:—

After burning 48 hours the light decreased 12·9 p.c.
" " 192 " " " 35·8 "
" " 384 " " " 65 "

Thus a month's burning in winter (six hours per day) reduces the light by more than one-third.

I have, however, reason to believe that in actual practice the results are far more unfavourable. As a rule, experiments for determining the candles given are carried on in laboratories, where the conditions are totally different to those obtaining where the mantles are actually used.

I therefore carried out a series of photometric tests in a London dining-room, morning-room, and drawing-room with mantles used on wall brackets and on pendants hanging from the ceilings. In the case of the wall brackets the figures obtained bore out those of Fähndrich fairly well, except where the light was exposed to draughts or was very near a door. The pendants, however, showed much poorer results, the depreciation in one particular case (pendant hanging from a ceiling beneath a room used as a nursery) being no less than 56 per cent. for three weeks' use for an average of 5·2 hours per day.

The angles at which the various inmates used the various lights were carefully measured, and, in addition, a large number of measurements were made in other houses (usually, of course, to the great amusement of the inmates), and the average angle with the horizontal was found to be rather over 60 deg. Here is a typical case:—The table in a morning-room, used for two meals per day and for writing and reading, is 4 ft. broad and 6 ft. long The room has a pendant immediately above the centre of the table, carrying two large Welsbach lights side by side, at a distance of 6 in. from centre to centre, and 4 ft. 6 in. above the table, measured from the centre of the mantles. The plate, book, or letter is placed, as a rule, 9 in. to 1 ft. from the edge of the table, say 9 in. Assuming that one person sits at each side and each end, the average distance of each person's plate, book, &c., from the centre of the table will be 1 ft. 9 in., and the angle with the horizontal will be over 60 deg.

Taking Lewes' figures for an angle of 60 deg. (2 candles per foot for the Welsbach and 26 for acetylene), and deducting only 30 per cent. for depreciation for the whole life of the mantle, we get 1·4 candles for the former as against 26 for acetylene and 2·07 for the batswing coal-gas burner. It is, therefore, evident that on Professor Lewes's own showing acetylene gives, *at the ordinary working angles*, 13 to 19 times more light than the Welsbach, and that the latter is even surpassed by the flat flame burner.

Burnt with a horizontal flame, as oil-gas is in most railway carriages, acetylene will give out nearly its full candle power on objects placed vertically beneath the light, whereas the mantle in such a situation, gives so little light that it is "unreadable" photometrically.

In conclusion, allow me to state that infinitely more disappointment has been caused in this country by carbide failing to give 5 ft. of gas than has been caused by the burner or mantle question. This statement will be confirmed by practically every generator maker in England. No carbide has up to the present been manufactured in Great Britain on a commercial scale for any reasonable period of time yielding 5 ft. per lb.; a carbide yielding 4·8 ft. in a good generator is a first-rate carbide, and you have to "see that you get it." The public should therefore not be led to believe that they will get 5 ft.

CHAS. BINGHAM.

THE PROPOSED NEW LAW COURTS FOR LEEDS.—The Property Committee of the Leeds Corporation recently had under consideration the dilapidated condition of the corridors on the ground floor of the Town Hall, and decided to obtain designs and estimates for mosaic flooring and faience work for the walls and ceilings. Tenders and designs were submitted to the Committee on the 17th inst., the figures varying from 3,000*l.* to 9,500*l.* Since the subject was first introduced to the Committee, however, the question of the erection of new Law Courts for the city has come more prominently to the front, and the Committee resolved to defer consideration of the matter pending a decision with regard to the Law Courts. The report by Mr. Boston (the Chairman) and Mr. Beaumont with reference to the Law Courts was adopted. These gentlemen, it may be recollected, reported as to the provision of Law Courts at Manchester, Liverpool, Birmingham, and Sheffield, and the special sub-committee appointed to deal with the question will visit the first three cities named and Cardiff, and will then present a further report.—*Leeds Mercury.*

HEATING OF BUSINESS PREMISES, DUBLIN.—Messrs. John King, Limited, engineers, Liverpool, are carrying out the heating, by means of their improved hot-water heating apparatus, of the Dublin premises of the Limerick Clothing Factory, Limited.

Illustrations.

COMPETITION DESIGN FOR OLD BAILEY SESSIONS HOUSE.

WE give this week the exterior and an interior perspective view, and the two principal plans of Mr. Brydon's fine design submitted in competition for the Old Bailey Sessions House.

We have already given our own comments on all the designs. It is only necessary to add here that the design was prepared in conjunction with Mr. J. S. Gibson, though it was necessarily sent in to the Corporation in Mr. Brydon's name. Had it been successful it would have been carried out by Mr. Brydon and Mr. Gibson as joint architects.

A HOUSE BY THE SEA.

THIS house of the bungalow type was designed for a particular site on the coast, and it is intended, alike in plan, treatment of the elevations, and choice of materials, to express a certain seaside character which would be entirely out of place in an inland site.

A special feature is the spacious loggia overlooking the sea, sheltered by the overhanging upper story. Up to the first floor level the whole of the exterior is of local stone in roughly-hewn blocks with a distinct batter, whilst extra protection from the weather is afforded by the unbroken surfaces of green weather slating above. The roofs, of low pitch, are also covered with green slates, and the feeling of strength and repose is enhanced by the long horizontal lines. In the front, the garden slopes down to the sea, being finished by a sea-wall architecturally treated. The architect is Mr. Arthur Stratton, A.R.I.B.A., of Liverpool and London.

The drawing was exhibited at the Royal Academy.

Books.

Reliques of Old London Suburbs North of the Thames. Drawn by T. R WAY, with an Introduction and Description by H. B. WHEATLEY, F.S.A. London: G. Bell & Sons.

Reliques of Old London on the Banks of the Thames. Drawn by T. R. WAY, with an Introduction and Descriptions by H. B. WHEATLEY, F.S.A. London: G. Bell & Sons.

THESE two very pretty and interesting volumes form practically part of a series of which we have previously noticed one or two others; though not nominally a series, they are all of the same size and got up and bound in the same manner, with what may be called symbolical variations in the design of the binding.

The first-named volume of the two contains sketches from Hampstead and Highgate; Stepney Green; Cheyne-walk, Chelsea; and old houses at Hammersmith and Chiswick. The plates are drawn in lithographic chalk, a style of execution which is not the best for doing justice to architecture, but which suits the object of these plates, which evidently is to give a general impression of the picturesque effect of the scene as a whole, not the detail of the buildings. From an architect's point of view, in fact, they are too sketchy and wanting in precision, but they show a good deal of artistic effect and feeling.

The second volume contains sketches mainly on the lower Thames, including a good many drawings of bridges and waterside scenes; also some of the old houses in the neighbourhood of the Thames, including that charming one in Putney High-street which has now been swept away with so many other interesting relics of the kind.

Mr. Wheatley has added to each sketch a short history and description of the building or locality illustrated. His knowledge of London topography gives a value to these as records. The books form a picturesque and interesting memorial of many old London sites and buildings; and their printing and general make-up is all that could be desired.

The Book of Glasgow Cathedral. With History and Description. Edited by GEORGE EYRE-TODD. Glasgow: Morrison Bros.

THIS is a book of essays by different writers, collected into a kind of memorial volume of Glasgow Cathedral. The principal contributors are Archbishop Eyre, Dr. T. F. S. Gordon, Dr. McAdam Muir, Mr. John Honeyman, Mr. James Paton, Mr. A. H. Millar, F.S.A. Scot., and Mr. Stephen Adam, F.S.A. Scot.

In the main the book is rather a history of circumstances and events connected with the cathedral than of the cathedral itself; but Mr. Honeyman's chapter of course is a completely architectural study, and it is almost needless to say that it is very well done. He makes an interesting comparison between Glasgow and Jedburgh, showing the probability that the same architect was employed on both, and that Jedburgh may be taken as throwing light on Glasgow. Mr. Honeyman does not accept the theory that mediæval churches designed themselves; he says, "We may fairly assume that there was such a servant of the Church as a diocesan architect in the olden time, and there is plenty of evidence to show that his practice was vastly larger, and his opportunities of doing great and original work more numerous, than those of the diocesan architect of the present day."

It is not surprising that comparisons should have been made between the east ends of Durham and Glasgow, but Mr. Honeyman points out that, though both show the peculiarity of having several altars in juxtaposition along the east wall, the chapels at Durham are not an integral part of the choir. He says:—

"There is a much more obvious analogy between the east end of Glasgow Cathedral and the corresponding portions of our large Norman choirs, such as Gloucester and Norwich, where the side aisles have been carried round the apsidal ends, with chapels beyond. The Glasgow plan is simply an adaptation of this arrangement to a square end; and in the lower church, where the chapels are separated by stone walls, the arrangement may be regarded as practically identical. There is no other example of this kind in any of our cathedrals. In Scotland we have no Norman choirs with apsidal ends, nor any remains which would lead us to suppose that such choirs at any time existed. At Jedburgh, an important example, where much of the Norman work remains, the choir may have had an apsidal termination, but the aisles certainly stopped short, and the same may be said of Glasgow. The truth is that, as already mentioned, we built no cathedrals in Scotland till the first quarter of the twelfth century, when the Norman style of architecture was on the verge of merging in the Transitional, after which apsidal terminations became uncommon, even in England."

It is a curious point in the design of the cathedral, noted by Mr. Honeyman, that an effort seems to have been made to keep the details homogeneous in character, in a manner seldom if ever met with in Engish Gothic. The best illustration of this, he observes, is to be found in the chapter-house. "Here we have the same base as that of the choir, and the same windows — narrow lancets with clustered shafts in the jambs and between the two lights—a perfect thirteenth-century elevation, and yet there can be little doubt that this building as it now stands was not completed till the fifteenth century." This is one of the surprises which Scottish Gothic has in store for the architectural student. Another is found in the fact that "about the time that this apparently thirteenth-century chapter-house was being built here, the Perpendicular style was fully developed in England; but there is hardly a trace of Perpendicular work in Glasgow": another instance of the manner in which political demarcations affect architecture. Evidently English Gothic found a difficulty in crossing the border.

Mr. Honeyman regrets that the beauty of the interior should be so seriously marred by its adaptation to the requirements of a large Presbyterian congregation. It would hardly be expected that a congregation of this persuasion could be adequately provided for in a mediæval church without some clashing with the architectural *genius loci*. Mr. Honeyman suggests that the congregation should rather occupy the nave, "where the introduction of chairs might be tolerated," and that all benches and chairs might be swept away out of the choir aisles. Architecturally speaking, we are of course entirely in sympathy with his wish. But if the modern Presbyterians are permitted to worship in the mediæval church, we do not know that they can be blamed for fitting it up in the manner best suited to their own religious service. The building, after all, is for the religion, and not the religion for the building.

Archbishop Eyre's chapter on the two

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western towers, which have now disappeared, and his account of their demolition (within the present century) and the alleged reasons for it, is of considerable interest.

Though not primarily an architect's book, the volume is a handsome memorial of the history of a remarkable building.

The Life of Sir James Nicholas Douglass, F.R.S. By THOMAS WILLIAMS. London: Longmans, Green, & Co. 1900.

IN these days of lengthy two-volume biographies it is a relief to meet with a book so remarkable for its brevity and unpretentious character as this short biography of an eminent engineer, "by one who for more than thirty years had the privilege of serving under him." In a literary sense, it is true, the book is not well written, but it makes amends for that shortcoming by its sincerity of tone and by the author's intimate acquaintance with his subject; it is just such a biography as suits with the simple-minded and practical character of the man who is the subject of it.

Sir James Douglass, who was for a long time engineer-in-chief to the Trinity House, and whose name will always be remembered as the engineer of the present Eddystone Lighthouse, was remarkable not only as a bold and capable engineer but as a man of great natural force of character. In the often dangerous work on which he was employed he was ready not only to go everywhere where the workmen were expected to go, but in fact led the way in circumstances of danger, and when working on the Smalls Lighthouse always accompanied the working party to the rock, where both landing and embarking were often dangerous, and was always the first to land and the last to leave, seeing his men safe in the boats before he followed; indeed, on some occasions when the state of the sea rendered the embarking more risky than usual, he would have the boat cast off when his crew were safe in, and swim to it himself. It is easy to imagine, without the evidence given in the book, how his subordinates admired an engineer of this pattern.

"No task that could advance the work that he had in hand did he deem beneath his notice or lowering to his personal dignity. By boldly taking this path, he struck a deathblow at the preposterous idea of many of his workmen, who thought their caste in danger if they did any but the one task they were pleased to call their own peculiar trade. Sir James, *by example*, soon convinced his men that the fact of a man being a good stonemason did not render him unfit to lend a helping hand to a smith or carpenter; there was a task to be done, and he and they were the men who had to do it; so his mechanics, good as they were in their own selected branches of work, soon, under his teaching, learned to be a help to the sailors of the tug and tender employed on the work, and as boatmen they were one and all hard to match and harder to beat. In all things he, the master-spirit, was better than the best man there."

This is refreshing reading, in these days when too many working men seem to find their greatest pride in skirking as much work as they can. Perhaps if there were more Douglass's there would be fewer strikes and fewer disputes as to who ought to do this or that bit of necessary work; men would be shamed out of it.

The book brings vividly before us the difficulties and dangers of lighthouse work on an exposed reef. At the Smalls lighthouse (eighteen miles off Milford Haven), when getting in the foundations, each man was compelled to wear a lifebelt at his work; and eyebolts, with ropes attached, had to be fixed in the rock as holdfasts for them, in the event of the sea suddenly rushing upon them; and the surf often rose so rapidly around the rock that the landing boats could not approach sufficiently near to take off the men, who had then to jump into the seething water, with ropes fastened to their waists, and be hauled to the boats by the crews. It was under circumstances of this kind that the engineer showed his readiness to rough it with the men, and even to face more than they were ready to face. The same trait, it is pleasant to note, is recorded also of Smeaton, his predecessor on the Eddystone rock.

The Wolf, the Basses, and the Longships lighthouses were all carried out under the personal supervision of Mr. Douglass, who was also responsible for the lighthouse at Great Castle Head, Hurst, Lowestoft, Hartland Point, St. Tudwal, and Ball Point; besides a good many smaller coast works of different kinds.

It was Douglass himself who, in 1887, announced at the Mechanical Section of the British Association that Smeaton's celebrated work at Eddystone was doomed, in consequence of the rock having been undermined by the sea. It was proposed in some quarters that the Eddystone rock should be blown up; but it was proved that this operation, if successful, must cost seven times as much as the erection of a new lighthouse, and there was also the important consideration that the lighthouse was very valuable as a guide to shipping in regard to their whereabouts. It is noticeable that in designing the new structure Douglass departed from Smeaton's model with the widely spreading base, the object of which was to divert the blow of the waves upwards, and adopted a nearly vertical section. He maintained that it was better to let the blow of the wave expend itself in rushing round the base, where the weight and stability of the structure were greatest, than to lead it up the walls to the higher part of the stalk; and in fact it has been stated elsewhere that the sea struck with such force against the underside of the projecting cornice of Smeaton's lighthouse that the men in it could actually feel the upward blow which seemed to lift it. Some details as to the structure of the new lighthouse are given. The tower is solid, except for a water tank, for 25½ ft. above high water spring tides. Where the rooms commence the walls are 8 ft. 6 in. thick, diminishing to 2 ft. 3 in. at the top. The masonry was all prepared and fitted on shore, and the blocks sent out to the rock finished and numbered. The method of joining the masonry consists in having a raised dovetailed band 3 in. high on the top bed and on one end joint of each stone (the material is granite). A corresponding dovetailed recess was cut in the bottom bed and end joint of the adjoining stones, with just sufficient clearance for the raised band to enter it freely in setting. The work when thus jointed and set in Portland cement, becomes almost like a solid piece of granite. It was on the completion of this work that Douglass was knighted.

For other information about the man and his works we must refer the reader to Mr. Williams's book, which is an interesting memoir of a remarkable man, who did some very remarkable work.

Acetylene: A Handbook for the Student and Manufacturer. By VIVIAN B. LEWES, F.I.C., &c. London: Archibald Constable & Co., Limited. 1900. Price 31s. 6d. net.

THIS is the most important and exhaustive book devoted to acetylene which has yet been published, and its contents clearly demonstrate that scientific men of all nationalities have been keenly attracted by the wide field of research opened by the discovery that by mere fusion of a mixture of lime and coke in an electric furnace a carbide may be manufactured which requires only contact with water to cause rapid generation of that most brilliant of gaseous illuminants—the simple hydro-carbon, acetylene. Six years ago calcium carbide and acetylene were laboratory curiosities familiar only to some few score chemists, whereas today it is being manufactured in Europe and America at a rate of many thousands of tons per annum; while acetylene is utilised for illuminating purposes in every quarter of the globe, and, employed as a searchlight, has repeatedly shed its brilliant rays over South African battlefields.

The book contains 228 illustrations, and is divided into three portions: Part I., scientific, is devoted to the scientific study of acetylene; Part II., technical, deals with the technical developments of the acetylene industry during the last few years; and Part III., includes the legal enactments in force in various countries concerning the use of acetylene, and gives a list of the patents relating to acetylene or carbide taken out in this country, with a short précis of their contents. The different fire insurance regulations, which are of particular interest to many of our readers, will be found indexed under "Legal Enactments." A feature uncommon in a book of this description is the introduction of marginal references in red letters, which greatly facilitate reference to any particular subject.

Professor Lewes has given careful attention to the work which has been done throughout Europe and America, and has woven the facts deduced from his own researches with those discovered by his numerous coadjutors into a connected history of acetylene from the date of its discovery in the year 1836 to the present time.

Although Professor Lewes has retained that popular style which is found in his earlier works, and for which his lectures are celebrated, he has contrived to combine with this an attention to detail and an accuracy of description which redeems the book from the superficiality so common in English popular books of science. We have no hesitation in commending the book to any one requiring information of any description regarding acetylene or calcium carbide.

Surveying with the Tacheometer. By NEIL KENNEDY, M.Inst.C.E. London: Crosby Lockwood & Son. 1900.

DURING the early part of the past century considerable attention was given by the well-known Italian engineer, Porro, to the improvement of methods of preparing preliminary surveys, and at a later period his work was systematised by the French engineer Moinot. As a result of their labours the instrument now known as the tacheometer was evolved. Briefly described, this is a transit theodolite having a large achromatic telescope, with stadia hairs in the diaphragm, and an annalatic lens. The last-named detail has been the chief means of rendering telescopic measurements practicable to the surveyor. Although largely adopted on the Continent and in the United States, very little use is made of the tacheometer by engineers, and practically none by land surveyors, in this country. Whilst particularly advantageous in many respects, tacheometric surveying is not popular, partly because the instrument is usually made with the graduation of 400 divisions instead of 360 deg. to the circle, and partly for the reason that some little trouble is involved in calculations for reducing inclined to horizontal distances in distance measuring, and for corrections of a similar nature in levelling.

The object of the book to which we refer is to explain the general principles upon which the system of tacheometric surveying is based, and to give an adequate idea of the manner of applying them in practice. Mr. Kennedy addresses civil and military engineers and surveyors, and it is consequently not necessary that he should discuss matters already known to his readers. His attention is strictly confined to the subject selected, and although the book in question is by no means diffuse, the aim of the author is admirably realised. After briefly describing the essential features of the instrument, Mr. Kennedy defines the six permanent adjustments of the tacheometer and the order in which they should be executed. The two following sections are devoted to "Measurements of heights and distances by means of the tacheometer and staff" and to "The staff." For the simplification of work it is recommended that the staff should be marked with divisions, each equivalent to a unit of linear measurement multiplied by the "constant" of the instrument. Then, the number of these special divisions observed gives at once the distance between the staff and the apex of the measuring angle, which coincides with the main axis of the instrument. Simple rules are given for computing the horizontal distance between the instrument and the staff when the line of sight is at an angle, and some other necessary points are also considered. "Field work," "office work" and "other methods of tacheometry" are succinctly dealt with, and the remaining part of the book consists of appendices; the first being a sample of field book; the second and third are tables for reducing distances and heights, with ordinary and centesimal degrees; and the fourth is a table for reducing centesimal to sexagesimal graduations and vice-versâ. Some useful diagrams are given at the end of the volume, one of which includes Gillman's patent diagram for the reduction of tacheometer readings. This diagram is fully explained in the section dealing with office work.

BOOKS RECEIVED.

UNIVERSAL DIRECTORY OF RAILWAY OFFICIALS, 1900. Compiled by S. Richardson Blundstone. (The Directory Publishing Company, Limited, Catherine-street, Strand.)

FREEHAND DRAWING OF ORNAMENT. By John Carroll. (Burns & Oates, Limited.)

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TRADE CATALOGUES.

Messrs. A. Ransome & Co. send us their catalogue of wood-working machinery exhibited at the Paris Exhibition, of which we may have more to say on another occasion. The catalogue includes description and illustration of their steam tree-feller; cross-cut saw for logs for saw-mill work; saw benches; ripping and cross-cutting bench; band saw machines: high speed moulding machines; planing, thicknessing and mortising machines; cask-making machinery; and pneumatic conductor for wood refuse, which last is a most useful and economic addition to a wood-working factory, preventing the accumulation of sawdust and chips, and disposing of them automatically. The catalogue is very well got up and illustrated.

Messrs. Heal & Son send us a series of illustrations of their guest room at the Paris Exhibition, or rather of the furniture contained in it, which can hardly be praised too highly; in point of good taste in fact there is not a fault to be found with it; some people may prefer a style of furniture less simple and square in line, but for furniture in a quiet unpretentious style it is admirable, and a firm who promote this kind of work are assisting in raising the taste of the public.

The Ashton and Green Iron Company send us their catalogue, divided into five sections. Section I. includes mantels and grates; Section II. cooking ranges, boilers, complete cooking apparatus for a hotel; Section III. includes baths, urinals, pedestal and valve closets, cast-iron lavatory frames (these latter would be much better without so much so-called ornament, but that is the common mistake in cast-iron work), cattle-troughs, tanks, steel mangers, &c.; Section IV. deals with stable and harness-room fittings, wrought-iron hurdles and gates, boilers and heating apparatus for public buildings, schools, private houses, and conservatories; and Section V. with door furniture, locks, window fittings, electric-bell fittings, &c., and also shows illustrations of their panic "exodus" door, for folding or swing doors for public buildings, to open with a push from inside. The whole catalogue includes an immense variety of work connected with practical ironmongery on a wholesale scale.

The British Luxfer Prism Syndicate send a new catalogue of their window and pavement prisms and diamond tiled lights.

Messrs. Steel & Garland send us their illustrated catalogue of artistic cast-iron mantels and grates, most of which are in excellent taste, and merit the adjective applied to them. They show also some antique copper repoussé mantels and fireplaces, which are very good.

Messrs. Dickinson & Co. send us specimens of their featherweight laid and wove book papers, an excellent style and surface of paper, described in very artistic type and setting.

Messrs. Sissons Bros. & Co. send us a pamphlet describing their "Hall's Sanitary Washable Distemper," made in sixty tints (some specimens of which are given). They claim for it that it sets hard, contains no lead, and does not turn black, and only requires the addition of water to render it ready for use, so that it can be used by any one.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

7. Alternating Current. Alternators. Frequency. Effective Volts and Amperes. Power Factor. Alternating and Direct Relative Advantages.

In a direct current dynamo the current generated in any coil of the armature flows in one direction round that coil for half a revolution, and in the other direction for the other half revolution. In order to get the current to flow always in the same direction in the external circuit an elaborate and costly device called a commutator is employed. The current is conveyed to the external circuit through stationary copper or carbon brushes, which press on the commutator. Now if the ends of a coil, instead of being connected to particular segments of the commutator, were simply connected to two metal rings round the spindle of the armature, and insulated from it and from one another, then, if two metal brushes press on these rings, we could get from them an alternating current as the armature revolves. For one-half revolution the first brush would be positive and the second negative, and for the other half revolution their polarities would be reversed. If a dynamo were constructed in this manner, then, during one turn of the armature the current in the external circuit would go through a complete cycle of changes, flowing first in one direction and then in the other, and during the next turn of the armature it would go through exactly the same cycle all over again. The time that an alternating current takes to go through all its values is called the period of the alternating current, and the number of periods in a second is called the frequency of the alternating current. If the armature were making 600 revolutions per minute, *i.e.*, ten per second, then the frequency would be 10. Such a frequency would not be suitable for electric lighting, as the flickering of the light in a glow lamp caused by the varying value of the current would be very unpleasant. If, however, the frequency is 40 or 50, then the light is apparently absolutely steady, and quite as suitable for illuminating purposes as that produced by direct current.

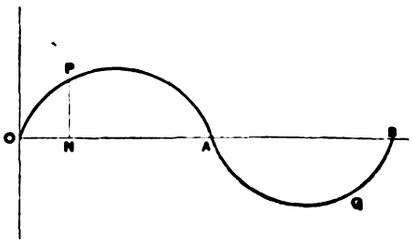
In our hypothetical alternator, in order to get a frequency of 50, we should have to rotate the armature fifty times per second or 3,000 times per minute. Whilst it is easy to do this mechanically with small armatures, yet with large armatures it would be practically impossible owing to the enormous centrifugal forces called into play tending to burst the armature. Hence in practically alternating current dynamos we have several pairs of field magnets in order to make the current alternate several times in one revolution.

Practical alternators can be divided into three classes. In the first class are those in which the armature revolves and the field magnets are stationary. In the second class the field magnets are rotated, whilst the armature is stationary. In the third class the alternators are called inductor alternators. In this class both the field magnets and the armature windings are stationary, the revolving part consisting of iron pieces which make and break in succession certain magnetic circuits connecting the armature coils with the field magnet coils, thus inducing alternating currents in the armature coils.

The field magnets of alternators are usually excited by a small auxiliary direct current dynamo. In the first class the terminals of the armature are connected to two collecting rings on the shaft, and the current is collected by metal brushes. In the second class the ends of the armature are simply connected to two terminals, and the coils round the rotating field magnets are excited by direct current passed to them by collecting rings on the shaft. In the third class no collecting rings are required, the direction of the magnetic flux in the armature coils being alternated by the pieces of iron making a magnetic circuit first with a positive pole of the field magnets, then with a negative pole, and so on.

The frequency of the alternating currents used in this country is a very variable quantity. Out of ninety alternating current supply stations twenty-five use a frequency of 50, twenty-four use one of 100, and the rest use frequencies varying from 40 up to 125. One would naturally think that it must make practically no difference what frequency you employ, seeing that British engineers have chosen their frequencies merely to suit the speed of their engines, &c. On the contrary, it is of very great importance. An arc lamp, for example, that will work well when the frequency is 100, will not work at all at a frequency of 50. In the same way a motor that will work when the frequency is 50 will not work in a circuit where the frequency is 100. In 1899 a committee of the Institution of Electrical Engineers unanimously recommended that a frequency of 50 was on the whole the best suited for alternating currents for glow lamp and power supply. For the transmission of power to long distances a frequency of 25 was recommended. It seems highly probable that 50 will become the standard, and so the grievances of manufacturers who have had to stock alternating current apparatus to suit the different frequencies in use all over the country will be removed.

We can represent an alternating current graphically as follows:—



Let (fig. 1), the time in fractions of a second, be measured horizontally, and the value of the current in amperes be measured vertically. Thus P N represents the current at the time O N. O A is half the period of the alternating current, and O B is the whole period. The locus of P is a curve which is called the wave of the current, and the shape of this wave is of great importance. O P A is the positive half of the wave, and A Q B is the negative half. At the time O B the current begins to go through its values all over again.

If the external circuit be non-indicative, *i.e.*, if the lines of force round the wire that grow with the current, and are inseparably linked to it, do not cut the wire, an action which would create an electric pressure tending to hinder the growth of the current, then the alternating pressure at the brushes is exactly in step with the current, vanishing when the current vanishes and attaining its maximum value when the current is a maximum. The shape of the wave of electric pressure would thus be a curve similar to the current curve in fig. 1.

In this case, if R be the resistance of the external circuit, c the instantaneous value of the current, and e the instantaneous value of the pressure between the brushes, then, by Ohm's law,

$$c = \frac{e}{R} \text{ - - - - - - (1)}$$

Also by Joules' law the power expended in the external circuit at this instant is c^2R or from (1) $c\,e$ watts. Now as c and e both go through a cycle of changes during a period the power expended in the external circuit is a continually varying quantity. What we want to know in practice is the mean rate of working during a period. Hence we want to find the mean value of c^2R for a period. Now the deflection on an alternating current ammeter measures the mean value of c^2, and if the reading be c, then c is the square root of the mean square of c. Hence the mean watts expended on the circuit is c^2R where c is the reading of the current on an alternating current ammeter. C is called the effective value of the current. Similarly if E be the reading on a voltmeter across the brushes then E is the effective value of e, or in mathematical language it is the square root of the mean square of e. Suppose, for example, that the pressure was 5 volts for the thousandth part of a second, 7 volts for the next thousandth part, then 13, 13, 7, and 5 for further thousandths respectively, then if E were the reading on the voltmeter

$$E^2 = \frac{5^2+7^2+13^2+13^2+7^2+5^2}{6} = 81$$

therefore the effective volts, *i.e.*, the reading on the voltmeter would be 9.

In the case of the non-inductive circuit, then, we have $E = CR$, and the power $= C^2R = CE$ where C and E are the ammeter and voltmeter readings respectively, exactly as in direct current circuits. In this case the current and the pressure are said to be in phase with one another. In general, however, alternating current circuits are inductive. The lines of force linked with the current are continually cutting and recutting the circuit, thus setting up an alternating pressure in it. In addition these lines of force may cut neighbouring circuits, setting up currents in them which give rise to lines of force which set up an alternating pressure in the original circuit as they cut it when expanding or collapsing. The effect of all this is that the pressure in the original circuit is the resultant of the original pressure and of several others called into play by the lines of force linked with the current. The wave of applied pressure is now no longer in step with the current wave, although, of course, this latter wave must always be in step with the resultant pressure. Hence sometimes the product $c\,e$ is negative, *i.e.*, the circuit is giving back power to the alternator.

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It can be proved mathematically that the maximum value of the power expended is CE. It has this value when c and e are in phase with one another. The minimum value is zero, and it has this value when the phase difference between the two is a quarter of a period—*i.e.*, when either the current or the pressure passes through its zero value a quarter of a period after the other. Merely knowing the ammeter and voltmeter reading in an alternating current circuit only tells us the maximum possible value of the power being expended. For example, in a certain transformer circuit the current was 1·194 amperes and the pressure 2,400 volts. The maximum value of the power in this circuit is 2,400 × 1·194 watts—*i.e.*, 2,866 watts. The actual power taken, however, was only 151 watts. Only six-hundredths of the apparent power was being expended in the circuit. Hence the current must have been flowing against the applied pressure for a considerable fraction of the whole period giving work to the alternator.

Again, if R be the ohmic resistance of an inductive circuit, and e, e^1, and c be the instantaneous values of the applied volts, the volts due to self and mutual induction, &c., and the current in the circuit then by Ohm's law

$$c = \frac{e - e^1}{R}$$

$$\therefore \frac{e}{c} = R + \frac{e^1}{c}$$

Hence $\frac{E}{C}$ is greater than R. It is convenient to give this ratio a name. It is called the impedance of the circuit. We see that the minimum value of the impedance in a circuit is the ohmic resistance of the circuit.

The following laws, then, in alternating current theory are respectively analogous to Ohm's law, Joule's law, and the power equation in direct current theory.

(1) $C = \frac{E}{I}$ where I is the impedance of the circuit.

(2) Power $= C^2R + H$ where H is the energy expended in the neighbourhood of the circuit, in eddy currents, magnetic friction, &c.

(3) Power $= CEf$ where f is defined as the power factor, and may have any value between 0 and 1.

In the particular case when we have only self-induction in the circuit, then H = 0 and from (2) and (3)

$$f = \frac{CR}{E} = \frac{R}{I} \text{ from (1).}$$

In general, however, f can only be found by means of a wattmeter. If W be the reading on the wattmeter then by (3)

$$f = \frac{W}{CE}$$

Ex. 1.—In a ten kilowatt Ferranti transformer the resistance of the coil to which current is supplied is 6·45 ohms. The current taken by this coil at a particular load was 0·270 amperes and the voltage applied was 2,400. The wattmeter reading showed that 637 watts were being expended on the transformer. The power factor is, therefore, $\frac{637}{2{,}400 \times 6{\cdot}45} = 0{\cdot}98$. The work expended in heating the coil was only $(0{\cdot}27)^2 6{\cdot}45$, *i.e.*, 0·5 watt. Hence H is 636·5. Again, the impedance $= \frac{2{,}400}{0{\cdot}27} = 8{,}889$ ohms.

Ex. 2. The voltage across the terminals of an inductive coil (choking coil) in series with an arc lamp is 60, and the current through it is 15 amperes. If it is taking 45 watts, what is its power factor and impedance?

The impedance $= \frac{60}{15} = 4$ ohms. The power factor $= \frac{45}{60 \times 15} = 0{\cdot}05$.

When power has to be transmitted to a distance by means of alternating currents it is necessary for economic working that the power factor of the motors at the receiving station be high. For if W be the watts received at the station, E the voltage, and f the power factor, then the current $C = \frac{W}{Ef}$ and the power expended in heating the mains is $C^2R = \left(\frac{W}{Ef}\right)^2 R$. Hence the smaller f is the greater the power lost in the mains. It is necessary then that alternating current motors have a high power factor.

One of the causes that produce a low power factor is that the pressure and current are out of step with one another, so that the current is flowing against the machine pressure for a fraction of a period and so restores to the dynamo some of the work it gets from it. Another cause is that the shapes of the waves are very different. For example, the power factor of an alternating current arc between two carbons may be as low as 0·7, yet the current and pressure are exactly in step with one another. The reason is that the shapes of the waves are different.

If we put a condenser across the poles of a direct current dynamo there is a momentary rush of current to charge it, and then there is absolutely no current, as the resistance of a condenser is practically infinite. If, however, we put a condenser across the poles of an alternator, then, since the polarity changes some hundred times a second, we get an alternating current in the wires leading to the condenser, and by varying the capacity of the condenser we can make this current of any magnitude we please. It is found that this current is always a quarter of a period in advance in phase of the pressure driving it, and hence the power factor of a condenser circuit is zero. We can produce, in fact, by a condenser a large idle current in a circuit a quarter of a period in advance in place of the applied pressure. Now, induction in a circuit produces a lagging current, and we can arrange by putting a condenser across the terminals of an inductive coil and adjusting its capacity that the idle current of the condenser supplies the necessary idle current of the coil and *vice versâ*. When this is arranged, practically none of the condenser current flows in the mains at all. It simply oscillates backwards and forwards through the inductive coil. By this means the current in the mains can, in many cases, be made very much smaller than the current in the choking coil, and the power factor of the circuit considerably increased. Condensers have been extensively used in electric lighting, especially with alternating current motors, but the results obtained have not been very satisfactory.

The effect of a combined alternating and direct current in a circuit is very instructive. If A be the value of the direct amperes and i the instantaneous value of the alternating current, then the instantaneous value of the combined current is $A + i$. The square of this current $A^2 + 2Ai + i^2$, and hence the mean value of this expression is $A^2 + I^2$ where I^2 is the mean value i^2. The mean value of the term $2Ai$ is zero, for i has as many positive as negative values during a whole period, and the positive and negative values are exactly equal to one another, and hence their sum must be zero. Thus, if we have a direct current A flowing in a main and also an alternating current I, then the ohmic loss due to the heating of the main is $R(A^2 + I^2)$ and not $R(A + I)^2$. In fact, each produces its heating effect exactly as if the other were not there. For example, suppose the resistance of a main to be 1 ohm, and that a direct current of 100 amperes is flowing in it, then the loss in the main is $(100)^2 \cdot 1$, *i.e.*, 10 kilowatts.

If the current were 200 amperes direct or alternating, the loss would be 40 kilowatts. But if the current were 100 amperes direct and 100 amperes alternating, then the loss would be only 20 kilowatts. By combining the two systems we can therefore sometimes diminish the loss in the mains.

The advantages of alternating current supply are that the dynamos necessary are simpler in construction than those for direct current, and the pressure of supply can be easily and economically varied by means of transformers, which we shall describe in our next lesson. The disadvantages are that alternating current motors and arc lamps are not so efficient as direct current ones, and it is a drawback also not to be able to charge small accumulators.

CATHOLIC CHURCH, BIRKENHEAD.—The Catholic church of St. Joseph, Birkenhead, was opened on the 19th inst. The church is situated at the corner of Willow Bank-road and North-road, Devonshire Park, is of red Ruabon brick and terra-cotta, and has seating accommodation for 700 worshippers. It has chancel, two side chapels, nave, and aisles, the two latter being separated by arches supported on marble pillars. There are two sacristies, and the plans provide for a presbytery. Entrance is from North-road, the doorways being at each end of a gallery, over which a choir and organ-loft are to be built. The church has been built by Mr. Peter Rothwell, of Birkenhead, from plans by Mr. Edmund Kirby, of Liverpool.

GENERAL BUILDING NEWS.

PARISH CHURCH, ROWLESTONE, HEREFORDSHIRE.—The parish church of St. Peter, Rowlestone, Pontrilas, was reopened on the 10th inst. after restoration. The work was carried out by Mr. Henry Phillips, of Pandy, under the direction of Mr. G. A. Derrick, architect, of Newport, Mon.

METHODIST CHAPEL, TANFIELD, YORKSHIRE.—The foundation-stones of a new chapel at Tanfield were laid recently. Mr. W. J. Morley, of Bradford, is the architect.

REOPENING OF GLENPROSEN CHURCH, FORFARSHIRE.—On the 12th inst. the church at Glenprosen was reopened after renovation. New pews of pitch-pine have been constructed, a pulpit of carved oak has been placed in position, and stained-glass windows have been inserted. The work was carried out under the directions of Mr. R. S. Lorimer, of Edinburgh.

ST. BARNABAS' CHURCH, CROSLAND MOOR, HUDDERSFIELD.—The foundation-stone of this building was laid recently. The nave is to be six bays in length and will measure 93 ft. by 24 ft., the chancel 37 ft. by 24 ft., and the aisles 37 ft. by 14 ft. East of the south aisle there will be a side chapel 37 ft. by 15 ft., whilst one bay east of the north aisle is to be reserved for the organ. To the east of the north aisle and organ-chamber will be a sacristy, and to the north of it a choir vestry. On the west of each aisle is to be erected a porch with doorways into the aisles and also into the western part of the nave. At present it is proposed to place only a wooden bell cote at the west end of the nave of the church. The church will be built of local stone, the high roofs being covered with tiles and the flat ones with lead. Chairs are to be used for seating accommodation, and the church will be heated by an arrangement of hot-water pipes. Messrs. Graham & Jessop are the contractors for the masonry, slating, and woodwork; Mr. W. E. Jowett for the plastering; Messrs. G. Garton & Son for the plumbing; and Mr. A. Beevers for the painting. Mr. Hodgson Fowler, of Durham, is the architect.

PRESBYTERIAN CHURCH, HOWTH, DUBLIN.—Howth new Presbyterian church has just been opened. The church faces the main Dublin road, adjoining the electric tramway. The architect was Mr. Arthur Young, of Lincoln's Inn-fields, London, and the building has been erected by Mr. Joseph Small, of Malahide. It provides accommodation for about 400 worshippers. There are seats for 300 in the body of the church, seats for the remaining 100 being provided in three small galleries. The pews have been made by Messrs. T. R. Scott & Co, Dublin, and are of pitch-pine. The floor is laid in a herring-bone pattern with oak blocks, carried out by Messrs. Bourke & Co., of Walthamstow. The doors are of teak and pitch-pine, and the heating, by the low-pressure hot-water system, has been carried out by Mr. William Baird.

WESLEYAN CHAPEL, SOUNDWELL, GLOUCESTERSHIRE.—Soundwell Wesleyan Chapel was reopened recently after undergoing renovation. Mr. J. H. La Trobe was the architect, and Mr. E. S. Bennett the builder.

RESTORATION OF CHILCOMPTON CHURCH, SOMERSETSHIRE.—The parish church of St. John, Chilcompton, has been restored at a cost of about 1,600*l*. The work was carried out under the superintendence of Mr. F. Bligh Bond, of Bristol, by Mr. John Sperring, of Midsomer Norton.

CHURCH, STRATA FLORIDA, CARDIGANSHIRE.—A new church was opened recently at Pontrhydfendigaid, in the parish of Strata Florida. The building will accommodate 250 persons, and has cost about 1,500*l*. Mr. Telfer Smith, of Builth Wells, was the architect.

BAPTIST SUNDAY SCHOOLS, SHEFFIELD.—The foundation-stone was laid recently of new Sunday schools in connexion with Cemetery-road Baptist Church, Sheffield. The buildings were designed by Mr. J. Amory Teatner.

CATHOLIC CHURCH, ARDARA, IRELAND.—The foundation-stone of the Church of the Holy Family, Ardara, Strabane, was laid recently. Mr. E. J. Toye, of Derry, is the architect, and Mr. D. M'Caffrey, Strabane, is the builder.

WESLEYAN CHAPEL, CLIFTON, NEAR OTLEY, YORKSHIRE.—Foundation-stones have just been laid of a new Wesleyan chapel at Clifton, near Otley. Messrs. Fairbank & Wall, of Otley, are the architects.

PRIMITIVE METHODIST CHAPEL, HASLAND, DERBYSHIRE.—Foundation-stones of a new Primitive Methodist chapel for Hasland, near Chesterfield, were laid on the 15th inst. The new building is being erected on the Chesterfield-road, at the junction with the Grassmoor-road. It will cost, including the site, 2,600*l*., and will accommodate about 300 worshippers. It will be of red brick, with stone dressings. Mr. W. Cecil Jackson, of Chesterfield, is the architect.

ACADEMY, LINLITHGOW.—The Linlithgow School Board are about to erect an academy on a site to the south-east of Linlithgow Palace. The cost will be between 3,000*l*. and 4,000*l*. Mr. Fairley, of Edinburgh, is the architect.

BOARD SCHOOL, KIRKBY-IN-ASHFIELD, NOTTINGHAMSHIRE.—Mr. J. Carvell Williams, M.P., recently opened a block of schools which has been erected at Kirkby-in-Ashfield, at a cost of 4,720*l*., in Chapel-street. The new building, which, together with two

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large playgrounds, covers a quarter of an acre of land (purchased from the Duke of Portland for 888*l.*), will afford accommodation for 420 children. The structure, which externally is of red brick faced with stone dressings, comprises a central hall, 55 ft. by 25 ft., and five classrooms, each 25 ft. square, in addition to several cloakrooms and a head-teacher's room. The internal fittings are of pitch-pine, and the classrooms are cut off from the main hall by folding partitions, the floors being paved with wood blocks. The building is heated by means of hot-water pipes, and Boyle's system of ventilation has been adopted. Mr. H. Gilbert, of East Kirkby, was the contractor, the architect being Mr. Lawrence Bright, of Nottingham.

THEATRE ROYAL, PORTSMOUTH.—The Theatre Royal, Portsmouth, was reopened on the 11th inst. after reconstruction. The building was closed about four months ago, and has since been practically rebuilt. A new stage, &c., has been erected on a piece of land at the back of the building, the space occupied by the old stage having been added to the auditorium. The entrances have been re-arranged and additional exits formed. An iron and glass shelter has been placed over the pavement in front of the principal entrances. The work was carried out by Mr. J. H. Corke, of Southsea, from designs by Mr. Frank Matcham.

NEW LUNATIC ASYLUM, NEAR ABERDEEN.—Mr. A. Marshall Mackenzie, architect, Aberdeen, has completed the plans of the new asylum (on the village system) to be erected by Aberdeen City Parish Council at Kingseat, New Machar. The model of the Alt Scherbitz Asylum in Prussian Saxony has been followed. The range of buildings will cover upwards of fifty acres. The hospital will provide for about 700 inmates, and stands in front of the administrative block, a recreation hall separating the two buildings. There will be observation wards for male and female patients, convalescent wards, and "closed villas," where patients will be kept under observation until fit to be transferred to the open villas and the working "colony." The administrative block, which is three stories in height, will contain (on ground floor) medical superintendent's room, boardroom, waiting-rooms, bathrooms, &c.; on first floor, bedrooms and smoking and billiard room for male attendants; and on second floor, bedroom accommodation. The quarters for female attendants and nurses will be to the west of the administrative block, and will be provided with an amusement hall, tennis court, and other means of recreation. The medical superintendent's residence, the gardener's house, and the steward's lodge will be built facing the public road, and the total cost of the scheme is estimated at from 80,000*l.* to 100,000*l.*

BOARDROOM, WALSALL WORKHOUSE.—The newly-erected boardroom and offices at Walsall Workhouse were opened recently by the Chairman of the Board. The new building has been erected on the land adjoining the workhouse, on the Pleck-road, and is of brick, with stone dressings, with an open space with palisading in front. On the ground floor, the chief room is the waiting-hall, of 40 ft. by 30 ft., and on the opposite side of the corridor are two committee-rooms, each of 20 ft. by 20 ft., with lavatory, &c. The upper story is approached by a stone staircase, and consists of the boardroom, 40 ft. by 30 ft., a room for the chairman, one for the clerk, ladies' and gentlemen's cloakrooms, waiting-room, &c. The building has been erected by Mr. W. Wistance, from the plans, selected in competition, of Mr. H. E. Lavender. The cost of the building has been 3,300*l.*

CO-OPERATIVE PREMISES, SELLY OAK, WORCESTERSHIRE.—The Stirchley Co-operative Society have erected five shops at the corner of Hulbert-road and Exeter-road, Selly Oak. The building is of red pressed bricks with buff terra-cotta dressings. The plans were prepared by Mr. R. W. Chadey, of Bournville, the Society's architect. Messrs. Cheese & Son, of Worcester and Birmingham, are the builders.

PUBLIC OFFICES, SETTLE, YORKSHIRE.—The Town Hall, which is in the Market-place, Settle, was recently purchased by the Settle Rural District Council, and converted into public offices for themselves and the Board of Guardians. The alterations cost about 1,100*l.*, and were planned by Mr. H. Ross, of Accrington, and carried out by the following contractors:—Masonry and furnishing, Messrs. Brassington Bros. & Corney; heating and plumbing, Mr. W. Hayton; joinery work, Messrs. Parker Bros.; and painting, Mr. E. Handby, all of Settle. The ventilating work was executed by Messrs. Hatton & Co., of Manchester.

NEW CHURCH HOUSE, WHITBY.—On the 14th inst. the new parochial hall and church house which has been erected for the parish of Whitby was opened. It contains a room for meetings, 66 ft. long by 33 ft. 6 in. wide, and is calculated to seat nearly 400 people, besides having a platform at the south end. It is approached direct from St. Hilda's-terrace, and the entrance is protected by a covered porch. Cloakrooms and ante-rooms are provided at the side of the building connected both with the hall and the platform, and there is also a kitchen. Under the platform end of the building is another story approached by staircases both from St. Hilda's-terrace and from Newton-street; it contains a class-room, 33 ft. 6 in. by 20 ft., and is divisible in the centre by a movable glazed partition, forming two separate rooms when needed for smaller classes; there is also a third classroom, 17 ft. 6 in. by 13 ft., and two cloakrooms. The whole building is of red brick and terra-cotta, and roofed with red tiles. The inside of the main hall is lined with glazed bricks to the height of 5 ft. all round, and the roof is of pitch-pine varnished. The classrooms have dados of glazed brick and floors of wood blocks. The heating is by hot water on the low-pressure system. The building has cost upwards of 1,500*l.*, and has been erected under the supervision of Mr. E. H. Smiles, A.R.I.B.A., of Whitby, the contractor being Mr. John Braim, of Whitby.

TOBACCO FACTORY, LIVERPOOL.—A tobacco factory has been erected off Bounday-lane, West Derby-road, Liverpool, for Messrs. Ogden's, Limited. The buildings and land have cost 81,000*l.* Mr. Henry Hartley, of Liverpool, was the architect, and Messrs. Kelly Brothers, of Walton, and Messrs. Joshua Henshaw & Sons, of Liverpool, were the contractors. Mr. John Kelly was the clerk of works.

HOTEL, UPPER HOLLOWAY.—The foundation-stone of the new Marlborough Hotel, Upper Holloway, was laid on the 14th inst. Mr. George Hubbard is the architect, and Mr. W. Nash, of New Cross, is the builder.

PUBLIC WASH-HOUSE, GLASGOW.—The new public wash-house in Bain-square, Glasgow, was opened on the 14th inst. The building was designed by Mr. M'Donald, the City Engineer, and has cost about 5,000*l.*

A NEW THEATRE IN SHAFTESBURY AVENUE.—Plans and designs have been prepared by, we understand, Mr. L. Sharp for a new theatre to be built upon a site in Shaftesbury-avenue, abutting in the rear upon Archer-street, Soho.

RESIDENTIAL FLATS, KNIGHTSBRIDGE.—Mr. G. D. Martin is the architect of the block of residential flats, named Park-mansions, now being erected upon a site situated between the High-road, Knightsbridge, Brompton-road, and Knightsbridge-green.

BUILDING IN ABERDEEN.—The lull in the building trade, which has lasted a year, shows signs of being over, and prospects are now much brighter. A fair number of structures of varied nature are in course of construction in the city, and there are not a few large public buildings to be gone on with forthwith. In connexion with the extension of Aberdeen Joint Station, in addition to our previous remarks, it may be mentioned that the railway viaduct is being seriously examined with a view to its enlargement for the Deeside Railway. The station buildings themselves will depend on the settlement of this point. Contracts will at once be entered into for the erection of a new electricity station for Aberdeen Corporation at Dee Village-road, and of the new asylum at Kingseat, Newmachar, Mr. A. M. Mackenzie, architect; while Messrs. Brown & Watt, architects, Aberdeen, on behalf of Aberdeen City Parish Council, are busily preparing plans for new poorhouse at Oldmill to supersede the existing East and West Poorhouses. It is also expected that estimates for the new General Post Office, Dee-street and Crown-street, will be settled next month. The new Greyfriars Church (Mr. A. M. Mackenzie, architect), and several new Board schools will also be proceeded with in the near future.

TOWN HALL, LYNTON, DEVONSHIRE.—On the 15th inst. Sir George Newnes, Bart., handed over the title deeds of the Lynton Town Hall to the Chairman of the Urban District Council. The building was designed by Messrs. Reed & Macdonald, of London, and erected by Messrs. Jones Bros., of Lynton. The principal hall, which is on the first floor, is 75 ft. long by 35 ft. wide. The ground floor contains a room 30 ft. by 20 ft. for the use of the Urban District Council. The cost was about 20,000*l.*

ARTISANS' DWELLINGS, DUBLIN.—The Corporation of Dublin intend to erect a large number of artisans' dwellings in the Bride's-alley area to replace the wretched tenements which until lately honeycombed the district. At a meeting of the Corporation on the 13th inst. a report of the Artisans' Dwellings Committee was adopted, in which tenders were submitted for the erection of the first section of the proposed artisans' dwellings in the Bride's-alley area. The first section of the building scheme provides for the erection of nine blocks of four-storied dwellings, four facing Bride-street and five facing Nicholas-street. The total number of dwellings in this section is seventy-two, of which fifty-six are three-roomed tenements, and sixteen are two-roomed tenements. The plans and specifications were prepared by the City Architect, Mr. M'Carthy, and seven Dublin firms tendered for the contract. Each of the builders sent in two estimates—one for the use of artificial stone, and the other for the employment of Irish limestone—for the dwellings. The Committee decided to use Irish limestone, and recommended the Council to accept the lowest total tender, which was sent in by Mr. Thomas Mackey, and which amounted to 17,132*l.* 10s. 2d. This recommendation has been agreed to by the Corporation. The conditions of contract provide that those employed on these works shall be paid not less than the minimum standard rate of wages paid in Dublin, that only regular tradesmen shall be employed to do tradesmen's work, and that the hours and conditions of employment now recognised as proper shall be observed. On the Bull-alley area Lord Iveagh intends building a large number of artisans' dwellings, a concert-hall, a swimming bath and wash-house, and a large public lodging-house. On the space flanked by St. Patrick's Cathedral Lord Iveagh is laying out a public park.—*Irish Independent.*

UNDERGROUND CONVENIENCES, LEICESTER-SQUARE.—The underground conveniences which have for some time been in course of construction in Leicester-square were opened to the public on the 5th inst. The conveniences are situated under the whole of the pavement opposite to the Empire Music Hall, and are for both sexes. The men's portion is at the Cranbourne-street end of the square, the accommodation consisting of twenty-nine urinals, thirteen closets, and eleven lavatories. The urinals are of the circular-back type in white enamel porcelain, the jambs, back skirtings, and top divisions being of St. Ann's marble; the foot treads are of hard slate. The tanks for periodical flushing are of marble with bevelled plate-glass fronts. The closets are Finch's siphonic, provided with three-gallon galvanised water waste preventers, and mahogany lift-up seats. The lavatories have tops of marble and are fitted with hot and cold water valves. The women's section contains seven closets, three urinals, and six lavatories, the entrance being opposite to Leicester-street. The closets and lavatories are the same as in the men's department. A feature of this section is a dressing-room for ladies. The conveniences have a dado of marble about 5 ft. in height, the rest of the walls being of white glazed bricks. The men's and the women's sections are connected by speaking tubes, for the attendants' use. The work was executed by Messrs. B. Finch & Co., Ltd., of Lambeth, for the Strand Board of Works, under the supervision of Mr. A. Ventris, the Surveyor to the Board. The whole is lit by incandescent electric lamps. The entrances are not yet complete, as the railings are not erected. There is, however, a temporary wall of wood. The railings will be erected by Messrs. W. A. Baker & Co., of Newport, Mon. At the bottom of each stairway is a gate by the B. and S. Folding Gate Company.

SANITARY AND ENGINEERING NEWS.

WATER AND DRAINAGE SCHEMES, WRITTLE, ESSEX.—A Local Government Board inquiry was held by Colonel A. J. Hepper, at the Board school, Writtle, on the 15th inst., with reference to an application by the Chelmsford Rural District Council for sanction to borrow 4,750*l.* for works of water supply, and 3,600*l.* for works of sewerage and sewage disposal in the Writtle special drainage district. Evidence was given by Mr. Taylor, the Engineer.

WATER SUPPLY, LEEDS.—The question of the water supply of the city was considered by the Waterworks Committee of the Leeds Corporation on the 17th inst. A short time ago the Committee made inquiries and ascertained that there was great waste of water in the city, and an appeal was issued to the public with the object of checking the waste. The figures submitted on the 17th inst. to the Committee by the City and Waterworks Engineer (Mr. Hewson) showed that the consumption of water at present was 16¼ million gallons per day, as compared with 18 million gallons per day a fortnight ago. The Committee are still prosecuting their inquiries with regard to the prevention of the waste of water, and a sub-committee has been appointed to visit other towns where a new system for the detection of waste in the mains by means of meters is in operation, with the view of obtaining information to guide the Committee in arriving at a decision. In connexion with this subject, the Engineer reported that he was taking steps to ascertain the actual water consumption in one or two districts of the city with some 20,000 to 40,000 inhabitants. The recent heavy rainfall has added greatly to the amount of water in store in the reservoirs, which is now equal to a supply for the city for ninety-three days. At the corresponding period of last year the quantity in the reservoir was equal to sixty-two and a half days' supply. A contract for a new 30-in. main to be laid from Eccup, by way of Arthington and Lindley Wood, to Swinsty Reservoir was adopted. The cost will amount to nearly 100,000*l.* At present there are three mains which are capable of bringing 18 million gallons per day to Eccup Reservoir. When the new main has been completed the quantity of water flowing into Eccup Reservoir will be increased to 24 million gallons per day.

SEWERAGE, &C., WOBURN, BEDFORDSHIRE.—The Ampthill Rural District Council and the Newport Pagnell Rural District Council have selected Messrs. D. Balfour & Son, of London and Newcastle, to prepare a scheme of main sewerage and sewage disposal, and also water supply, for the rapidly-developing districts of Woburn Sands, Aspley Heath, and Aspley Guise, which are to be embraced in a special district for these purposes.

NEW FOG-SIGNAL, ABERDEEN.—The Northern Lighthouse Commissioners are to proceed at once with the erection, at a cost of 5,000*l.*, of a new fog-signal at Gridleness, Aberdeen, the building, &c., being designed by Mr. David Alan Stevenson, M.Inst.C.E., the Commissioners' Chief Engineer.

WATERWORKS, BURLEY.—The new scheme of the Burley District Council—sanctioned by Parliament last year—has advanced another step by the letting

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of the work of constructing the Carr Bottom Reservoir on Burley Moor to Mr. Thomas Smith, of Bingley, at about 5 per cent. in excess of the estimate of the Engineer, Mr. Malcolm Paterson. The reservoir will be formed by an earthen dam about 367 yds. long, with curved ends, and will hold about 15,000,000 gals. It is expected to be completed in two years.

OSSETT SEWAGE DISPOSAL.—On the 21st inst. Colonel A. J. Hepper, R.E., held a Local Government Board inquiry at Ossett into the application of the Town Council for sanction to a loan of 8,500*l.* for the extension of their southern outfall sewage works at Healey. The works proposed will transform the existing works, which, when complete, will consist of a screening tank, precipitation tanks holding 200,000 gallons, buildings and machinery, sludge tanks, and about seven acres of land for filtration. There will also be 1,000 square yards of storm-water filtering area. The details of the scheme were explained by the Engineer, Mr. Malcolm Paterson, on behalf of himself and Mr. S. Shaw as joint engineers. This is the second scheme affecting this outfall now before the Local Government Board, the first being for a loan of 5,000*l.* for an intercepting sewer nearly three miles long, to bring into the above works the sewage of several outlying parts of the borough. The whole scheme will thus cost 13,500*l.*, but it should be explained that this amount includes the purchase money for 32 acres of land at 80*l.* per acre, the vendors having refused to sell a part only of their estate. The sewage contains a good deal of trade effluents, chiefly wool-washing and dye-water, with a little sulphuric acid.

FOREIGN.

FRANCE.—A new square is to be formed in the Eighteenth Arrondissement of Paris, at the Place Hébert.——The Paris Chamber of Commerce has voted a sum of 420,000 francs for the enlargement of the Ecole Supérieure de Commerce.——The Exhibition of Femmes Peintres et Sculpteurs will open on September 1, in the Orangery of the Tuileries.——The Château of Malmaison has now been entirely restored and put in order, but the Government are still hesitating about officially accepting it from the present proprietor, M. Osiris; and it is possible that he will end by presenting the house and its contents to the Municipality of Rueil.——A new line of railway is to be opened in the Jura, from Morbier to Morez.——The Municipal Council of Avignon is considering the means of preserving the old Papal palace, which has for many years been in use as a barracks. A sufficient sum of money is to be voted for the construction of a new barracks, and for a restoration of the ancient building.——The death is announced, at the age of seventy-eight, of M. Henry Jean Baptiste Dubois, member of the Société Centrale des Architects. He was a pupil of Vaudoyer, and, after filling the office of Inspecteur des Travaux for the Nord Railway Company, he held a similar post under Visconti for the repair of the Tuileries in 1851-52. In 1864 he became architect to the "Compagnie Générale des Marchés" of Paris. He was also architect for a number of private houses, houses in flats, &c. His son, M. Henri Dubois, is also a member of the Société Centrale.——We have to announce also the decease of M. Antony Valabrègue, a well-known art-critic, who had been entrusted with a good many artistic missions by the Government, and had visited the art museums of England, Germany, Holland, and Belgium, in order to draw up a catalogue raisonnée of French works of art in foreign museums. He was also much concerned in establishing museums of industrial and applied art in France.

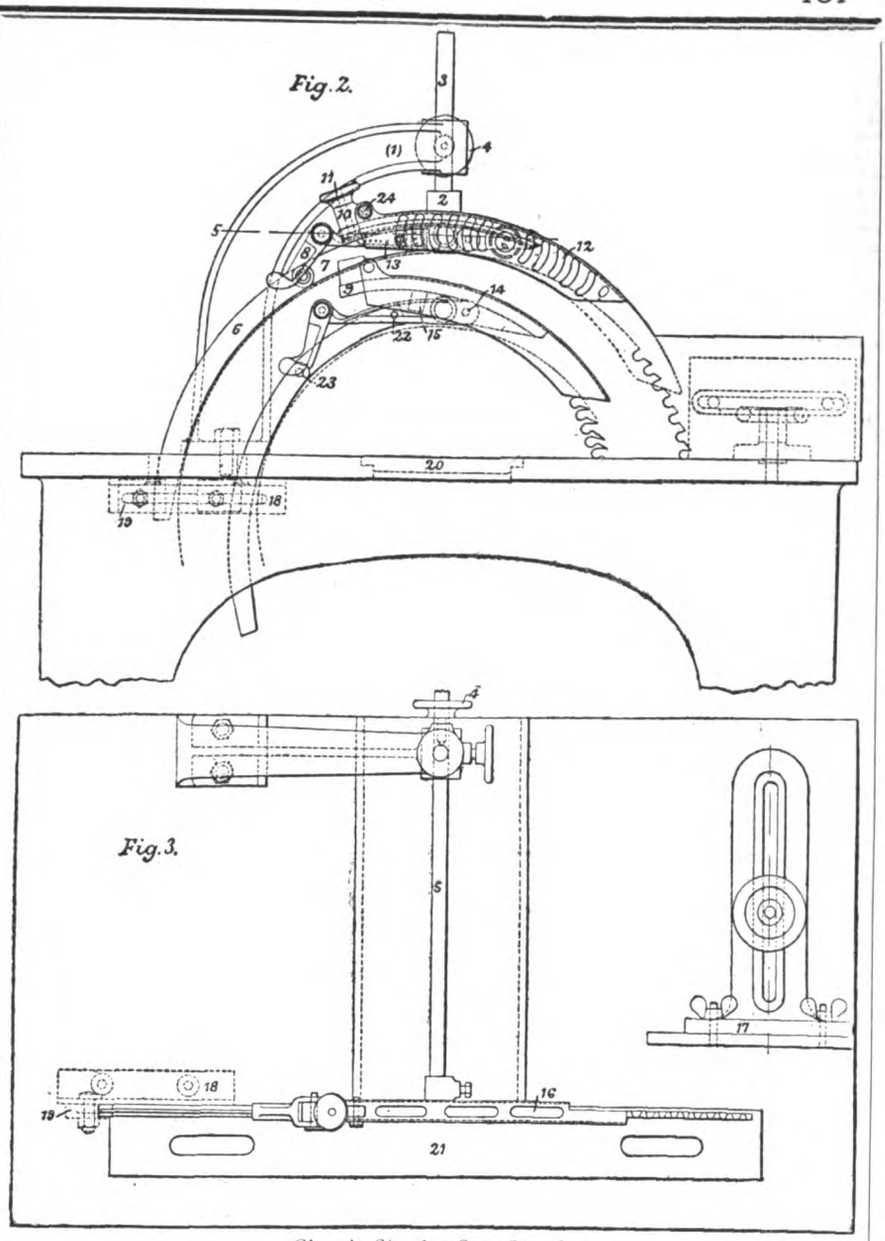
MISCELLANEOUS.

APPOINTMENT.—We are informed that Mr. P. E. Taylor, for seven years Architectural Assistant to the Hull Corporation, has been appointed Chief Architectural Assistant to the Corporation of Coventry.

DUST DESTRUCTOR AND ELECTRIC LIGHTING STATION, WHITECHAPEL.—The new dust destructor was opened and the foundation stone of the new electric lighting station was laid on the 2nd inst. The works are being carried out under the supervision of Mr. Jameson, the Engineer to the District Board of Works, in consultation with Mr. Knight, of Brighton. The destructor was built by Messrs. Manlove, Alliott, & Co., of Nottingham, and Mr. Wm. Griffith is building the electric lighting station.

ISLINGTON PROPRIETARY SCHOOL.—The premises in Barnsbury-street occupied until lately by the Islington Proprietary School are offered for sale. The old school buildings, since enlarged and heightened with an additional story, were built in or about the year 1820 after John Newman's plans and designs.

ST. PAUL'S CATHEDRAL.—Under the superintendence of Mr. Somers Clarke, architect to the Dean and Chapter, and Mr. Harding, clerk of the works to the cathedral, an inscription has been carved in a stone at the foot of the steps leading up to the western doors to commemorate the fact that upon that spot, on June 22, 1897, the Queen offered up thanks for the sixtieth anniversary of her accession.



Glover's Circular Saw Guard.

GLOVER'S CIRCULAR SAW GUARD.—To have a guard to a circular saw which shall afford adequate protection and at the same time interfere as little as possible with the working, is a matter of great importance in a steam joinery shop; and we therefore call attention to the drawing of a circular saw guard made by Messrs. M. Glover & Co., of Leeds, and called by them the "Ideal" guard. The advantages claimed for this are, among others, that it can be adjusted, with ease and with little loss of time, to smaller or larger saws, that it protects the sides of the saw-teeth as well as the tops, and that it protects the front of the saw as far down as the wood being sawn will allow. The following references to the figures on the diagram will afford the best explanation of its structure and action:—

References to Diagram:—

1. Bracket fixed on back or side of bench.
2. Universal carrying block, working on upright shaft, enabling guard to be quickly adjusted or swung aside in case of sharpening in the bench. No need to move the guard when changing saws.
3. Upright shaft or screw with means for fixing.
4. Small hand wheels for fixing after adjusting.
5. Horizontal shaft carrying the guard.
6. Curved and hinged steel "rear guard blade," held at one end under bench top by adjustable bracket and bolt.
7. Curved double-hinged steel "back guard blade."
8. Forked hinged tail piece, whereby the hinged blades are kept linable with saw and rigid side ways.
9. "Tilting holder" with long circular slide carrying the hood (12) in whatever position may be desired.
10. Curved block working in slide of "tilting holder" (9) to which "hood" (12) is hinged.
11. Small hand wheel for instantaneously fixing the block (10) with hood (12) in the required position.
12. Adjustable and hinged hood.
13. Shows one of the devices for instantaneously adjusting blade (7) to the curve of saw and for fixing same.
14. Centre upon which the "holder "(9) "tilts" when adjusted, so that the hood (12) operates suitably for the required curve of saw, whatever be the diameter.
15. Shews one of the devices for fixing the "tilting holder "(9) in the required position instantaneously, nuts or cotters being avoided.
16. Perforations in hood (12) which enable the sawyer to see the line of his saw.
17. Fence which may be brought up close for sawing thin boards, and with ground off saws.
18. Slotted bracket which fixes underneath the bench, and upon which works the cramping plate (19) and bolt, which holds the back knife (6) in line with the saw.
20. Loose leaf which is provided in many types of saw benches, but the brackets are fixed quite clear of this.
21. A loose leaf against the saw.
22. One of the centres upon which the back blade hinges. The main portion of the guard can be swung away from the saw whilst the back guard is left bolted in its position; thus there is no difficulty in sharpening a saw whilst in the bench, after which the main portions of the guard can be swung back again, and almost instantaneously connected with the back steel guard.
23. Refers to a level rule joint in the back blade, which enables the blade to fit more perfectly different diameters of saws.
24. Refers to a hinge upon which the sliding hood works when required.

ADVANCED INSTRUCTION FOR TEACHERS OF PLUMBING CLASSES.—With a view to creating an efficient body of teachers of plumbing classes throughout the country, advanced courses of instruction are carried on at King's College, London. A course is now in progress under the auspices of the Plumbers' Company and the Technical Instruction Committees for Lancashire, the West Riding of Yorkshire, and Great Yarmouth. Instruction is given in the branches of physics and chemistry underlying the practice of plumbing, as well as in sanitation and advanced practical plumbing. The classes are held daily for a month in the workshops and laboratories equipped by the Plumbers' Company. The Saturdays throughout the course are devoted to visiting important plumbing and sanitary works in and around London. By the courtesy of Messrs. Waterhouse & Son, architects, Messrs. Matthew Hall & Co., plumbers, and Mr. Thomas Holloway, builder, the students were enabled on Saturday last to pay visits to the extensive flats now being erected at Artillery Mansions, Westminster, and the extension to the University College Hospital.

TIMBER YARD FIRE, SHEFFIELD.—A fire broke out in the early morning of the 10th inst. at Messrs. Flowerday's Midland Saw Mills and Joinery Works, in Savile-street and Greystock-street, Sheffield. The whole of the premises, with the exception of the offices, was destroyed.

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State of Labour in the Building Trades during July.—According to the *Labour Gazette*, employment in the building trades remained good during July. The percentage of unemployed union members among carpenters and plumbers at the end of the month was 1·8, compared with 2·0 in June and 1·1 per cent. in July of last year. Of the seven disputes which commenced during the month, six were in England and one in Scotland. Five of the disputes have been settled, no settlement being reported of the remaining two.

The Roman Wall of the City.—By a gradual and successful process the course of the old Roman wall, which formerly encircled the City, is being located. The suspicion that the Mediæval wall followed the course of the splendid line of fortification built by the Roman warriors has in more than one instance been proved to be a fact. By means of the excavations made very recently under the old wall at the back of the church of St. Giles, Cripplegate, additional evidence is afforded of the circumstance. The work has been carried out under the direction of the City Surveyor (Mr. A. Murray) and Mr. Deputy Baddeley, and under the personal superintendence of Mr. J. Terry, the clerk of the works. The old bastion was greatly in need of repair, and when the workmen made further excavations it was discovered that the whole of the Mediæval work had been built upon the Roman bastion. This result was obtained at a depth of just 6 ft., where the vastness of the foundation was soon made manifest, and its remarkable strength demonstrated. The skill of the Roman builder is everywhere in evidence, even to the building of a culvert beneath the wall. This hard red-brick construction was probably used for draining the ditch when the latter was full. The culvert is oval in shape, and is in a remarkably good state of preservation. Everything points to the fact that the Mediæval wall follows that of the ancient fortification, which did infinite credit to the Roman workman. It is a matter of historic record that in 1477 the civic authorities repaired the old Roman wall from Aldgate to Cripplegate; and, further, that the Goldsmiths' Company mended the wall from Cripplegate to Aldersgate at about the same time. There is much yet to be learnt concerning the trend of the wall of the Romans, and it is probable that we are on the eve of more than one important and interesting archæological discovery in connexion with the recent excavation.—*City Press.*

Proposed New Street, Bradford.—The quarterly meeting of the Bradford City Council was held on the 14th inst., when it was decided to advertise for an architect to act as head of the proposed new municipal Architectural department, at a salary of 400*l.* per annum.—The Street Improvement Committee recommended that application be made to Parliament for powers to schedule a quantity of property for street improvements, including the proposed new street from the Exchange Station to the Midland Station. Alderman Dobson said the passing of the resolution would not bind the Council to construct the street, but would enable the committee to procure information upon which they might base a scheme to be laid before the Council for acceptance or rejection. Alderman Jowett suggested that the whole matter should be withdrawn for one month, and Alderman Dobson agreed to this, although he urged that the scheme was important, and its ultimate adoption would probably result in a saving to, not an increase of, the rates. The minutes were passed, with the exception of the scheduling clases.

The Great Seal.—The new Great Seal, which will replace the seal that has been used during the last twenty-two years, has been made from the designs of Mr. De Saulles. The seal itself represents the Queen in state robes seated upon a throne, whose arms are supported by lions. At the Queens' feet is a cushion embroidered with the rose, thistle, and shamrock, laid upon a footstool. At her right hand stands St. George, in armour, holding a lance. On the panels are the sword and scales of Justice within wreaths of laurel; around is the legend, "Victoria Dei Gratia, Britt. Regina, Fid. Def. Ind. Imp." On the counter seal is the Queen crowned and holding the orb and sceptre, mounted on a palfrey. In the right field are the Royal arms, encircled with the Order and motto of the Garter. Above is a scroll bearing "Dieu et Mon Droit," and at the sides are the rose, thistle, and shamrock. In the distance, below, are the sea with an ironclad and a sailing ship, together with a trident, dolphins, and waves, emblematical of our country's naval strength and maritime commerce.

Institute of Sanitary Engineers (Incorporated).—At a meeting of the Election Committee held on the 15th inst. the following gentlemen were elected. Members: G. W. Allen, London; H. W. Gladwell, Walton-on-Naze; J. New, Italy; T. S. Venkateswariah, Madras. Associates: R. Blythe, Durham; M. J. H. Lawrence, Pontypridd; W. G. Truscott, Southend-on-Sea; H. Willard, Tunbridge Wells.

Hyde Park-place.—The sites of Nos. 18-24 (west block), having a frontage of 152 ft. to the Bayswater-road, and covering an area of about 8,720 ft. superficial, and of Nos. 12-17 (east block), having a frontage of 121 ft. to the main road, and covering an area of about 9,450 ft. superficial, are about to be let, upon terms of ninety-nine years, for the erection of mansions, or flats, or hotel. Mr. A. J. Bolton is appointed, we learn, as architect for the proposed scheme.

Windows, &c., Clonfert Cathedral.—Three stained-glass windows and a memorial brass have been erected in the chancel of Clonfert Cathedral. They are the gift of Dr. Kenny, of Treeton, Rotherham, Yorkshire. The windows are rich in colour and represent David, Solomon, and the Good Shepherd. They were made by Messrs. Watson, of Youghal. The brass is what is known as a "Latten" brass. It was made by Gawthorp, of London.—A lady has presented to the cathedral a brass font ewer.

CAPITAL AND LABOUR.

The Building Trades in Cork.—For some little time past the builders' labourers in Cork have been negotiating with their employers for an increase of wages. The lowest rate of pay is 16*s.* a week, and in certain instances some men receive 17*s.* and others 18*s.* The demand now is for a weekly advance of 2*s.*—a shilling a week increase on September 1 prox., and another shilling on March 1 next. The employers met recently and refused to grant this, but as a compromise agreed to give a shilling increase on the standard rate of wages in March next. This decision was subsequently communicated to the men, who, as far as can be learnt, have not announced their acceptance or rejection of these terms, but continue to work under the conditions hitherto existing.—*Cork Examiner.*

LEGAL.

DISPUTE AS TO ANCIENT LIGHTS.

The case of Limburg *v.* Daniels again came before Mr. Justice Farwell, sitting as Vacation Judge, on the 22nd inst., on the application of the plaintiff for an interim injunction to restrain the defendant from erecting a building so as to interfere with the plaintiff's ancient lights. The case was reported in the *Builder* last week.

Upon the case being called on, Mr. Alexander, Q.C., for the plaintiff, said that the defendant had given an assurance that he was not going any further with his building, and inasmuch as the plaintiff, by his notice of motion, was not asking for a mandatory injunction, it was useless for him to proceed with the motion for an interim injunction. In these circumstances he had arranged with Mr. Everitt, Q.C. (for the defendant), that the motion should stand till the trial, the costs to be made costs in the action. The action to be set down at once.

Order accordingly.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

8,336.—A Regulator for Gas Supply: *J. Jones and D. Jones.*—For checking the supply of gas to a burner the inventors put a plug or diaphragm in a screw socket within the pipe. The plug—made of metal or of wood—has a small bore along its axis, into which is placed a small tube; the gas cock may also be similarly bored, or one of its elbows may be drawn together.

8,341.—A Stop for French Windows, Louvre Blinds, &c.: *A. I. Gousalves.*—To the fixed framing is pivotted a lever that is loaded at one end in order that the other end may form a stop as it rises to an extent which is limited by means of a curved slot and a screw. As the window is opened in one direction it lowers the end of the lever and passes over it, the window being freed by pressure upon the stop; the lever can be pivotted on to the window instead of the frame, and when fixed beyond reach can be pulled down with a cord or wire.

8,378.—Door Catches: *H. H. Fassett.*—A flanged disc which is kept in its place with a ring that is screwed on to, and is recessed in, the door frame holds a flexible ball within a metal socket which is placed within a recess in the frame, and a counterpart is screwed on to, and is recessed in, the door; by another method a length of india-rubber or other tubing is laid over a metal pin inserted into a rectangular socket, a counterpart being also provided.

8,383.—Bolts for Doors: *J. Banks and J. H. Banks.*—For use with "Tower" bolts the inventors have devised a combined base-plate, guides, and staples, which is fashioned out of a soft sheet-steel blank having slots and screwholes. After it has been annealed the blank is shaped between a pair of dies, so that it may have a guide-way, stop, and staples; the stop is bent to one side when the bolt is to be inserted, and the latter may be turned down into one or other of the depressions in the customary manner.

8,407.—Shutters for Windows: *J. Beaufils.*—The vertical plates are hinged together so that they may be folded against the wall or into a case or locker. The hinge pins carry upon their upper ends rollers that run upon rails above, and upon their lower ends rollers that run within a guide-rail or channel sunk in the ground. The end plate is pivotted on to a pivotted upright, which is fastened with sliding bolts. When fully extended the shutter is secured by means of pivotted catches that engage with staples, or of a jointed sliding bolt attached along its whole width.

8,450.—Manholes for Drains: *F. T. Grant.*—In the cover's depending flange are cut openings that will register with chambers in the frame, which communicate with the shaft underneath the dirt-box. The openings are fitted with flap valves made so as to open only inwards.

8,498.—Regulation of Cage Lifts: *G. Rennerfelt.*—In order to prevent an excessive rate of speed when the motor acts as a generator, the armature in the circuit is polarised by a current which passes through in a direction always the same. In the armature circuit of the motor are the starting-resistance and the field magnet's coil; when, therefore, the current in the field magnet is reversed it causes the armature to rotate, whereupon, by means of a crank, a link, and a pivotted arm, the contacts become bridged over and the resistance is short-circuited. In order to prevent a too sudden increase of the cage's rate of velocity, the motor is arranged to drive a pulley which a spiral spring joins to a fly-wheel upon its shaft. Upon opposed faces of the fly-wheel and pulley are contacts in the circuit of an auxiliary electro-magnetical brake. The fly-wheel's inertia and the spring's strength are so adjusted that the two contacts shall engage when the pulley's acceleration becomes excessive, and the brake arrest the cage's motion. The electro-magnetical switch for the motor armature circuit is put in the field magnet's circuit so that the latter circuit becomes closed always first.

8,511.—Ventilation and Hollow Walls: *A. Simpson.*—The walls are constructed with chambers within them, carried to any length and in any direction, the apertures for the admission of air from without, and for the escape of vitiated air, having a collective area much smaller than that of the wall-chambers, say in the ratio of 1 to 6. In order that vitiated air may be carried away holes having an aggregate area equal to that of the air chambers are made in the walls, floors, roofs, or ceilings. Within the chambers can be placed an apparatus for cooling, warming, or moistening the air.

8,541.—A Water Waste-Preventer, and Siphonical Discharge: *H. Klein.*—The cistern's inlet cock has a float which is made in the shape of a trough or bell, and is arranged over the outlet, to which a twin siphon is attached. Between the two siphons is a pipe up which the pull-chain is passed, and the pull-chain is secured at its end to the float, so that when the chain is pulled the float descends, whereupon the dispersal of water in the cistern induces a discharge of the siphon.

8,561.—Opening and Closing of Gates: *W. H. G. Greaves.*—The invention's object is to provide means for enabling a gate to be opened and closed by any one who is on horseback, or automatically by the weight of a vehicle; to the gate-post is pivotted a sector-shaped arm which carries an upper pivot or pivot-socket, and is also fitted with cords that pass through a guide-ring common to both. The gate can be opened or closed from either side by the pulling of one of the cords; for a fastener or latch a projection upon the gate is caused to engage between two pivotted and weighted jaws, whereof either one is pressed down by the projection when the gate is closed. When the gate is opened with one of the cords it becomes first raised so as to liberate the projection from the jaws, and when the gate has been again closed (by the pulling of the other cord) it becomes raised above an ordinary pivotted stop. The principle of the invention is adapted to other forms whereby the gate may be opened from only one side, or be opened and closed from both sides automatically, through a vehicle's weight, by means of a lever and arch contrivance.

8,638.—Couplings and Joints for Pipes: *R. Mark and W. Mark.*—To effect a disconnectible bayonet-joint or coupling projections upon each pipe fit into grooves inside the sleeve, and when the sleeve is turned round the pipes are moved inwards by the slope of the sides. Between the ends of the pipes is inserted a packing or a washer, and the joint is tightened with wedges that are forced into the grooves lengthwise; the coupling is described as being applicable for shafts.

8,642.—Pavement Lights: *R. Skene.*—The edges of the lights are bevelled so that they shall rise up in the frame as the latter contracts when it becomes cold; the light's refractive portion is shaped in the form of the base of an obtuse-angled triangle, whilst at intervals across its top are made parallel ridges whose cross-section is semi-circular.

8,645.—A Shed for Seasoning Timber: *F. Spaight & Sons and T. J. Ferguson.*—The shed is provided with arrangements for heating and for the supply of air. Perforated air-pipes are laid across

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the shed's floor, their open ends passing through the outer wall; two steam pipes, fitted with drain cocks, and joined with a range of subsidiary inclined pipes, are set over the air-pipes, and above the pipes are tiers of joists, upon which the timber is laid. The steam-pipes heat the air that enters through the air-pipes, and which, having passed amongst the timber, escapes through the roof. Hot air or hot water may be employed instead of steam.

8,659.—A LOWERING APPARATUS: *F. O. Miller and D. Agnew.*—The contrivance, whilst devised chiefly for a fire-escape, is available for use by painters and other workmen and in wells and mining shafts. A set of pivotted toggle-links force friction rollers against the lowering rope, which winds around a drum upon the axis of the clutch from which the workman is suspended. Two escapement wheels at the opposite ends of the drum's axis form an additional device for regulating the descent, the revolution of the wheels being controlled with reciprocating sliding pieces joined by a cross-lever. There are teeth upon the sliding pieces which severally engage with the two escapement wheels in turn.

8,663.—EXTINCTION OF FIRE: *A. H. Van Riper and P. F. Guthrie.*—A water pipe is supplied with chemicals that can be replenished as may be necessary. The chemicals consisting, say, of ammonium chloride four parts, and sodium chloride one part, are put into an inner and perforated removable casing, into which water is admitted. When two containers are used the water enters into one of them at a time, upon the closing and opening respectively of two valves, so that the container which is not in action may be again filled. If only water is employed one of the valves may be opened, whilst that of the chemical-container is closed.

8,726.—ELECTRICAL SWITCHES: *A. Watson (trading as A. Watson & Co.).*—The switches are more especially adapted for connecting up the one or the other of a pair of lamps. In one form of the apparatus a contact which connects the terminal with another contact is carried by an oscillating block, which is either slotted or forked to take the tumbler handle's working end; in another form a turn-button is substituted for the handle, and an eccentrically-mounted block takes the place of the oscillating block. For single-pole switches one of the contacts, or a pair of contacts, is discarded, and for a two-way switch spring contacts that engage with terminals are mounted upon the block.

8,796.—PROCESS OF MOULDING BRICKS, BLOCKS, &c.: *G. Woolliscroft and H. Todd.*—The inventors contrive that a handle, a crank shaft, and a system of levers shall force the ends of the mould and the upper and lower plungers inwards for pressing the material. The mould-ends, sliding upon a table, are joined to cranks with rods and levers; slotted links join a horizontal sliding-rod to a crank upon the shaft, and the sliding-rod carries side-rollers that act upon inclined blocks which are joined to the plungers. As the rollers are moved from between the inclined blocks the top plunger is raised by means of weighted levers, whose ends are taken in slots cut in slide-rods, which join the top plunger's cross-head to one of the blocks.

MEETINGS.

SATURDAY, AUGUST 25.

Northern Architectural Association.—An Excursion Meeting. Members to assemble at the Co-operative New Warehouse, Quayside, Newcastle, at 3 p.m. Mr. D. H. Brims, the contractor, will meet the party, and show them over the works of this patent ferro-concrete building.

SATURDAY, SEPTEMBER 1.

Architectural Association.—Summer Visit to Colney Chapel Convent, near St. Albans, by permission of the architect, Mr. Leonard Stokes.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 1.—By MASON & SONS (at Boston).

Wrangle, Lincs.—Freehold farm, 128 a. 2 r. 32 p.	£5,000

August 9.—By J. A. & W. THARP (at Broadstairs).

Broadstairs, Kent.—Swinburne-av., 36 plots of building land, f.	1,803

By WYATT & SON (at Chichester).

Chichester, Sussex.—110 to 114, Bognor-rd., f.	700

By Messrs. BALLS (at Sudbury).

Cavendish, &c., Suffolk.—The Brick Works and 28 a. 0 r. 34 p., f.	400
Hawkedon, Suffolk.—Swan's Hall Farm, 179 a. 0 r. 19 p., f.	900

By BUCKLAND & SONS.

Windsor, Berks.—Thames-st., Layton's Restaurant, f.	24,000

By FAREBROTHER, ELLIS, & Co.

Merton, Surrey.—Morden-rd., enclosure of building land, 2 a. 0 r. 16 p., f.	810

By FURBER, PRICE, & FURBER.

Islington.—Ball's Pond-pl., i.g.r. 36*l.*, u.t. 32 yrs., g.r. 20*l.*	£180
Dulwich.—160, Rosendale-rd., f., e.r. 65*l.*	700

August 10.—By WYATT & SON (at Pulborough).

Pulborough, Sussex.—Fairview and Brook Lodge, f., r. 46*l.*	700

By R. IMESON & SON (at Bedale).

Carthorpe, Yorks.—Freehold farm, 120 a. 1 r 21 p.	3,200
Three cottages and enclosures of land, 17 a. 1 r. 39 p., f.	765

August 11.—By WILLSON & PHILLIPS (at Burnham-on-Crouch).

Burnham-on-Crouch, Essex.—Green's Farm, 30 a., f.	2,250
Terrace-lane, eighteen cottages, f., r. 109*l.* 15s.	1,480
High-st., house and range of stabling, f., r. 40*l.*	1,125
Piece of garden ground, f.	500

By SWORDER & SONS (at Cambridge).

Ickleton, Cambs.—Abbey-st., Accommodation Farm, 129 a., f. and c.	2,200

August 13.—By VINTEN & SONS (at Ramsgate).

Northwood, Kent.—1, 2, and 3, Coromandel-cottages, f.	340
St. Peter's, Kent.—Vicarage-rd., Thaxted Cottage and three cottages adjoining, f.	400
Vicarage-st., Alfred and Rose Cottages, f.	265
Church-st., cottage and stabling, f.	400
Chilton, Kent.—Chilton-lane, Chilton Farm, 110 a., f.	5,650
Pegwell, Kent.—Pegwell-lane, five cottages, f.	800
Ash-next-Sandwich, Kent.—15 a. of marsh land, f.	500

August 14.—By J. W. COADE.

Battersea.—14, Dorothy-rd., u.t. 87 yrs., g.r. 7*l.* 10s., e.r. 35*l.*	355

By DEBENHAM, TEWSON, & Co.

Hampstead.—69, Fellows-rd., u.t. 64 yrs., g.r. 2*l.*	800
Forest Gate.—Dames-rd., f.g.r. 7*l.*, reversion in 69 yrs.	160

By Messrs. FOSTER.

St. James'.—1c, King-st., u.t. 44 yrs., g.r. 70*l.*, r. 300*l.*	3,500

By H. SPENCER & SONS (at Torksey).

Brampton, Lincs.—Enclosures of grass and arable land, 37 a. 3 r. 39 p., f.	1,367

By WILLIAM ROLFE (at Masons' Hall Tavern).

Guildford, Surrey.—High-st., the Angel Hotel, f., with goodwill	11,500

August 15.—By T. N. TURNER.

Hyde Park.—139, Edgware-rd., and 15, Burwood-mews, u.t. 20 yrs., g.r. 16*l.* 10s., r. 135*l.*	1,100

By WYATT & SON (at Chichester).

West Ashling, Sussex.—Four cottages and 1 a., c., e.r. 32*l.* 10s.	610

August 16.—By PEARCE & SONS.

De Beauvoir Town.—84 and 86, Southgate-rd., u.t. 18½ yrs., g.r. 14*l.* 8s.	625
Hackney.—91, Lauriston-rd., u.t. 51½ yrs., g.r. 7*l.*, r. 48*l.*	420

By STIMSON & SONS.

Hornsey.—Frobisher-rd., f.g.r.'s 31*l.* 10s., reversion in 89 yrs.	780
Putney.—Mexfield-rd., f.g.r. 6*l.* 6s., reversion in 93 yrs.	160
Bethnal Green.—204, Cambridge-rd., f.	470
Battersea.—16 and 17, Bolingbroke-rd., f., r. 87*l.*	1,200
Stoke Newington.—128, Manor-rd., u.t. 74½ yrs., g.r. 11*l.*, r. 75*l.*	920
Highbury.—140, Drayton Park, u.t. 76¼ yrs., g.r. 6*l.* 10s., r. 36*l.*	365
Clerkenwell.—41, Rosoman-st., and 50, Northampton-rd., u.t. 33¼ yrs., g.r. 8*l.*, r. 45*l.*	280
Hounslow.—Bath-rd., Park Dene and 5 a. 2 r. 18 p., f., r. 80*l.*	3,500
Grosvenor-rd., plot of building land, f.	350
Wellington-rd. North, Grosvenor House, also shop with stabling, &c., u.t. 60½ yrs., g.r. 10*l.*, r. 56*l.*	650
Croydon.—9, Addiscombe-gr., u.t. 64 yrs., g.r. 4*l.*, r. 30*l.*	400
Brockley.—7, Malpas-rd., u.t. 52¼ yrs., g.r. 2*l.* 10s., r. 30*l.*	300
Tooting.—The Broadway, shop and premises, f., r. 40*l.*	700
Brixton.—34 and 36, Josephine-av., u.t. 65¼ yrs., g.r. 18*l.*, r. 110*l.*	1,200
11, Pulross-rd., u.t. 64¼ yrs., g.r. 4*l.* 10s., r. 36*l.*	315
14, Trinity-sq., u.t. 27¼ yrs., g.r. 3*l.* 12s. 6d., r. 78*l.*	920
19, Raeburn-st., u.t. 73¾ yrs., g.r. 6*l.* 10s., r. 36*l.*	395
19 and 24, Solon-st., u.t. 67¼ yrs., g.r. 13*l.*, r. 66*l.*	720
27, Plato-rd., u.t. 67¼ yrs., g.r. 6*l.* 10s., r. 34*l.*	380
41, Stockwell-pk.-rd., u.t. 22 yrs., g.r. 10*l.* 10s.	460

***Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.**

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	s.	d.		
Hard Stocks	34	0	per thousand	alongside, in river.
Rough Stocks and Grizzles	30	0	,, ,,	,, ,,
Smooth Bright Facing Stocks..	58	0	,, ,,	,, ,,
Shippers	42	0	,, ,,	,, ,,
Flettons.....	29	6	,, ,,	,, ,,
Red Wire Cuts ..	34	0	,, ,,	at railway depôt.
Best Fareham Red	71	6	,, ,,	,, ,,
Best Blue Pressed Staffordshire ..	87	0	,, ,,	,, ,,
Do., Bullnose	92	0	,, ,,	,, ,,
Best Stourbridge Fire Bricks	84	6	,, ,,	,, ,,
Best White Glazed Stretchers.....	260	0	,, ,,	,, ,,
Headers	240	0	,, ,,	,, ,,
Quoins and Bull-nose	340	0	,, ,,	,, ,,
Double Headers..	320	0	,, ,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	,, ,,	,, ,,
Quoins and Bull-nose	280	0	,, ,,	,, ,,
Double Headers..	280	0	per thousand	at railway depôt.
Seconds Quality White and Dipped Salt Glazed	40	0	per thousand	less than best.

	s.	d.	
Thames and Pit Sand	8	0	per yard, delivered.
Thames Ballast	6	9	,, ,,
Best Portland Cement	36	0	per ton ,,
Best Ground Blue Lias Lime..	23	6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt,

STONE.

	s.	d.		
Ancaster in blocks	2	0	per ft. cube,	deld. rly. depôt
Bath ,, ...	1	7	,,	,,
Beer ,, ...	1	6½	,,	,,
Grinshill ,, ...	1	10	,,	,,
Brown Portland in blocks	2	2	,,	,,
Darley Dale ,,	2	1½	,,	,,
Red Corsehill ,,	2	5	,,	,,
Red Mansfield ,,	2	4½	,,	,,
Hard York ,,	2	10	,,	,,
Hard York 6 in. ,,	sawn both sides landings, to sizes (under 40 ft. sup.)		s. d. 2 7	per ft. super. at rly. depôt.
,, ,,	6 in. Rubbed Ditto..		2 10½	,, ,,
,, ,,	3 in. sawn both sides slabs (random sizes)		1 3	,, ,,
,, ,,	3 in. self-faced Ditto		0 9	,, ,,

SLATES.

in.	in.	£	s.	d.	
20×10	best blue Bangor..	11	5	0	per 1000 of 1200 at ry. dep.
,,	best seconds ,,	10	15	0	,, ,,
16× 8	best ,,	6	2	6	,, ,,
20×10	best blue Portmadoc	10	18	0	,, ,,
16× 8	,, ,,	6	0	0	,, ,,
20×10	best Eureka unfading green.....	11	2	6	,, ,,
16× 8	,, ,,	6	15	0	,, ,,
20×10	Permanent green and Sedan green	10	0	0	,, ,,
16× 8	,, ,,	5	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles..	41	6	per 1,000 at rly. depôt.
Hip and valley tiles....	3	7	per doz.
Best Broseley tiles	48	6	per 1,000 ,, ,,
Hip and valley tiles....	4	0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000 ,, ,,
Do. ornamental Do.	60	0	,, ,, ,,
Hip tiles.....	4	0	per doz. ,, ,,
Valley tiles.....	3	9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000 ,, ,,
Hip tiles	4	1	per doz. ,, ,,
Valley tiles.....	3	8	,, ,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15	10	0	16	10	0
Deals: best 3 by 9	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12	10	0	13	10	0
Battens: best 2½ by 6 and 3 by 6 ..	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds.....	0	10	0	,, ,,		

	At per load of 50 ft.					
Fir timber: Best middling Danzig or Memel (average specification)	4	5	0	4	10	0
Seconds	3	17	6	4	5	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Swedish balks.....	2	15	0	3	0	0
Pitch pine timber (35 ft. average)..	4	0	0	4	10	0

[*See also page 185.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Harbour Offices	Swansea Harbour Trustees	100*l.* and 50*l.*	Nov. 30

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Granite and Gravel	Barnet U.D.C.		Aug. 27
*Waiting Room	Shoreditch Vestry	Vestry Clerk, Town Hall, Old-street, E.C.	Aug. 28
Paving, &c., Short-street, Chickenley	Soothill Nether U.D.C.	J. H. Ward, Surveyor, Council Offices, Earlsheaton	do.
Cottage and Bakehouse, Mill Dam, Pontefract		C. Keyworth, Architect, Bank Chambers, Pontefract	do.
Sewers, &c., between Spotland Bridge & Shawclough	Rochdale Corporation	S. S. Platt, Civil Engineer, Town Hall, Rochdale	do.
Shops, Witton, near Birmingham	Messrs. Byng, Hirst, & Byng	T. W. Willard, Architect, Rugby	do.
Workmen's Dwellings, James-street	Devonport Town Council	Borough Surveyor, 30, Ker-street, Devonport	do.
Schools	Kirby (Essex) School Board	C. E. Butcher, Architect, Queen-street, Colchester	do.
Additions to Tram Car Sheds, New Ferry	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	do.
Church, Waskerley Park, Blackhill		Rev. James Taylor, 10, West View, Blackhill	do.
Flagging, &c., Footpaths, Claremont-road	Salford Corporation	L. C. Evans, Town Hall, Salford	do.
Additions to Holme Hill School	Great Grimsby School Board	H. C. Scaping, Architect, Court Chambers, Grimsby	Aug. 29
Making Michaelson-road	Barrow-in-Furness Corporation	Borough Engineer, Town Hall, Barrow-in-Furness	do.
Sewers, &c., Low Friarside and Linty	Tanfield (Durham) U.D.C.	R. Heslop, Surveyor, Burnopfield	do.
Sewers, &c., Crumlin Cross Roads	South Dublin R.D.C.	T. Phelan, Board Room, James-street, Dublin	do.
Sewers, Abbey-road	Barrow-in-Furness Corporation	Borough Engineer, Town Hall, Barrow-in-Furness	do.
Hotel, Rhymney	Rhymney Brewery Company	T. Roderick, Architect, Aberdare	Aug. 30
Alterations to the Royal Arms Hotel, Rhymney	do.	do.	do.
Seven Cottages, St. Olaves, near Yarmouth		Morgan & Buckingham, Architects, 3, Bidwell-street, Norwich	do.
Alterations to Chapel, Lwyddffynnon, Wales		J. Lloyd, Chapel House, Lwyddffynnon	do.
Water Supply Works, Huntly	Aberdeen Commissioners	J. Barron, Civil Engineer, 1, Bon Accord-street, Aberdeen	do.
Additions to Premises, Howick-street, Alnwick	Mr. A. H. Henderson	W. R. Hindmarsh, Architect, Alnwick	do.
Five Houses, Bargoed	Rhymney (Wales) Brewery Co.	T. Roderick, Architect, Aberdare	do.
Public Baths, &c., Marsh-lane	Bootle (Lancs.) Corporation	T. Cox, Architect, 11, Dale-street, Liverpool	do.
Culvert, Walker Park	Walker (Northumberland) U.D.C.	T. M. Sturgess, 5, St. Nicholas-buildings, Newcastle-on-Tyne	do.
Tar Pavement (6,500 yards)	Leamington Corporation	W. de Normanville, Engineer, Town Hall, Leamington	do.
Drainage Works, Balcarres-street	Edinburgh Magistrates & Council	Burgh Engineer, Town Hall, Edinburgh	do.
Workmen's Houses, West Port	do.	T. Hunter, City Chambers, Edinburgh	Aug. 31
Cottages, Abbotsham	Rev. R. W. Sealey	R. T. Hookway & Son, Architects, 12, Bridgeland-street, Bideford	do.
Shop Front, &c., 40, Scotch-street	Carlisle Corporation	H. C. Marks, Civil Engineer, 36, Fisher-street, Carlisle	do.
Additions to the Western Schools	Tynemouth School Board	F. R. N. Haswell, Architect, Tyne-street, North Shields	do.
Reservoir, High Warren	Warrington Corporation	J. Deas, Civil Engineer, Bank House, Warrington	do.
Stabling, &c., Treninick Farm, Gorran, Cornwall	Mr. W. Knight	F. C. Jury, Architect, Tregonissey-road, St. Austell	Sept. 1
Additions to Schools, Fazeley	Tamworth School Board	J. W. Godderidge, Architect, 4, Bolebridge-street, Tamworth	do.
Reconstruction of Bridge, Hammond Beck, Donington	Holland (Lincs.) County Council	L. Starkie, Surveyor, Wellington House, Skirbeck	do.
Sewers, &c.	Carrickfergus (Ireland) U.D.C.	S. P. Close, Civil Engineer, 13, Donegall-square North, Belfast	do.
Sewerage Works	Alderley Edge (Manchester) U.D.C.	W. Spinks, Engineer, 23, Park-row, Leeds	do.
*Firemen's Dwellings	Bradford Corporation	Mawson & Hudson, Architects, The Exchange, Bradford	do.
Sewers, Whitchurch-road	Llandaff R.D.C.	W. Fraser, Civil Engineer, 35, St. Mary-street, Cardiff	Sept. 3
Sewerage Works	Lower Bebington (Cheshire) U.D.C.	Beloe & Priest, Civil Engineers, 13, Harrington-street, Liverpool	do.
Subway under Railway, Dolan	Llanelly U.D.C.	H. W. Spowart, Town Hall, Llanelly	do.
Tramcar Shed, Thornbury	Bradford Corporation	J. H. Cox, City Surveyor, Town Hall, Bradford	do.
Road Works, Alexandra and Victoria-streets	Stapleford R.D.C.	F. R. Hawley, Surveyor, 1, Stamford-street, Ilkeston	Sept. 4
Billiard Room, &c., Polapit Tamar, Launceston	Mr. R. C. Coode	R. P. Whellock, Architect, 45, Finsbury-pavement, London, E.C.	do.
*Foundations, &c.	Bristol County Council	H. Williams, Architect, 24, Clare-street, Bristol	do.
*Slop Carts	Leyton U.D.C.	Surveyor, Town Hall, Leyton	do.
*Lodge	Southgate U.D.C.	Council Offices, Palmer's Green, N.	Sept. 5
Sewers, &c.	Leicester Corporation	E. G. Mawbey, Civil Engineer, Town Hall, Leicester	do.
Paving, &c., Hanson-street	Middleton (Lancs.) Corporation	W. Welburn, Borough Surveyor, Town Hall, Middleton	do.
Water Supply Works	Melton Mowbray U.D.C.	E. Jeeves, Surveyor, Nottingham-street, Melton Mowbray	do.
Flints, &c.	Clacton-on-Sea U.D.C.	A. R. Robinson, Surveyor, Town Hall, Clacton-on-Sea	do.
Making-up St. Andrew's-road	Clacton (Essex) U.D.C.	do.	do.
Laying C.I. Pipes (5,060 yards)	Newtown (Montgomery) U.D.C.	R. W. Davies, Surveyor, Newtown	do.
Street Works, Hamlet Court-road	Southend Corporation	A. Fidler, Civil Engineer, Borough Surveyor, Southend	Sept. 6
Street Works, Kilworth-avenue and George-road	do.	do.	do.
Sewerage and Water Supply Works, Heamoor	Madron (Cornwall) U.D.C.	F. Latham, Civil Engineer, Penzance	Sept. 7
*Coastguard Buildings at Cromer	Admiralty	See Advertisement	do.
Drainage Works	Roxetti (Harrow) Burial Board	Cowell & Shaw, Surveyors, 49, Finsbury-pavement, E.C.	Sept. 8
*Cast-iron Socket Pipes	Reigate R.D.C.	R. B. Grantham & Son, 23, Northumberland-avenue, W.C.	Sept. 10
*Sewage Works	do.	do.	do.
Engine House at Waterworks	Worcester Corporation	T. Caink, Civil Engineer, Guildhall, Worcester	Sept. 11
Asphalte Paving, &c.	Wallasey (Cheshire) U.D.C.	W. H. Travers, Engineer, Public Offices, Egremont	do.
*Sewering, Levelling, Paving, &c.	Bromley U.D.C.	Surveyor, Council Offices, Bromley, Kent	do.
*Sewerage Works	Greenwich Board of Works	Offices, 141, Greenwich-road, Greenwich	Sept. 12
*Improving the Sea Front at Minehead	Minehead U.D.C.	F. W. Roberts, Engineer, Taunton	Sept. 15
*Stables, &c.	Bermondsey Vestry	Vestry Clerk, Town Hall, Spa-road, Bermondsey, S.E.	Sept. 17
*Storage Reservoir, &c.	Tynemouth Corporation	See Advertisement	Sept. 18
*Schools, Pleasley Hill, near Mansfield	Mansfield School Board	Vallance & Westwick, Archts., White Hart Chmbrs., Mansfield	Oct. 1
*Engineering Work for Public Baths	Acton District Council	Council Offices, 242, High-street, Acton	Oct. 2
*School at Croyland-road	Edmonton School Board	See Advertisement	do.
*Boundary Walls	Stepney Guardians	Guardians' Offices, Barnes-street, Stepney, E.	No date
Sixty-six Cottages, Shotton Colliery, Durham	Horden Collieries, Limited	The Manager, Shotton Colliery, Castle Eden R.T.O.	do.
Two Villas, Lightcliffe, near Halifax		G. H. Elliott, Architect, Lightcliffe	do.
Slater's Work at Electricity Works	Keighley Corporation	J. M. Smyth, Borough Engineer, Bridge-street, Keighley	do.
Altering Houses into Shops, Cheltenham-rd., Bristol		T. J. Moss Flower, Civil Engineer, 28, Baldwin-street, Bristol	do.
Roads, Conisborough, Yorks.		J. White, Civil Engineer, Mexborough	do.
Street Works, Ballysillan, Ireland		M. Johnson, Lough View House, Lower Ballysillan	do.
Road Works	Calverley, near Leeds, U.D.C.	W. Walker, Surveyor, Council Offices, Calverley	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	St. Pancras Vestry	3*l.* 3s. per week	No date

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xix. Public Appointments, pp. xvi. xvii. & xix.*

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PRICES CURRENT (*Continued*).

JOINERS' WOOD.	At per standard. £ s. d.	£ s. d.
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	17 10 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	24 0 0	25 0 0
Do. 3 in. by 9 in.	21 0 0	22 0 0
Battens	16 0 0	17 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0	19 10 0
Do. 3 in. by 9 in.	16 10 0	17 10 0
Battens	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in.	14 10 0	15 10 0
Do. 3 in. by 9 in.	13 10 0	14 10 0
Battens	12 0 0	13 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 10 0	12 10 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
,, ,, ,, 3 in. by 9 in.	12 10 0	13 10 0
,, ,, battens	10 10 0	11 10 0
Pitch pine: deals	16 0 0	18 0 0
Under 3 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	29 0 0	31 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,,	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 6	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders ,, ,,	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	12 0 0	- - -

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	10 5 0	10 15 0
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0
Staffordshire "Marked Bars"	13 5 0	- - -
Hoop Iron, basis price	11 5 0	11 15 0
,, ,, galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 10 0	- - -
,, ,, to 24 g.	12 15 0	- - -
,, ,, to 26 g.	13 15 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. by 3 ft. to 20 g.	14 15 0	- - -
,, ,, 22 g. and 24 g.	15 5 0	- - -
,, ,, 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 10 0	- - -
,, ,, 22 g. and 24 g.	19 0 0	- - -
,, ,, 26 g.	20 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 0 0	14 15 0
,, ,, 20 g. and 24 g.	14 15 0	15 10 0
Cut nails, 3 in. to 6 in.	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
COPPER—		
Strong per lb.	0 1 0	- - -
Thin ,,	0 1 2	- - -
Copper nails ,,	0 1 3	- - -
TIN—English Ingots ,,	0 1 7	- - -
SOLDER—Plumbers' ,,	0 0 8	- - -
Tinmen's ,,	0 0 10	- - -
Blowpipe ,,	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3½d. ,, ,,
,, ,, fourths	3¾d. ,, ,,
26 oz. thirds	4½d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5½d. ,, ,,
,, ,, fourths	5d. ,, ,,
Plated sheet, 15 oz.	3½d. ,, ,,
,, ,, 21 ,,	4½d. ,, ,,
Hartley's Rolled Plate	3d. ,, ,,
,, ,, ,,	3½d. ,, ,,
	4d. ,, ,,

PRICES CURRENT (*Continued*).

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
,, ,, ,, in barrels ,,	0 3 2
,, ,, ,, in drums ,,	0 3 4
Boiled ,, ,, in pipes ,,	0 3 4
,, ,, ,, in barrels ,,	0 3 5
,, ,, ,, in drums ,,	0 3 7
Turpentine, in barrels ,,	0 2 11
,, in drums ,,	0 3 2
Genuine Ground English White Lead ...per ton	27 10 0
Red Lead, Dry ,,	25 0 0
Best Linseed Oil Putty ...per cwt.	0 9 6
Stockholm Tar ... per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 6
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

C. C. H.—A. H. (Amounts should have been stated). J. P. E. (Below our limit.)

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We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

AUCHTERLESS, N.B.—For additions to farm steading, Kingsford. Messrs. J. Duncan & Son, architects, Turriff:—

Masonry.—Pratt & Sons, Fyvil* £95 15
Carpentry.—W. H. Skene, Turriff* 135 0
Slating.—S. Christie, Jnr., Dyce* 72 15
} £303 10

BARKING (Essex).—For making-up, kerbing, &c., Creeksmouth-lane, for the Urban District Council. Mr. C. F. Dawson, surveyor, Public Offices, Barking:—

W. Griffiths £2,998 | D. T. Jackson, Barking* £2,400
J. Burrill 2,700 |
[Surveyor's estimate, £2,500.]

BEDFORD.—For making-up Dunville, Gratton, and Preston roads, for the Urban Sanitary Authority:—

Prestom-road.

Rootham & Jeakings £63 5 3
A. Henman, Bedford* 62 5 6

Dunville and Gratton-roads.

Rootham & Jeakings £151 16 6
A Henman, Bedford* 149 8 0

BRIGHTON.—For the execution of wood-paving works for the Corporation. Mr. F. J. C. May, C.E., Town Hall, Brighton:—

A. & F. Manuelle.. £13,707 | P. Smith £13,140
W. Griffiths 13,584 | Mowlem & Co., Westminster* 13,034
Acme Wood Flooring Company 13,336 |

BURTON-UPON-TRENT.—For the erection of fifty cottages for the Corporation. Mr. G. T. Lynam, Borough Surveyor, Town Hall, Burton-upon-Trent:—

A. Jewell £12,133 19 2 | R. Kershaw £9,750 0 0
J. Dickenson 11,411 11 6 | J. & T. W. Selby 9,395 14 4
W. A. Stevenson 10,600 0 0 | W. Walkerdine, Derby* 9,000 0 0
G. Hodges.. 9,875 0 0
A. Geary .. 9,751 0 0

CANTERBURY.—For the execution of water-supply works, for the Blean Rural District Council. Mr. H. T. Sidwell, C.E., Herne-street, near Canterbury. Quantities by the Engineer for the Works:—

For supplying and laying:—
Williams, 71, Bankside* £1,446 0 0
Laying only—
Turner 918 0 0
Seamark & Hudson 727 0 0
E. Nun 595 0 0

Per ton:—

C. P. Gibbons £8 12 0 | Cochrane & Co. £7 15 0
Stanton Iron Works 8 7 6 | Butley Iron Works 7 12 6
J. Romans 8 2 0 | Sheepbridge Co... 7 12 6
S. Roberts 7 15 0 | Biggs, Wall, & Co. 7 9 6
| Merton 7 7 0
[Engineer's estimated cost, £1,500.]

CARDIFF.—For the erection of a house and depot, Roath Park, for the Corporation. Mr. W. Harpur, C.E., Town Hall, Cardiff. Quantities by the engineer:—

Gerard Hallett £2,149 8 10 | D. W. Davies £1,896 0 0
John Blight .. 2,041 9 1 | Geo. Griffiths 1,855 8 0
Melhuish Bros. 2,035 12 3 | E. R. Evans Bros. 1,850 8 2
W. H. Ingleson 1,998 10 0 | J. H. Venning* 1,850 0 0
Blacker Bros.. 1,939 13 1 |
[All of Cardiff.]

COTTESMORE (Rutland).—For groom's cottage, with outbuildings, loose boxes, coach-house, and laundry, for Mr. G. Cecil Noel. Messrs. Tait & Herbert, architects, Friar-lane, Leicester:—

Emerson & Co., Cottesmore* £1,582 19 2

COVENTRY.—For the erection of foundations for an engine-house, Hales-street, for the Corporation. Mr. J. E. Swindlehurst, City Engineer, St. Mary's Hall, Coventry:—

Isaac & Sons, Foulshill* £1,019 13

CROYDON.—For making-up Marian-road, Mitcham, for the Rural District Council:—

Free & Sons £652 10 | E. Iles, Mitcham* £636 0

ESH (Durham).—For the construction of sewage disposal works for the Lanchester Rural District Council. Mr. J. E. Parker, C.E., Post-office Chambers, Newcastle-on-Tyne:—

E. H. Bell, Bishop Auckland* £898 9
[Engineer's estimate, £915.]

GRAVESEND.—For making-up, &c., Lennox-road, for the trustees of the late Mr. J. Willoughby-Brown. Mr. G. W. Cobham, surveyor, 1, Edwin-street, Graves, end:—

J. C. Trueman‡ £250 0 0 | Masters & Co., Gravesend‡* £207 0 0
Thos. Adams§ .. 249 0 0 |
F. J. Field‡ .... 221 7 9 |
‡ Including fence. § Not including fence.

HALIFAX.—For the erection of a house, West Vale, for Mr. Chas. Greenwood, West Vale, near Halifax. Mr. F. F. Beaumont, architect, Southgate-chambers, Halifax:—

Masonry.—Drinkwater & Schofield, Greetland* £204 15
Joinery.—James Garside, West Vale* 62 0
Slating.—Hill & Co., West Vale* 42 0
Plumbing.—J. Sykes, West Vale* 30 0

HERNE (near Herne Bay).—For additions to hospital, west end (complete new block of four beds in two wards, convalescent ward, nurses' duty and day-rooms, &c.), for the Blean Rural District Council. Mr. H. T. Sidwell, C.E., Council Offices, Herne-street, near Herne Bay, Kent:—

Gain & Co. £1,930 | Smellie £943
Thos. Turner 1,283 | F. J. Gates, Herne Bay* 761
E. Adams 1,210 |
Spencer Bros. 1,135 | [Surveyor's estimate, £778.]

KEIGHLEY.—For the erection of a rectory house, for the Rev. H. J. Palmer. Messrs. J. B. Bailey & Son, architects, 3, Scott-street, Keighley:—

Greenhow & Murgatroyd, Keighley* £2,733 17
[All trades.]

KENDAL.—For the erection of a villa at Kendal, for Mrs. Bryce. Mr. John Hutton, architect, Kendal. Quantities by architect:—

Masonry and Slating.—J. Howie, Kendal*
Carpentry and Joinery.—T. & S. Park, Kendal*
Plastering.—Woodburn & Storey, Kendal*
Plumbing, Painting, and Glazing.—L. Airey, Kendal*
} £880

KING'S NORTON.—For the execution of private street improvement works, for the Urban District Council. Mr. A. W. Cross, C.E., 23, Valentine-road, King's Heath:—

Jacob Biggs £719 14 8 | Abel Cooper £467 14 6
Lowe & Sons .. 573 0 0 | R. W. Fitzmaurice, Birmingham* 457 7 2
Carrall, Lewis, & Martin 488 2 4 |

KIRBY MUXLOE.—For additional schoolroom accommodation at the Nonconformist Church. Messrs. Tait & Herbert, architects, Friar-lane, Leicester:—

Mason & Sharpe, Leicester* £187 15

LONDON.—For the erection of two houses and shops, Nos. 412 and 416, High-road, Tottenham, for Mr. Andrew Powles. Mr. Augustine C. Green, architect, 40, Bruce Castle-road, Tottenham, N.:—

H. Knight & Son.. £2,650 | W. H. Howell £1,850
A. Porter ..... 1,972 | S. Goodall 1,597
J. Stewart ..... 1,927 | John Groves* 1,474

[*See also next page.*

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LOUGHBOROUGH.—For painting and decorating interior of Corn Exchange, entrance hall and staircase, and exterior of Town Hall. Mr. A. H. Walker, A.M.Inst.C.E., Borough Surveyor. Quantities by Surveyor :—

	Exterior of Hall.	Entrance Hall and Staircase.	Interior of Corn Exchange.	Total.
W. Bass	£25 0 0	£67 10 0	£132 15 0	£225 5 0
A. E. Walker	25 0 0	66 19 6	131 0 0	222 19 6
W. J. Billson	24 18 6	67 5 0	127 16 6	220 0 0
J. Fisher	26 15 0	56 17 6	134 0 0	227 12 6
F. Shipley	23 15 0	67 5 0	132 12 0	223 12 0
Grundy & Son	30 0 0	65 0 0	132 0 0	227 0 0
A. Street	27 10 0	68 4 6	135 15 0	231 9 6
T. Johnson	23 19 6	67 10 0	131 17 3	223 6 9
W. J. Shipley	23 9 0	70 0 0	134 5 0	227 14 0
Whitlock & Gatton	12 12 2	36 1 2	89 13 7	138 6 11
Snaith & Co.	13 4 7	56 10 7	102 0 0	171 15 2
Walker & Son*	9 17 6	43 17 6	83 8 4	137 3 4
Sparrow & Son	12 2 4	49 16 4	84 19 4	146 18 1

LONDON.—For the erection of a stable and store, Page Green-road, South Tottenham, for Messrs George Hickling & Co. Mr. Augustine C. Green, architect, 40, Bruce Castle-road, Tottenham, N. :—

J. Edgar	£385	J. Stewart	£265
Knight & Son	314	W. Easun*	235
C. H. Coll	284		

LONDON.—For proposed new depot for the London Parcels Delivery Company, Limited, at South End-road, Hampstead, N.W. Mr. Henry Poston, architect, 39, Lombard-street, E.C.:—

Holliday & Greenwood	£7,149	Hall, Beddall, & Co.	£6,819
Killby & Gayford	6,936	Todd & Co.	6,817
Mowlem & Co.	6,850	Blyton & Sons*	6,700

LONDON.—For sundry repairs at 12, Penywern-road, Earl's Court, South Kensington. Messrs. Morley & Letts, surveyors, 185, Earl's Court-road, S.W. :—

Heath & Son	£345	Smith & Son	£331
J. Whitaker	339	Holdstock & Mould*	325

LONDONDERRY.—For the erection of a shop and house, Barry-street and Strand-road, for Mr. W. M'Carter. Mr. T. Johnston, architect, 11, East Wall, Londonderry :—

McDaid Bros.	£525	Joseph Shannon	£405
J. Mooney	517	Alexander Dunlop	405
Maultsaid & Polloch	490	Shannon & Rutledge, Fountain-street*	400
Matthew Jack	427		
Crooks & Ferguson	424		

LOUGHBOROUGH (Leicestershire).—For alterations, &c., to Town Hall, for the Town Council. Mr. A. H. Walker, C.E., Town Offices, Loughborough. Quantities by engineer :—

H. Shardlow	£3,730 0 0	W. Corah	£3,466 11 11
J. G. Parker	3,627 0 0	Moss & Sons, Ltd., Loughborough†	3,450 0 0
J. F. Ball	3,620 0 0		
W. F. Harding	3,606 0 0	Main, Kendall & Main	3,395 0 0
J. G. Sills	3,550 0 0	Wm. Tailby‡	3,304 0 0
C. A. Dobson	3,475 0 0		

‡ Withdrawn.

MORLEY.—For additions to bakery, Bakery-street, for Messrs. Metcalfe & Bradshaw. Messrs. Buttery & Birds, architects, Queen-street, Morley :—

Masonry.—W. & H. Sykes, Westfield-road, Morley	£186 12 10
Joinery.—J. Broscombe, Adwalton	157 13 0
Plumbing.—G. A. Firth, Fountain-street, Morley	28 0 0
Plastering.—E. Wilson, Westfield-road, Morley	30 0 0
Slating.—J. May, Peel-street, Morley	26 5 6

POKESDOWN.—For kerbing, paving, &c., Parkwood-road and two others, for the Urban District Council. Mr. E. W. Ingamells, engineer, Council Offices, Pokesdown, Hants :—

The Asphaltic Limestone Concrete Company, Limited	£2,259 16 5
W. H. Saunders	1,832 9 1
Josiah Smart	1,799 4 1
Grounds & Newton, Bournemouth and London*	1,752 2 7
H. Shepperd (informal)	—

PULHAM MARKET.—For the erection of a laundry at Workhouse, for the Depwade Guardians. Mr. A. Clarke, architect, 126, London-road, Lowestoft :—
Anthony Boddy, Orchard-street, Norwich .. £499

ST. ALBANS.—For the erection of a detached residence, Manor-road, St. Albans, for Mr. A. E. Hancock. Mr. S. Doddimeade Edmunds, architect, 23, Victoria-street, St. Albans, and London :—

Miskin & Sons	£1,450	J. T. Bushell	£1,080
Goodchild & Sons	1,450	E. Dunham*	1,065
Boff Bros.	1,092		

[All of St. Albans.]

WESTCLIFF-ON-SEA. — For the erection of a detached house, Imperial-avenue, for Mr. R. Chadwick. Messrs. Greenhaigh and Brockbank, architects, Bank Chambers, Southend-on-Sea, and Broad-street House, New Broad-street, London. Quantities by architects :—

Kirk & Kirk	£2,150	Dupont & Co.	£1,865
F. & E. Davey	1,956	Shelbourne & Co.	1,850
E. West	1,945	T. C. Galliard, Charing Cross, W.C.*	1,783
Davis & Leaney	1,935		

WESTCLIFF-ON-SEA.—For the completion of small residence in Preston-road, Westcliff-on-Sea, for Mr. J. Luke-Cocks. Mr. H. Fuller Clark, architect, 28, John-street, Bedford-row, W.C.:—
T. Lawford* £695

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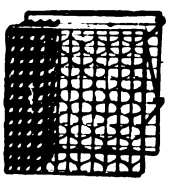

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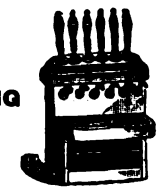

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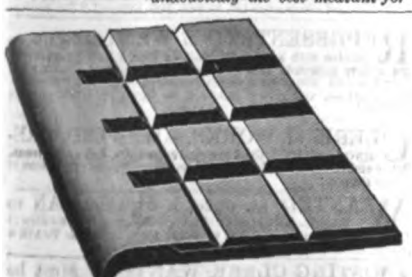

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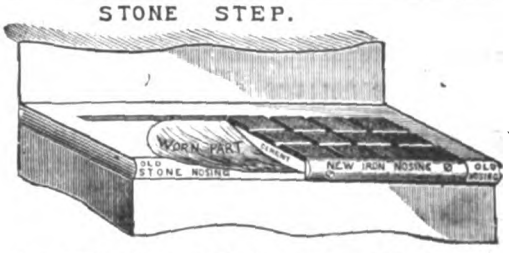

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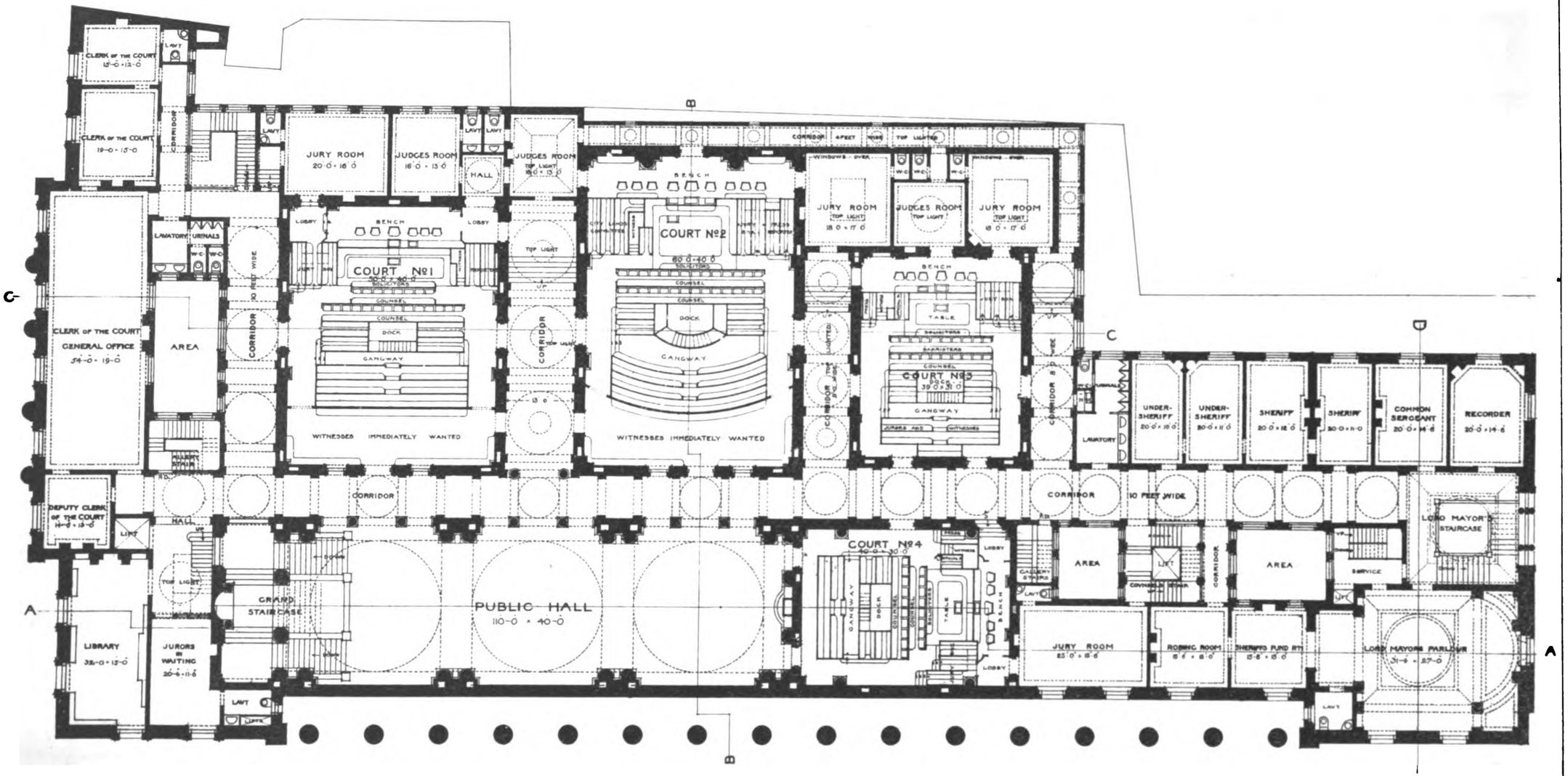

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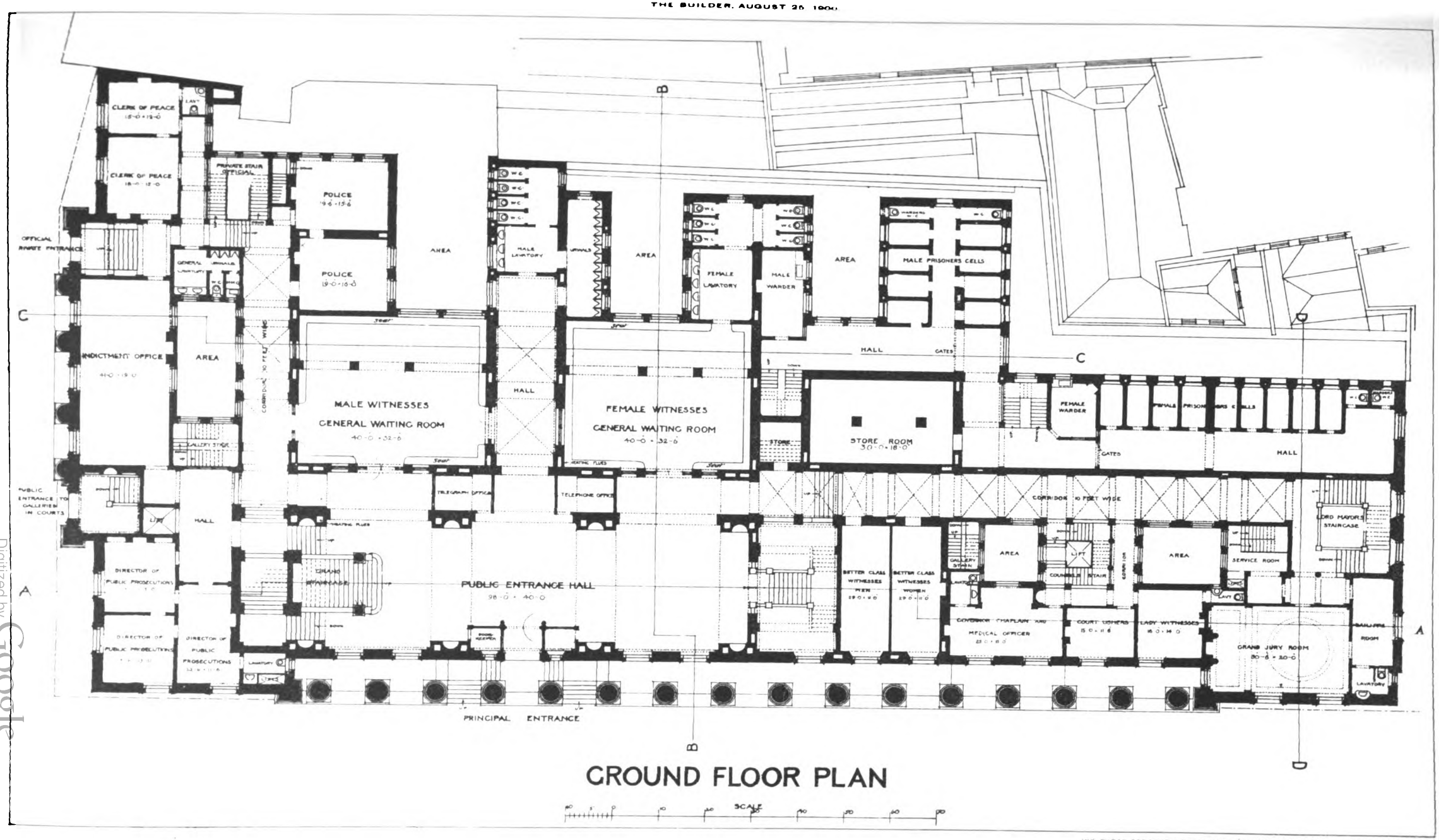

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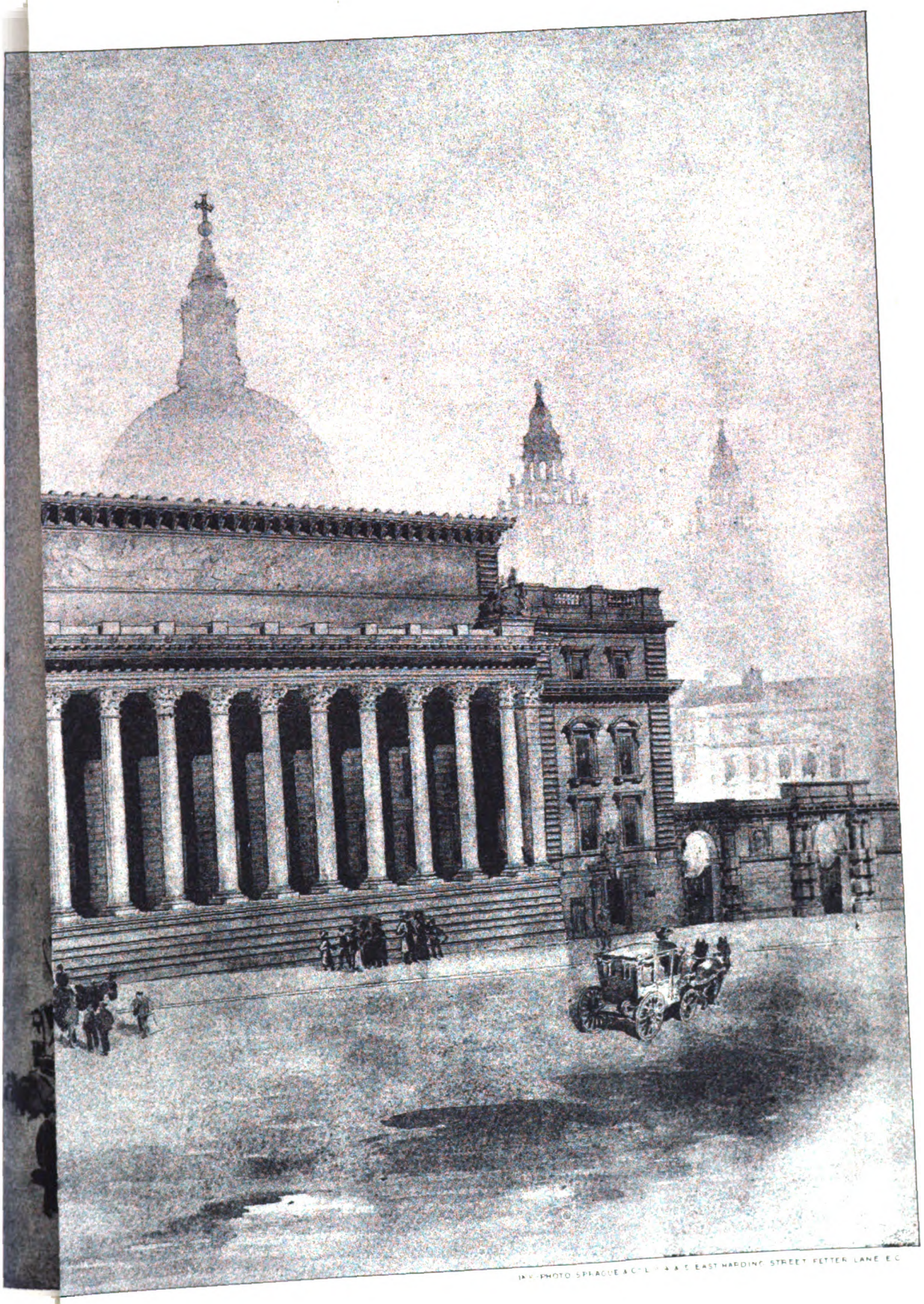

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VOL. LXXIX., No. 3304 SEPTEMBER 1, 1900

ILLUSTRATIONS.

Old Bailey Sessions House Competition.—Design submitted by Mr. John Belcher, A.R.A. :—
Perspective View ..... *Double-Page Ink Photo.*
Interior of Great Hall ..... *Double-Page Ink Photo.*
Detail Elevation of Angle Portico and Cupola ..... *Double-Page Ink Photo.*
Plans ..... *Double-Page Ink Photo.*

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Administrative Engineering at the Paris Exhibition.

AMONGST the features of interest in the Paris Exhibition none are more worthy of attention than the installations dedicated to the service of exhibitors and the public; and some record of the system employed may not only be of interest for the moment, but may be useful as a suggestion for the working, in this respect, of future great exhibitions on other sites.

Systems designed for the distribution of power, light, and water depend alike upon the central embodiment of energy to be found in the boiler department. It is therefore appropriate that our brief review of administrative services should commence with some notes upon the "Bâtiments des Chaudières" and their equipment. There are two boiler-houses, situated on either side of the Salon d'Honneur, their ends bounded respectively by the Avenue de la Bourdonnais and the Avenue de Suffren. Each building measures 383 ft. long by 131 ft. wide, and contains two rows of boilers, linked together by steam pipes which communicate with the general distributing mains. Thus all the generators become units in one great system, constituting the fountain-head of activity for that part of the Exhibition which is within the walls of Paris. The boilers are disposed back to back in ranges of twenty, and between the ranges in each boiler-house is a central passage 13 ft. in width, along which are railway tracks running from the Champ de Mars station, so that fuel may be delivered in trucks directly upon the site. When we state that about 200 tons of coal are consumed daily, the advantage of this arrangement will be fully appreciated. Beneath the rails are two parallel galleries conveying products of combustion from the boiler flues to the chimney shafts immediately outside the two buildings. These underground galleries are built of brick on a foundation of *béton*; the spaces between the two inner walls are filled with sand, in order to provide for expansion by heat, and they increase in height as the chimneys are approached, the maximum internal dimensions being about 15 ft. high by 8 ft. 6 in. wide.

Both chimney shafts were built by MM. Nicou & Damarigny, whose designs were accepted as the result of a competition. The height of each shaft is 263 ft. above ground level; the external diameter is 39 ft. 4 in. at the base, whilst the internal measurements are 20 ft. 4 in. at the base and 14 ft. 9 in. at the top. As the total weight to be carried by each foundation is more than 7,850 tons, specially careful treatment was necessary. Through a stratum of soft clay, encountered at the depth of about 26 ft., piles were driven to the rock level situated nearly 60 ft. below the surface; the upper ends of the piles were then embedded in *béton* to a depth of 5 ft., and upon this bed, 60 ft. in diameter, a masonry foundation was built to the ground level. The lower portion of the work was executed by the aid of external scaffolding and the remainder by internal platforms. An attempt has been made to impart an artistic appearance to the chimneys by the use of light-tinted ceramic bricks for facing and by the introduction of designs in bricks of various colours, but the idea conveyed is merely that of a somewhat decorated factory chimney. The cost of the two shafts is stated at 16,240*l.*, and 3,000,000 ordinary bricks were required without reckoning ceramic bricks.

So far as the boilers themselves are concerned, it may be mentioned that the gallery adjoining the Avenue de la Bourdonnais is reserved for French makers, amongst whom are the Babcock & Wilcox French Company; the Compagnie de Fives-Lille; De Naeyer & Cie., of Willebroeck; and J. & A. Niclausse, of Paris. In the gallery next the Avenue Suffren, where the rest of the world is permitted to exhibit, the plant includes boilers by Babcock & Wilcox, U.S.A.; Berninghaus, of Duisberg; Dereux, of Duren; Fitzner & Camper, of Sosnowice; Galloways, of Manchester; the H. Pancksh Actien Gesellshaft, of Landsberg; Simonis & Lanz, of Frankfort; and Steinmuller, of Gummersbach. Out of the eighty boilers installed only six are of English make, and more than half of the total number are of the water-tube type.

Some idea of the collective power represented by the boiler installation is furnished by the fact that 44,000 gallons of water must be evaporated per hour to supply the engines with steam. Beyond this a vast quantity of water is required for condensing plant and other purposes, as we shall describe later. Steam is collected from the boilers by mains of 10 in. diameter, carried along each side of the building, and before entering the distributing mains it passes through equalising cylinders, so that a uniform pressure of 140 lbs. per square inch may be ensured. It should be remarked that some of the engines are unable to exert their full power, being designed for using steam at higher pressures, whilst others intended for lower pressures than 140 lbs. per square inch are necessarily provided with reducing valves.

In the machinery gallery, of which one-half is devoted to France and the remainder to foreign nations, steam is supplied to upwards of forty engines and dynamos capable of developing fully 40,000 h.-p. Of this power only about one-half is required for administrative purposes, 5,000 h.-p. being used for power and 15,000 h.-p. for electric lighting. We must candidly admit that Great Britain makes a very poor show in this department of the Exhibition. Messrs. Willans & Robinson have a very fine central valve engine of 2,500 h.-p., which suffers in appearance because the front could not be placed facing the central avenue of the hall. Messrs. Galloway exhibit a compound vertical engine and dynamo of admirable design and massive construction. The engine is capable of developing 680 i.-h.-p. with steam at 150 lbs. pressure; and the dynamo by Messrs. Mather & Platt, designed for lighting or power circuits, has an output of from 220 to 250 volts and 1,400 amperes. Messrs. C. A. Parsons & Co. have two

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steam turbines driving dynamos for lighting purposes, the arrangement being exceedingly neat and compact. Beyond these three exhibits there is very little worthy of special mention, but a certain amount of melancholy satisfaction may be derived from the fact that the United States is only represented by one engine built by the Société Française de Constructions Mécaniques, from the designs of the E. P. Allis Company, of Milwaukee. On the other hand, the productions of French, German, and Swiss firms are particularly varied, including numerous engines of considerable power, admirable design, and excellent workmanship. As specially exemplifying these characteristics we may refer to the exhibits of Herr A. Borsig, Berlin, and of MM. Sulzer Frères, Winterthur. Owing to our efforts in the past to restrain the adoption of electrical appliances as far as possible, we have clearly been outclassed by foreign nations, many of whom are now making better machinery than is turned out by our own manufacturers, though perhaps not better than they could produce if the necessary encouragement were forthcoming.

Electrical energy generated in the machinery gallery is distributed to all parts of the Exhibition where power is required. Thus the old fashioned method of power transmission by means of shafting and belts is avoided, and the authorities have been enabled to operate useful machinery in widely separated positions from a central power house, instead of being compelled to establish a number of auxiliary stations at isolated points. The great facility afforded by electricity for the distribution of power has no doubt had the further, and unfortunate, effect of encouraging the administration to scatter exhibits of machinery in motion all over the Exhibition in the most inconvenient and incongruous positions. No doubt the idea of collecting together all appliances incidental to different manufactures is excellent in its way, but it is utterly impracticable on a large scale. For instance, one firm may produce a dozen kinds of machines, each available for a dozen distinct industries. Carrying the French notion to its logical conclusion, such a firm as we have indicated would require 144 separate stands. Electricity is conveyed from the generators to the two switch-rooms, each about 99 ft. long, situated behind the cascade of the Château d'Eau. From the Bourdonnais section alternating tri-phase currents are distributed at tensions varying from 2,200 to 5,500 volts, according to distance, and from the Suffren section continuous currents are furnished at 125, 250, and 500 volts tension. Ten lines of cable serve to convey high tension currents to various parts of the Exhibition area as follows :—

Entrée Monumentale and Foreign Department of the Esplanade des Invalides, 740 kilowatts.

French Department of the Esplanade des Invalides, 670 kilowatts.

Champs Elysées, 200 kilowatts.

Cours la Reine and Quai de Billy, 500 kilowatts.

Quai d'Orsay, 240 kilowatts.

Palais du Trocadéro and vicinity, 2,200 kilowatts.

Champ de Mars, two lines of 200 kilowatts and one line of 300 kilowatts.

And, finally, one line of 300 kilowatts for operating "Rampes Mobiles," or inclined elevators, in the palaces on the Esplanade des Invalides.

As a general practice the cables are carried beneath the surface, those conveying high-tension currents being provided with a protection of lead outside the insulating material, and sheathed with a winding of steel strips. The aggregate length of the main lines of cable is approximately 23 miles. Although we need not enumerate all the electric lamps installed in various parts of the Exhibition, it may be interesting to mention a few figures relative to the principal buildings and gardens. At the Entrée Monumentale there are more than 3,000 incandescent, and thirty-six arc lamps, twenty-four of which are furnished with reflectors; the two palaces on the Esplanade des Invalides are provided with 2,136 incandescent lamps, and the grounds with fifty-nine arc lamps; the Alexander III. bridge is lighted by 508 incandescent lamps of 16 c.-p. On the Champs Elysées there are 174 arc lamps; the Château d'Eau has 1,100 incandescent lamps, in addition to which lamps of considerable power are used for illuminating the fountains; the Palace of Electricity is fitted with 5,000 incandescent lamps, four arc lamps with reflectors and eight coloured search lights. The Salle des Fêtes contains 4,500 incandescent lamps; and the Eiffel Tower is provided with 7,000 incandescent lamps of 10 c.-p. All the remaining Exhibition buildings and those devoted to what are called "attractions" are well lighted, and this remark applies especially to the Palais Lumineux Ponsin.

We will now look a little into the details of arrangements adopted for the distribution of steam and water, and in order that matters may be the more intelligible a few notes are desirable as to the quantities dealt with, and to the general outlines of the system followed. It has already been stated that 44,000 gallons of feed water per hour are evaporated by the boilers. This volume of water represents 440,000 lbs. weight of steam. At the pressure used (140 lbs. per square inch) the weight of steam mentioned is equivalent to about 1,260,000 cubic feet, and the steam mains must be capable of dealing with this volume every hour. Moreover, as the temperature of the steam is 361 deg. Fahr., adequate covering of the pipes is necessary in order to minimise losses by radiation and contact of air. In addition to the 44,000 gallons of boiler feed water, at least 1,000,000 gallons per hour is necessary for condensers, as all the engines are of the condensing type. Moreover, other supplies, both of river and drinking water, have to be distributed to various parts of the Champ de Mars, and hot water from the condensers has to be returned to the river. Altogether about 1½ million gallons of water are supplied hourly, or 10½ millions per day of seven hours, a quantity sufficient for the supply of thirty gallons per head daily to a city of 350,000 inhabitants. Water discharged from the cascades and fountains of the Château d'Eau is collected and used for some of the purposes already indicated.

Having now some conception of the work to be done, we may appropriately proceed to inquire into the organisation by whose aid it is performed. The greater part of the water supply is derived from the river, and the pumping station is situated on the left bank of the Seine, near the Champ de Mars railway station. The building measures 165 ft. long, 50 ft. wide, and 165 ft. to the top of the central dome. Its equipment includes four Worthington triple-expansion pumping engines, capable of raising 1,440,000 gallons per hour. These engines are of the duplex type, with Worthington compensators, and are fitted with Corliss valve gear. They work at a steam pressure of 140 lbs., and the consumption is stated to be 13 lbs. per i.-h.-p. per hour. In addition to the pumping engines a Laval steam turbine and dynamos are provided to generate current for 1,400 incandescent lamps by which the building is lighted, and this turbine is fitted with a Worthington jet condenser. Worthington pumps are also used for working a lift conveying visitors to the dome. The whole of this plant has been installed by the Société Française des Pompes Worthington.

Water is taken from the pumping-station in two 30-in. mains, to an immense reservoir constructed behind the façade of the Château d'Eau, at a height of about 115 ft. The cascade supplied by this reservoir falls from a height of nearly 100 ft., and is 32 ft. 9 in. wide. As high pressure is necessary for the great fountains, a separate supply, at the rate of 237,000 gallons per hour, is furnished from the municipal reservoir on the plateau of Villejuif.

From the basin at the foot of the cascade water is conveyed at low pressure to the boiler-houses and machinery galleries. All the distributing mains for water and steam, as also the pipes returning hot water to the river, are laid in subways extending along three sides of the Champ de Mars. These subways differ somewhat in dimensions, but in general construction they are more or less alike, having a horseshoe section, with walls 14 in. in thickness. The total length of the three subways is about 4,850 ft., their separate lengths and internal dimensions being approximately as follows: (1) 1,750 ft. long, 8 ft. 6 in. wide, by 8 ft. 10¼ in. high; (2) 2,410 ft. long, 7 ft. 10½ in. wide, by 8 ft. 6 in. high; (3) 690 ft. long, 6 ft. 6½ in. wide, by 8 ft. 6 in. high. At certain points where the tunnels meet access chambers have been formed measuring 14 ft. 9 in. square by 13 ft. high, and in these supplies of fittings are kept in readiness for repairs. Ventilation is effected by two cement-built ducts 9 ft. square, rising through each of the boiler-houses.

Taking one of the subways to illustrate the arrangement of the mains, we find in the lower portion one cold and one hot water pipe, each of 23¾ in. internal diameter, resting on masonry supports; outside these are two lines of steam pipes of nearly 10 in. internal diameter; and two more steam pipes are suspended by hangers caulked into the arched top of the subway. Branches from the main tunnels communicate with covered trenches in the machinery galleries, the trenches being lined internally with wood, and measuring 3 ft. 3 in. high by 2 ft. 7½ in. wide. Contained within each of the latter conduits are three branch pipes, two of about 10 in. diameter, conveying water to and from the engine condensers, and one of 6 in. diameter serving the engines with steam. The whole system of pipes is suitably controlled by valves, some in the subways and others in the trenches, but the responsible officials do not appear to be so well acquainted as they ought to be with the exact working details of the scheme. On one or two recent occasions, whilst inconvenient escapes of steam were in progress, it was extremely difficult for exhibitors to find any one who knew which was the proper valve to shut off the section where the leakage had developed.

If it were useful in no other way, the Exhibition of 1900 would be valuable as an

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object-lesson of the prodigious waste inevitably attending the use of coal and steam for the development of energy. So much is heard of modern achievements in mechanical science that one is apt to forget the disadvantages of the steam-engine, for which, however, no one can at present suggest an efficient substitute. Taking some of the figures already quoted, and using round numbers for the sake of simplicity, we find the coal consumption at Paris to be at the rate of 30 tons per hour, the theoretical value of which is about 870 million heat units per hour. But the consumption of steam is estimated at 440,000 lbs. weight, and taking the original water temperature at 50 deg. Fahr., this is equivalent to rather less than 500 million heat units. Consequently nearly four-ninths of the calorific value of the coal is lost in the boiler-houses and pipes. As for the engines, it is common knowledge that the proportion of steam theoretically convertible into mechanical effort can in no case exceed 26·2 per cent. It is, therefore, a liberal assumption to take the practical efficiency in the present case as 20 per cent. Then, out of the 500 million thermal units contained in the steam supply, only about 100 millions are utilised. All the rest of the heat is absolutely wasted, the greater portion being carried into the river by water from the condensers. Finally, we find that of the original 30 tons less than 3½ tons become actually utilised in the production of mechanical energy.

Amongst other examples of administrative engineering the Eiffel Tower lifts are worthy of remark. There are now two lifts installed by the Compagnie de Fives-Lille, in addition to the Otis elevator and the Edoux lift, and the joint capacity of these appliances is 62,000 passengers per hour. The Fives-Lille lifts are placed in the south-west pier of the tower, and are arranged to work independently. Each car is divided into two compartments, one over the other, and the floors are maintained in a horizontal position by means of suitable mechanism. In each instance the cars run on the rails previously existing, but additional steel runners have been provided, in which racks are cut, and upon these hydraulic safety clutches will act in the event of any failure in the other mechanism. Each car is suspended by six steel cables working over pulleys about 13 ft. diameter fixed on the second stage, and passing under another series connected with and actuated by the hydraulic rams on the ground level. A group of sixteen Worthington pumps is used for operating the hydraulic plant for the whole of the lifts. Two accumulators working at 2,200 lbs. pressure serve to operate the hydraulic rams, the pistons of which are 15¾ in. diameter, with a stroke of 55 ft. 9 in. The energy furnished by the descent of the cars is utilised by the discharge of water into an accumulator working at 294 lbs. pressure. Energy equal to more than 438 h.-p. can be stored in the two high-pressure accumulators.

In several of the Exhibition buildings the visitor will find convenient, if relatively expensive, means of ascending to the upper floors in the "Rampes mobiles." A few of these conveyors were installed by the Reno Elevator Company, but by far the greater proportion are of the "system Hallé" constructed by MM. A. Piat et ses fils, of Paris. The endless band forming the footway runs round two large pulleys and upon boxwood rollers; the upper pulley-shaft carries gear, operated by an electric motor by Sautter, Harlé, et Cie. The handrails are supposed to travel at the same rate as the footway, but in one or two instances we discovered a slight excess of speed on the part of the handrails.

Mechanical ventilation in connexion with the Salle des Fêtes is effected by several Leroy fans about 12 ft. diameter, driven by belting from electric motors, and the two Palaces of Agriculture and Aliments are supplied with air by fans made by MM. E. Fargot fils, of Paris. There are some similar appliances scattered about in other parts of the Exhibition, but not nearly enough. In the agricultural section, which is supposed to be ventilated, the climate is particularly oppressive, and its tropical character is in great measure due to the absence of awnings to intercept the rays of the sun.

Besides the services we have already mentioned, there is a very extensive system of drainage over the whole of the Exhibition area.

NOTES.

The Monument to Ruskin.

THE opposition that has been raised to the proposed monument to Ruskin in Westminster Abbey, in some letters which have appeared in the *Times*, is a foolish and unreasonable one. The occasion seems to have been laid hold of by some of those hypercritical people who are always detecting irreverence to ancient buildings where rational persons can see no reason for such a charge, for a special objection fortified by a reference to expressions used by Ruskin himself, the real intent of which seems to have been misrepresented. Mr. Cook's reference, in Saturday's *Times*, to Ruskin's refusal to subscribe to a bust of F. D. Maurice in the Abbey, makes it quite clear that Ruskin had no rooted objection to the placing of such memorials in the Abbey, otherwise he would certainly have taken the opportunity to give expression to it. He objected—and quite rightly—that Maurice was not a man of sufficient calibre to claim the honour of special commemoration in the Abbey, and his objection seems to have gone no further than that. Though we think Ruskin a man much overrated in many ways, he has a far better right to a memorial in Westminster Abbey than some of those who have obtained it, and the opponents of the proposal have failed to show any reason for thinking that he would himself have objected to it. The Committee concerned about the memorial is not one which is likely to sanction anything that would be in any sense an injury to the Abbey.

Recent Changes at the Tower.

IN the spring of last year was pulled down the old guard-house which had been built in 1827 to replace the "Stone Kitchen" as fitted up in the Stone House—formerly the Spanish Armoury—lying between Coldharbour and Wakefield (or Hall) Towers, in the latter of which the regalia is now kept. Northwards from Wakefield Tower extended a curtain wall, since embodied in the Stone House, and against its outer or western side was built a row of gabled and bow-windowed houses, with red brick chimneys and tiled roofs, the "Seven Houses of Office" cited in the survey of 1532 as being then newly built, and pulled down in 1827. For the incongruous design of the new guard-house, built by Messrs. J. & M. Patrick, of Wandsworth, upon the same site, the War Office authorities are responsible. Constructed of light terra-cotta coloured bricks with stone dressings, and having gables upon its lofty western front, the new structure is utterly out of keeping with the adjacent buildings, and, moreover, quite obstructs the view of the White Tower from the south-west. We are not surprised that even the Office of Works are prompt to repudiate any share in its design or erection. The new guard-house contains quarters for the main guard, school-rooms, sergeants' mess-room, quarter-master's stores, recreation rooms, and offices. We understand that measures were taken to preserve the well, 90 ft. deep and about 5 ft. in diameter, which, together with the base of the curtain wall, was discovered in clearing the site. The twelfth-century masonry of the well was of rubble, steined down to 15 ft. below the water level with Gatton ashlar—a firestone that was largely used for a dressing of the Kentish rag in the older portions of the Tower. The curtain wall appeared to be a contemporary piece of masonry. The Office of Works have lately repaired the roofs and exterior walls of the Lieutenant's Lodgings and other half-timbered houses on the south and west sides of the Inner Ward, standing upon the curtain walls which join the Beauchamp, Bell, and Garden (or "Bloody") Towers. They have also refaced portions of the outside of the Garden Tower, after removing the cement and embedded flints and many decayed stones, and have replaced the oaken door in the doorway, latterly blocked up, which opened from "Raleigh's Walk" into the upper room wherein, it is believed, the two young Princes, Edward V. and the Duke of York, were smothered to death; the adjoining room is that in which the portcullis was worked. "Raleigh's Walk," along the retaining wall, leads to the Lieutenant's quarters, and, together with the leaded roof of the Garden Tower, formed an exercising ground for the prisoners—Cranmer, Ridley, Sir Walter Raleigh, Colonel Hutchinson, and Thistlewood amongst them, who were confined in the Garden Tower.

Old Westminster and Thorn-eye.

IN preparing for the foundations of the new Government offices on the Parliament-street site a stratum of fine yellow sand, resting on gravel, about 30 ft. below the present roadways, has been laid bare, and a powerful pump is kept constantly at work to prevent flooding. Above the sand lies a thick stratum of a dark green peat-like compound of loam, sand, and vegetable matter, the deposit of flowing or running water in the wide marshy lagoon through which ran the Thames, below the sand, which is 10 ft. deep, is a stratum of gravel at a depth of 30 ft., which will be cleared for laying a bed of concrete, 6 ft. deep, for the foundations. The excavations should prove of great interest to students of the geological history of the site of London, and the strata should be compared with those shown in the model of the "London Basin" at the Museum of Practical Geology in Jermyn-street. For they can see, in Parliament-street, ample vestiges of a portion of the ancient Bulunga fen on which nearly all Pimlico, Belgravia, and Westminster now stand. The Abbey was built upon the island of bramble and thorn that arose out of the

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surrounding marshes and pools watered by the tidal overflow from the Thames and by effluents of the Tybourne, and formed a refuge for the primæval wild ox, elk, and red deer. It is the "locus terribilis," the awful or venerable, rather than terrible, place, so named in the charter of Offa of Mercia, A.D. 785, to the Benedictine monks of St. Peter's Monastery, and in Edgar's charter to Dunstan which delimits the manor, the original parish of St. Margaret, that he bestowed upon the Abbey at its refoundation nearly two hundred years afterwards.

Glasgow School of Art.

FROM the prospectus and prize scheme of the Glasgow School of Art we learn that the new session commenced on Thursday. The School has just erected new buildings in Renfrew-street, which were opened in December last; and though the scheme is not complete, the foundations have been laid for the remaining third of the work. The subjects taught at the School include architecture, modelling, design and decorative art, &c. A museum of casts contains examples of figure and ornament from the Classic, the Gothic, the Renaissance, and later styles, and there is a library containing over 1,400 volumes of works on architecture, &c. The architectural tuition of the School aims at (1) the preparation of students for an architectural career; (2) supplementing the office training of the pupil and assistant; (3) imparting an appreciation and knowledge of architectural form to painters, sculptors, and workers in the decorative arts. Exclusive of preparatory studies, the course extends over four years, provided that the full time of the student is employed. The instruction given meets the requirements of the examinations for the membership of the Royal Institute of British Architects, but, in addition to the subjects included in that scheme, the School course provides also for the study of nature and from life. The Architectural curriculum is divided into—I. Probationary course. II. Intermediate course (in two divisions). III. Final course (in two divisions). Mr. Alex M'Gibbon, A.R.I.B.A., is the Director in Architecture, assisted by Messrs. W. R. Watson, J. Smith, E. Brady, and the Architect Visitors.

Commons and Footpaths Preservation Society.

THE Report for 1899-1900 of the Kent and Surrey Committee of this Society deals with the useful work of the Committee in its efforts to maintain public rights in the counties of Kent and Surrey. The Committee has been called upon to deal with over eighty cases involving the preservation of common land, rights-of-way, roadside wastes, and open spaces in various parts of the two counties. A considerable proportion of these cases have been brought to a successful issue, sometimes wholly through the Committee's exertions, and at others mainly through its influence and advice, while a number of Parish and District Councils have consulted the Committee and have received information upon which they have acted. During the year a new centre has been formed for the parishes of Chelsfield, Down, Cudham, Farnborough, Orpington, and Halstead, and efforts are being made to organise centres in other parts of Kent and Surrey. The Committee raised 1,020*l.* towards the scheme for the extension of Brockwell Park, and it is helping the promoters of other open-space schemes. In order effectually to carry on its work the Committee desires:—(*a*) To enrol as many residents in Kent and Surrey as possible as members of the Society, who will each pay an annual subscription. (*b*) To enlist the services of riders or pedestrians who know any parts of the counties well, who will mark on sheets of the Ordnance map, supplied by the Committee, the footpaths now open to the public, the roadside strips still unenclosed, and the commons. (*c*) To enrol in many parts of the counties corresponding members who will be prepared to allow the secretary to ask them to obtain for him any information he may need in their neighbourhood, should questions arise as to enclosure of open land or obstruction of paths. (*d*) To establish in all urban centres in Kent and Surrey local committees, to whom any cases sent direct to the Committee for advice and assistance may be referred.

Sanitary State of Pontypridd.

DR. L. W. DARRA MAIR'S Report to the Local Government Board on the fatal prevalence of diphtheria in the Pontypridd Urban District, while it does not trace the disease to any special defects in the sanitation of the district, shows that there are serious defects which ought to be remedied. The district has an area of 2,560 acres, and a population, estimated at the middle of 1899, of 38,900, living in some 6,000 houses. The average number of persons per house is computed at about six and a half. The population of the Pontypridd Urban District is made up almost entirely of members of the working class, who are engaged almost exclusively in coal mining, as in the adjoining Rhondda district. The majority of the dwellings in the district are of recent construction, and houses are, as a rule, built of local stone. Many of the houses appear to be well built and well arranged in streets of adequate width, but some of the old houses in Pontypridd itself are "back to back." Water is supplied to the district by the Pontypridd Water Company, but the supply is said to be inadequate in summer. The District Council have spent 40,000*l.* on the construction of sewers over and above their contribution to the joint sewerage scheme. There are still several houses in each ward unconnected with sewers, and steps are now being taken by the District Council to deal with them. House refuse is disposed of in large heaps in various places. "I saw one enormous accumulation in the Rhondda Ward in the midst of a large number of houses." The sanitary staff consists of the Medical Officer of Health, who is actively engaged in practice in the district, and two inspectors of nuisances. The preventive measures adopted in the district appear to be inadequate. For instance, there is no isolation hospital, and disinfection of infected houses is carried out in but few cases. The Report mentions the advice given in the matter to the Local Authorities by Dr. Darra Mair, which is very much to the point, and the Urban District Council will do well to take advantage of it.

Acetylene *versus* Coal-gas.

IN our last issue we published a letter from Mr. Chas. Bingham relating to the relative values of acetylene and coal-gas for illuminating purposes. Our correspondent objected to our statement that the claim that acetylene gives a light fifteen times greater than that yielded by coal-gas is misleading, and then endeavoured to prove that the claim was not exaggerated by reference to figures published by Professor Vivian Lewes. In London the standard illuminating value of the public gas supply is sixteen candles for gas burned in an Argand burner at a rate of 5 cubic feet per hour, but our correspondent for obvious reasons prefers to take flat flames possessing a much lower light efficiency as his basis of comparison, while for comparison of the incandescent gas-light with acetylene he compares the relative values of the light thrown down at an angle of 60 deg. In fact, Mr. Bingham takes for his basis of comparison the efficiency commonly obtained from coal-gas, instead of the efficiency which it is possible to obtain from coal-gas. The average gas consumer by placing his burners in wrong positions, and by using faulty burners, loses more than half the light efficiency of the gas he consumes. A common flat-flame burner frequently yields a satisfactory flame when first used, but before it has been in use six months has become dirty, and yields a flame of miserable appearance and small light efficiency. In few cases does the consumer then invest in a new penny burner, but probably spends his penny in writing to the Local Authority to complain that the gas supply is much worse than it was a few months previously. For this, of course, the gas manufacturer is more to blame than the consumer, since it is the business of the former to have a knowledge of all things appertaining to the use of gas, and to assist his customer to utilise to the greatest advantage the article sold. The figures quoted by our correspondent are worth careful perusal, as they clearly demonstrate the absurdity of placing incandescent mantles upon overhead pendants (especially when reflectors are not employed), and that "gasfitting" in general requires more careful attention than it usually receives. With regard to our correspondent's observations regarding the unsatisfactory quality of the carbide now on the market, we may add that similar complaints have reached us from other sources, and that it is commonly remarked that the carbide now sold is worse than that manufactured three or four years ago. As, however, the Acetylene Illuminating Company* guarantee a regular supply of carbide which will yield an average of 5 cubic feet of gas per lb., users of acetylene should obtain a written contract from the firm they patronise agreeing to a suitable reduction in price for all carbide supplied which is found to be of inferior quality.

South Shields Municipal Buildings Competition.

THE instructions to architects for the competition for new municipal buildings at South Shields include some provisions which are not at all satisfactory, and which ought to receive the attention of the Competitions Committee of the Institute. In the first place, the competition plans are to be to ⅛-in. scale, which is a working-drawing scale, and architects ought not to be put to the trouble and expense of making drawings to so large a scale for the mere chances of a competition, as the essential qualities of

* See the *Builder*, August 4, p. 96.

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a design can be perfectly well appreciated on a smaller scale. Then it appears that if the successful architect is employed to carry out the building, he will have to pay his own travelling expenses; an utterly improper tax on him, which no one would think of making in the case of any other profession, and which is directly against the recognised scale of charges of the Institute of Architects. The same clause (19) in which this is mentioned also contains a rather vague statement as to furnishing to the Corporation "copies of all subsequent drawings, elevations, details, and sections of the building which may be found necessary." As "detail drawings and superintendence" are already included in a previous sentence, this appears to mean that the Corporation have power to order additional copies of all working and detail drawings to be made for their own use. This may not be the intention, but it reads so, and at any rate calls for explanation. It is to be regretted also that the instructions include the requirement of a perspective view—an extra piece of trouble and expense to competing architects which has long ago been condemned by competent judges as not only useless but often mischievous in a competition, as affording a means of cooking up an effect which the actual building would not realise.

DISCOVERIES AT THE PRIORY CHURCH OF ST. JOHN OF JERUSALEM, CLERKENWELL.

In our number of October 13, 1894, we published a drawing and description by Mr. W. Monk of the Norman and Transitional crypt of the present Church of St. John the Baptist, Clerkenwell. In May of that year a faculty had been granted by the Consistory Court for the removal of the remains of about 325 bodies to Woking. In April last a similar faculty was issued for making some alterations in the cleared crypt, to include the laying of the floor with tiles, a dais for an altar at the east end, and other repairs, at an estimated cost of 1,400*l.*, towards which sum the Ecclesiastical Commissioners contribute 400*l.* out of the City Parochial Charities Fund. We have taken an opportunity of visiting the works, which are being executed under the superintendence of Mr. John Oldrid Scott, F.S.A., who in 1887 made an extensive repair of the church, re-erected in 1721-3 on the site of the choir of the Hospitaller's Church through the instrumentality of Gibson, Bishop of London, being the second of the "fifty churches" in order of consecration. The crypt's east end, through which it was entered from the disused churchyard, is now built up, and a range of steps has been built at the west end leading down to a doorway made in the wall at that end of the crypt's middle aisle. Thus the crypt will now be dependent upon lighting by artificial means, as all the side windows have gradually become blocked in during many years past. Some drain-pipes which carried rain-water from the roof of the church are taken away from its interior.

In excavating the ground for a new entrance into the crypt have been found a flight of stone steps leading to an archway in the west wall, and portions—as there appears to be very little doubt they are—of the original "round" of the Hospitallers' Church, which, on March 6, 1185, was consecrated by Heraclius, Patriarch of Jerusalem, who, some days before, had consecrated the Templars' new church of St. Mary. The latter remains are carefully built up on either side of the new doorway. They consist of two fragments of masonry, circular on plan, which, if completed, would form a round wall of, say, from 65 ft. to 70 ft. internal diameter. The interior diameter of the Temple Church is 58 ft.; we saw no trace of a wall arcade resting upon a continuous sedile or table, as there is at the Temple. On the splayed plinth course, 6 in. high, rests a walling of from three to four courses of ashlar finely dressed, constructed of Reigate or a similar stone, and bearing mason's marks perfectly preserved. The ashlar and its backing of rubble are nearly 4 ft. thick. The dressed stone and backing rest upon a very hard mass of concrete embedding rubble, flag-stones, pebbles, and so on. Just outside the curve of the fragment to the right hand of one descending the steps into the crypt has been uncovered what is taken to be a portion of a buttress of the original south aisle of the choir. The floor of the "round" church would lie 8 ft. 4 in. above the existing floor of the crypt, which was entered through a door whose jamb remains *in situ* at the north-west angle of the crypt. In the crypt's north aisle, where the vaults for the most part and the north wall are of brick, coarsely worked, are now arranged a large store of carved and moulded stones, some bearing traces of colour, as relics of the fabric. The western retaining wall of the steps stands over the foundations, in two lines about 22 ft. asunder, of, it seems, the piers of the nave, standing over the "round" and extending into the now open space of St. John's-square. On the west side of the east bay of the crypt's north aisle is a trefoil-headed doorway, retaining the large iron eyes.

Wat Tyler's rioters destroyed the earlier church, the crypt excepted, in 1381; the conflagration of the Priory buildings lasted seven days. The second church, which had nave, aisles, choir, choir-aisles, side-chapels, and the bell-tower described by Stow, was completed in 1504, *temp.* Prior Docwra. But the greater part of the later church was destroyed with gunpowder by Somerset, who coveted the materials for his projected riverside palace by the Strand. Then Cardinal Pole restored the ruined choir, and set up Sir Thomas Tresham, of Rushton, as prior in 1557. After the abolition of the English religious order (since revived, with a difference, at St. John's Gate) in 1559 by Queen Elizabeth, the property passed from John Dudley, Lord Lisle, to Ralph Freeman, *temp.* James I.; then from William Cecil, second Earl of Exeter, to his daughter Diana, who married for her first husband Henry Vere, Earl of Oxford, and for her second husband Robert Bruce, second Earl of Elgin, who for his active promotion of the Restoration was created, on March 18, 1664, Earl of Ailesbury in the peerage of England. Lord Ailesbury occupied the house which is depicted at the north in Hollar's two views (1661), from the west and from the east sides of the priory church; his successor lived there until 1706, using the choir as his private chapel. The chapel, having been converted into a Presbyterian meeting-house, was sacked by the mob during the Sacheverel riots: Bishop Burnet, who lived opposite, mentions its pillage. It was then bought, with the remains of the Preceptory, by Simon Michell, who built Aylesbury-street, Red Lion-street, and other streets in the neighbourhood. Michell restored the fabric, built a new roof and west front, and sold it to the Fifty New Churches Commissioners for 3,000*l.*, less 50*l.* in consideration of a vault in the crypt, 1723, and the church was reopened for divine service on Thursday, December 27, that year.

COMPETITIONS.

BOARD SCHOOL, WISHAW.—The plans by Mr. James Cowie, of Wishaw, have been accepted in a competition for designs for a new Board school at Wishaw. The school will be built on a site off Alexander-street. It will be a one-story building, and will accommodate 518 scholars.

WESLEYAN CHURCH, SUNDERLAND.—In the competition for the proposed new Wesleyan church, Holly House, Durham-road, Sunderland, the first premium has been awarded to Mr. J. Jameson Green, 19, South John-street, Liverpool, who has since been appointed architect for the new church; and the second premium to Mr. Fredk. Boreham, A.R.I.B.A., 75, Finsbury-pavement, London, E.C. There were nineteen competitors in all.

THE CHURCH CRAFTS LEAGUE.—A leaflet has been issued by the League giving an account of its objects and methods. At the recent half-yearly meeting, held under the presidency of the Bishop of Rochester, Mr. Anning Bell and Mr. Mouat Loudan, decorative artists, and Mr. Harrison Townsend and Mr. Leonard Stokes, architects, were elected as Artist Members. Membership of the League is open to ordinary members on payment of a small annual subscription. Those desirous of further particulars should write to the Secretary of the League, at the Church House, Westminster, S.W.

MEREWORTH CASTLE AND CHURCH.

ON the 18th ult. some members of the Architectural Association visited Mereworth Castle and Church, near Wateringbury, Kent.

When Colin Campbell, the industrious editor of the first three volumes of the "Vitruvius Britannicus," decided about the year 1723 to translate the Villa Rotunda, by Palladio, from Italy into England, he must have felt that the most difficult part of the undertaking would be to find conditions and a site that would justify such an exceptional scheme for a house. The well-known description of the villa as "the last word of temple architecture applied to a house" hardly accounts for the whole idea of the original, because, beside the attraction of combining the points of a circular and a rectangular temple in one design, there was a special suitability in this conception by Palladio of a four-square suburban casino for a site on a prominent knoll just outside the walls of Vicenza, each portico to command a view and a possible approach, while the domed circular saloon provided a centre point and a cool place of retreat from the summer heat of the Italian climate.

Mereworth Castle, however, is, as it were, astride an avenue; the side porticoes are deprived of their steps and have always been unapproachable, all the more because of the moat that formerly surrounded it. Thus the front and rear flights of steps, widespread out and arched across the water, have a prominence that suggests a way through, an intermediate rather than a final point of rest, as the idea of the design.

The exigencies, moreover, of the all the year round occupation of an English country seat, led to the isolation of the central saloon from the porticoes that would otherwise lead into it. The centrality of the plan is consequently destroyed, three of the four vestibules of the original scheme being swallowed up in the surrounding rooms.

Incidentally, and as by force of tradition, a fine gallery 82 ft. by 20 ft. by 22 ft. 6 in. high is obtained, occupying the full length of the rear façade. This room has a cove sprung at two-thirds the height of the walls, and having an opening into a portico 47 ft. wide, as on to a raised terrace, forms an admirable reception-room. The circular saloon, however, in spite of its 35 ft. of diameter, with a height of no less than 60 ft. to the crown of its dome, makes a very inadequate substitute for the traditional hall. The suggestion of cross traffic is, perhaps, responsible for the sense of smallness relatively to the known dimensions. In itself this saloon is a success, even unexpectedly so in its lighting, for from the drawings one would hardly expect that four bull-eyes, 4 ft. 6 in. in diameter, placed at half the height of the dome, would so fully light an apartment on this scale. The intersections of the dome over these lights are cleverly managed, but at the cost of the effect of the spherical form; a ceiling rather than a dome resulting. The single eye of the original could not easily have been obtained in this case, owing to the exigencies of the English fireplace, all the flues of the house being drawn over the inner dome to a central lantern, treated in the usual Renaissance manner. This solution of the great chimney question has not, however, been carried through, in reality, with all the apparent ease of Campbell's drawings, as where he shows a small attic stage under the lantern cupola, is, in fact, a gaping void, necessary for the emission of the smoke, which curls out from under what might be irreverently described as a copper umbrella.

Of service conveniences it is naturally idle to speak; there are two circular stairs each of about 3 ft. 6 in. clear way, and, as for their light, they depend mainly upon unglazed openings into the central saloon, they are, in more ways than one, traps for the unwary.

The best bedrooms, placed over the great gallery, have interestingly treated alcoves for the beds, with side closets in the Continental fashion. The bed space is cross-elliptically vaulted with enriched mitres, the façade to the rooms having Ionic pilasters with an entablature from which the segmental arch of the central opening is sprung. The sash windows in these rooms are curious in their arrangement, as being square, the difficulty of that type has been met by a scheme of sliding the single sash into a cavity in the wall overhead. Campbell's evident indifference to points of scale is betrayed in such

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details as the clumsy divisions of his sash-bars. The change of fashion in fireplace arrangement, that all architects know so well, is amusingly illustrated in these bedrooms, for the low prominent fireplace breasts of those days, when walls were thick and could hide their own flues, had some time in this century been made out above, and carried up with the ceiling cornice returned round them, as though they were the chimney breasts of a thin-walled modern villa. The owner has pleasingly restored one of these rooms to its former state.

In internal finishings, wood and stucco are much in evidence; the central saloon, with walls of a cool green, has all the ornamental plaster-work of a type verging on the bold exuberance of the Italian original, in white; while the doors are of a rich mahogany, set in white door-cases with occasional gilded enrichment. The floor was unfortunately tiled some thirty years ago, but the original plain terrazzo mosaic floors remain in some of the surrounding rooms. In the latter the painted ceilings are more ambitious than successful, but here, as at Stowe, the original gilded enrichment is marvellously fresh; nothing more is required or has been used than soap and water washing to restore its effect.

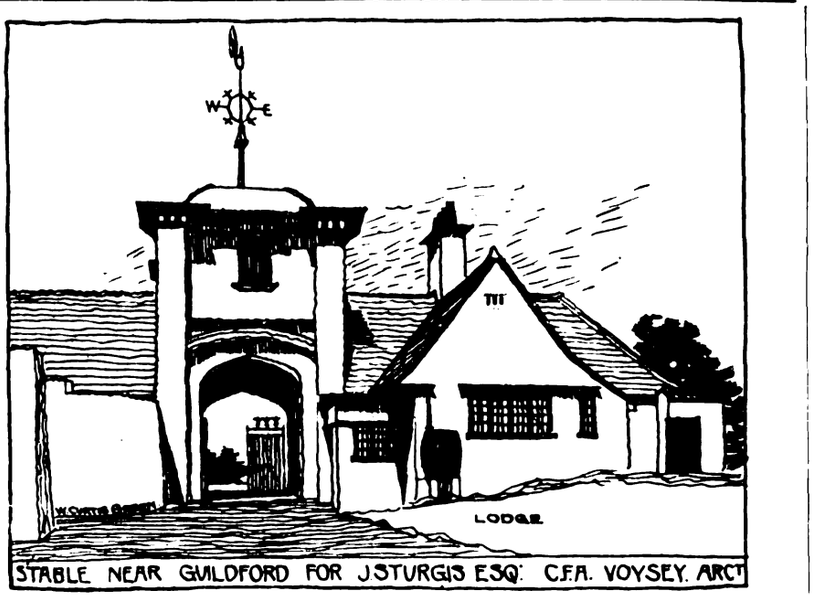
It cannot be pretended that Campbell had much idea of refinement in detail; the work compares unfavourably with even the average internal work of that age, while of his sense of proportion the inadequacy of his porticoes is a standing condemnation. With an order of 2¼ ft. diameter, of a height of 21 ft. in the column alone, standing on a basement 16 ft. in height, some effect in a hexastyle portico might clearly be expected. The attic story, however, of the main building, equal in height to half the column, deprives the portico of its dignity, more especially as above the visible roof is hipped all ways, to a square, on to which the lead dome, of a diameter about equal to the width of the portico, appears placed without any thought of the connexion of parts, or idea of growth, that the combination of such features demanded. It is most instructive to compare this mixture of motives with the simplicity of Palladio's design. There the portico reigns supreme; the saloon dome is discreetly visible under its rough tile roofing, free from any lump of a lantern, like that in Campbell's version, while the mass of the composition, a square relieved by advanced porticoes crowning a knoll, satisfies the eye of itself. At Mereworth two secondary blocks, placed beyond the former moat, on the lower level of the ground at either side of the main avenue, save the situation, and redeem the heaviness of the house itself, by making it the centre of a group.

These subsidiary blocks are later additions. Treated with a bold Doric order, they contrast the Ionic of the main building, while the scale is such that the metopes are utilised as entresol windows. The wings and advanced features are carried on bold arches that help to carry out the idea that these are office buildings subsidiary to the mansion beyond. There is a cross connexion by a wide footway, well paved in stone slabs of two colours, running past the great flight of steps up to the main portico—an idea pleasant in itself, but rendering still more impossible, in a damp climate, the approach to the house, as the drive is cut off even from the foot of the staircase that must in any case be ascended in the open.

About a mile from the house is the Parish Church, built at the same period, and presumably also Campbell's work. At all events, it illustrates the same mania for reproducing other people's designs under different conditions. In this case it is Inigo Jones' Church of St. Paul's, Covent Garden, with a tower and steeple after Gibbs' ideas planted on to it, that is caricatured. The special feature of the original, the Tuscan Portico, is here replaced by an open semi-circle of columns carrying round the characteristic eaves, widely projected on cantilevers in the fashion that distinguishes the celebrated barn. A kind of flat is thus formed over this semi-circular portico; while above, the main roof, brought over to the same extent as the eaves, makes a pediment. The combination, needless to say, is a hopeless one, the semi-circular portico being far too large in scale to be a subordinate feature, while at the same time it is not frankly accepted as the end elevation of the church. It happens, therefore, that the east end with its flat wall surface, surmounted by the uninterrupted widespread pediment, is far more successful. The church is built in rough rag stone, two courses to the height of the single blocks of rustication at the angles, which are in dressed stone of a yellowish white colour, contrasting the slate grey walling. The windows are plain openings, with rusticated key blocks to their flat heads. The base of the tower forms a circular vestibule, reached from the portico, and contains two winding stairs of moulded spandrel steps cut out of the solid timber. Inside, the nave, 23 ft. 3 in. clear span, is barrel vaulted on to a Tuscan order, 2 ft. 3 in. diameter, set 6 ft. 3 in. apart, in seven bays, from the tower to the east wall. The aisle bays are similar squares, an engaged column being set against the side walls, and the architrave of the entablature is carried round to a flat ceiling, each bay having, in sham painted relief, a large rosette. The nave vault is painted in false coffering, the order is marbled, and the triglyphs are imaginary. The end walls of the nave are in the three intercolumniations, the entablature is returned across, the eastern spandrel to the vault being filled with a large lunette. It has been contemplated to add a chancel, possibly in the form of a circle retaining the existing intermediate columns, but it would seem to be a better idea to return the aisle across the nave with a semicircular apse beyond, which would give the required amount of space with the least interference with the original scheme, and would obviate certain difficulties of Classical detail that would otherwise arise. Fortunately the day is passing when a church in this style could *not* be adapted to modern uses without being recast in a mediæval manner; and somewhat unfamiliar as this city church in a country-side may appear to English ideas, it is a legacy from a generation that took pleasure in erecting it.

The Architectural Association are indebted to Viscount Falmouth for allowing them to visit Mereworth Castle, and for much kindness on the part of his family and himself in entertaining the party, while at the church the vicar kindly explained all the points of interest.

BOARD SCHOOLS, SPARKHILL, BIRMINGHAM.—On the 27th ult. the new schools erected by the Yardley School Board at the foot of College-road, Sparkhill, were opened. The building, which is of red brick, with buff terra-cotta facings, and will cost between 13,000*l.* and 14,000*l.*, is situated on a triangular piece of land, and is divided into three main halls, provision being made for 360 boys, 360 girls, and 410 infants. Five classrooms each have been provided for the boys' and girls' sections, provision having been made for two additional rooms in each of these departments in the future, while six classrooms, to accommodate sixty children each, are connected with the infants' schools. The classrooms are 24 ft. by 24 ft. each, and two of the main halls 68 ft. by 30 ft., and the third hall 48 ft. by 30 ft., while the corridors are each 6 ft. wide. The school flooring is of wood blocks, and that of the corridors and playgrounds of asphalt. There is a cookery centre to accommodate fifty or sixty pupils. Haden's low-pressure system has been adopted for heating purposes. The buildings include a caretaker's house. Mr. R. F. Matthews, of Birmingham, was the architect. Messrs. Harley & Sons, of Smethwick, were the builders.



STABLE NEAR GUILDFORD FOR J.STURGIS ESQ. C.F.A. VOYSEY. ARCT

SKETCH OF STABLE NEAR GUILDFORD.

THIS little sketch, done some time ago, is a record of some stables near Guildford, designed by Mr. C. F. A. Voysey in the style so peculiarly his own.

ST. PAUL'S IN 1666.

FROM A CORRESPONDENT.

THE controversy about St. Paul's is no new thing. It raged as violently in the seventeenth century as it is raging now at the end of the nineteenth. The prophesy of Haggai about the second temple, "In this place will I give peace," has not proved true of our national Zion, which arose Phœnix-like from the ashes of its predecessor.

In Evelyn's "Diary," under the date of June 27, 1666, we find this entry:—

"I went to St. Paule's Church, where, with Dr. Wren, Mr. Prat, Mr. May, Mr. Thos. Chichley, Mr. Slingsby, the Bishop of London, the Deane of St. Paule's, and several expert workmen, we went about to survey the generall decays of that ancient and venerable church. . . . When we came to the steeple it was deliberated whether it were not well enough to repaire it only on its old foundation, with reservation to the 4 Pillars; this Mr. Chichley and Mr. Prat were also for, but we totally rejected it and persisted that it required a new foundation, not only in reguard of the necessitie but for that the shape of what stood was very mean and we had a mind to build it with a noble cupola, a forme of church building not as yet known in England but of wonderful grace."

A curious confirmation of Evelyn's statement has lately come to light in the papers of the above-named Mr., afterwards Sir, Roger Pratt (1620-1684), of Ryston, the architect of the famous Clarendon House and the associate of Wren in planning the rebuilding of London after the Great Fire, which appointment he tells us of in his own quaint language.

"His Majesty King Charles II. was pleased out of his owne merre motion to appoint his Surveyour for ye present Mr. Hugh May, Doctor Renne, and myselfe to be his Commissioners to treate with such as ye citty should think fit to nominate about ye more quick and orderly re-edification of the citty, who sente to us Mr. Milles and Mr. Hooker, Professor of ye Mathematics in Gresham Colledge, and Mr. Germain, an experienced man in buildings."

We find that the salary asked by the Surveyours was 12d. per hour "wherewith ye citty most readily complyed," too readily perhaps, for though it is afterwards raised to 18d. a message is sent by Mr. Pratt to the city "that they would bee pleased to raise ye 18d. formerly layed by them upon each houre to 2sh.-6d. beeing yt ye surveyours have refused to undertake it at soe low a rate."

The surveyors seem to have been suspicious of the good faith or the ability of the "citty" to pay these usurious demands, for we find a request that "they (the citty) would now think fitt to appoint some person or persons to covenant with ye surveyours . . . soe they might be assured of theire pay." What would a modern Clerk of Works say to these fees?

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Mr. Pratt's services, however badly paid for by "the city," are recognised by the King, as is seen by this entry :—"Fees for my knighthood 69*l.*" This is highly creditable to Charles, for the new-made knight, although not afraid to stay in London during the Plague, had not been an active supporter of his father. He candidly tells us :—

"In this very nick of time comes on this Civill Warre . . . . to avoid wch Storme and give my selfe some convenient Education I went out of England about April, Anno 1643, and continued Travelling in France, Italie, Flanders, Holland, &c., till Aug. 1649, viz., about six yeares and a halfe, at wch time I againe returned after ye ende of ye warre and ye death of ye King."*

But perhaps Charles thought a good architect better than a bad soldier, for a man works best at what he likes, and Sir Roger, as the sequel showed, had profited by his exile and gained "some convenient education." He considered travelling a necessary part of an architect's training, and thus advises people bent on building :—

"First resolve withe yr selfe what house will bee answerable to yr purse, then gett some ingenious gentelman who hath seen much of yt kinde abroad and bin somewhat versed in ye best authors of archit., viz., Pallad, Scamozzi, Serlio, etc., to doe it for you, and to give you a designe (wch will generally fall out better than one wch shall be given you by a home-breed architect), for architecture here hath not as yett received those advantages which it hath in other parts it continuing allmost still as rude here as it was at ye verry first."

With this preamble we must now return to Mr. Pratt's views on St. Paul's. As Evelyn notes, they differed from Wren's. We find him, however, willing to concede "the noble cupola," though he objects to the position assigned to it by Wren in his "modell." In "His Queries concerning ye first repaire of St. Paul's Church, London," the good knight tell us :—

"If totally to be repaired, why not then according to its first manner, that being most agreeable to its first composition ? but this likewise waved, for yt would have bin too greate an abuse to soe vast an expense to have onely produced a thing soe Gothlike and ungraceful. . . . . If masterly and nobly to bee done what hinte then to be taken either from thinges moderne or antient.

From thinges moderne I thinke yt as then there was noething to be taken either of ye greatnes in any part of Europe except in Rome and I yett doubt whether St. Peter's there, was as then finished, howsoever ye manner yt is soe verry particular yt it could hardly if at all bee brought to suite with such and soe olde a body as our Pauls. Recourse was therefore had to ye reliques of ye most famous buildings of ye antient Greekes and Romans from which all thinges were borrowed, wch seemed best for ye turne.

And truly as to ye divisions of ye side walles from ye steeple to ye portico west, all thinges seemed iuditiously done, ye building first to bee raised with a maine foote from ye plaine, and ye antient Anterides to bee thinned, sett upon a perpendicular, and not with many settings of, as wee see those of olde, to bee made of a convenient breadth (as I suppose of our 3rd or 4th part of ye space between pilastron and pilastron, with ye window placed equally between them, and of about 1½ foote or at most 2, in proiection. The whole worke as to ye rest to bee most nobly composed of most hard stones, ashler revailed of about 2 ft. in depth, 3 in length or better, each one, and if ye higher courses clear ye lower, etc., and fitted with cornishes proportionable to them yt is vast, stronge by its modiglions, and of few members for its greater appearance and layed down securely by ye parapetts upon them, I mean first yt wch concludes ye side isles, and afterwards yt of ye nave of ye building with piedistalls returned and adorned with vast pireoples upon them drawn from ye example of yt formerly standing on ye toppe of moles Adriani in Rome.

The first of these cornishes was taken from yt about ye Court of Marte Vindicatore at Rome, wch doubtlessly would have done much better if it had had either ye on-volo, or golo reverseia, if not both under it, soe as to have seemingly made up a whole cornish, where as now it seems to bee but a part of one and to fall too suddenly, and nakedly to ye upright of ye walls, having noe extended moulding under ye modiglions, whereby to have sweetely brought them of by degrees, and to have bin as it were a common ligature and support to them, ye reason why this was omitted in its first buildings seems to have bin a kinde of neglect of ye court wall and allsoe to save expense and to sett of ye better ye temple standing within wherein was to be shewed ye utmost of skill.

The uppermost cornish seems to bee taken from yt 2nd one of ye Pantheon vide Palladio, lib. 4, page 78, but there ye Modigel have yett a tondine under them, etc., but I thinke ours stands without anything at all, wch for ye reasons above said I conceive ought not to have bin done espetially since it presently falls confusedly into a kind of freeze below of lyons heads and bobbins, for soe I must call them from ye neerest thing yt I know doth anywise resemble them. Concerning this freeze (for soe I must call it or else I know not what to make of it) it seems somewhat to allude to ye Dorich order, where ye bobbins are set for ye triglifes, and ye lyons heads for ye metopes, wch heades indeede are extreemely greate and noble, but as for ye bobins, it is to bee wished yt hee would rather have putt ye triglifes and soe have forborne soe ungraceful an invention for ought yt I have ever seene or readde its without example and yt which lookes yett not well, this freeze stands without any moulding either from ye cornish above or ye supposed archit ; beelow, wherein to include it, so yt this falls indistinctly into ye revailed worke of ye walling below, as ye cornish doth into it, wch stands above it.

Soe yt these things beeing mended in ye cornishes as above-said I conceive yt ye whole worke would have stood most nobly, if yt ye lyons heads had bin sett at a convenient distance each from other large festons betweene them and yt ye parapett had either bin distinguished according to art into sollid, and balusters, or if yt this seemed not durable ennough, then to have at ye least ye pannells revailded out and wch perhappes might ye better agree with ye seeming much intended solidiness of ye worke, and to bee of longer duration, except wee had yet rather wholy take away ye freeze afore-said from below and place its ornament heere wch would exceedingly grace ye whole.

As to ye windows the lowermost might have bin more gracefully sett out with balustred stooles, etc., though those now there are well and of great solidinesse and duration, ye architr : about them is well where I suppose all imposts, etc., to have bin omitted (though ye windowes in arco for ye greater strength) to avoid all inconvenience in its future glaceing ye cherubi for its serraglio is new and verry gracefull, and so is its cornish upon seroles with ye spandrells. The 2nd story of rounde windowes with theire archits onely introduce a pleasing noveltie and varietie in ye building, but those uppermost in ye nave seeme to narrow and low and to require yett more ornament than ye architr about them, viz., a noble cornish and frontispeece. . .

February 12, 1672.—The measures of St. Paul's, London, as I finde them sett downe in Dugdall's booke of Paul's, pag. 161, concerning ye truth of ye seale queere.

Breadth.—The whole breadth of ye church from out to out in its maine walleing is about 100 ft. of ye same breadth is ye crosse parte. But beesides this, ye proiection of ye crisme of ye nave and ye crosse part westward is about 2½ or 2 ft., but that of ye anterides of ye quire and eastside of ye cross part is about 10 ft.

Isles.—The side isles of them 20 fts., ye outwalles 5 ft. each, and of 5 ft. ye maine of ye two pilastrons, wch in all doe just make up ye summe of 100 ft. ; but ye pilastrons proiecting on each side of theire square 2 ft. ½ for ye carrying up soe many arches several wayes will make these isles 5 ft. lesse then above said between pilastron and pilastron." [Here follow more details.]

Cupolo.—But heere *vide* if yt 4 vast pilastrons might not be raised at ye 4 angles of ye crosse next ye nave, whereupon to sett a *cupolo* of about 100 ft. in diameter, viz., ye breadth of ye whole building mem., yt ye arches wch goe upward are of ye same breadth with those of ye side isles, yt they may by this meanes agree in vaulting.

1673.—Objection against ye modill of St. Paul's standing in ye Convocation House there as its now designed by Dr. Renne. July 12, 1673, according as it offered itself unto mee upon ye short and confused vewe of ¼ of an houre onely.

Planta.—First as to ye forme of it its wholly different from yt of all ye cathedralls of ye whole worlde, beesides this beeing one long continued body onely ; all others beesides, in ye forme of a crosse either more or lesse.

2ndly.—Yt ye two side isles are wholly excluded from ye nave of ye church and turned into uselesse porticos without instead of adding a spacious gracefullness to ye church within.

3rdly.—In setting ye cupolo at ye west ende of ye church insteade of over ye middle of ye crosse isles, and then separating ye whole diameter of this cupolo from ye nave of ye church as I remember wch hath most causelessly and ungracefully shortened it.

4th.—Makeing 3 severall porticos all of ye same fashion at ye western ende of ye church whereas there seemeth to bee noe necessary use of any more than one.

The upright.—As to this I had scarce time to viewe it, soe can saye but little to it ; but see since thyt (as I remember) there is a double portico, as it were, one over ye other, ye lowermost looking from ye church, ye uppermost into it, whether all ye sidelights of ye nave come not through the upper portico, wch, if soe, then how darke and ungracefull will ye nave bee.

2ndly.—How ungracefully and weakely doe ye lucarnes stand wch are over ye portico of ye east ende, etc., vide with what basement ye church raised. What ornament of ye windowes to ye porticos, etc. Ten windowes as I remember make ye whole length of ye church, ye architects in such cases usually make an odde one.

That wch I observed in ye cupolo were yt ye pillers stood too thick and consequently ye windowes between too much crowded and too plaine beeing without all ornaments and yt there were noe lucarnes in the arch of it and contrary to all coustume wch must needes darken it."

The Clarendon House which we have already mentioned is also noticed in Evelyn's Diary. In a letter to Viscount Cornberry, January 20, 1665, he speaks of its glories in language which would have been intensely flattering to the architect had he heard it. He says :—

"My old friend and fellow traveller (cohabitant and contemporarie at Rome) has perfectly acquitted himself. It is without hyperbolies the best contrived, the most usefull, gracefull, and magnificent house in England. . . . Here is state and use, solidity and beauty most symetricaly combin'd together. Seriously there is nothing abroad pleases me better, nothing at home approaches it. I have no designe, my Ld, to gratifie the architect beyond what I am obliged as a profess'd honorer of virtue wheresoever tis conspicuous. . . .

What shall I add more, *rumpatur invidia !* I pronounce it the first palace of England, deserving all I have said of it and a better encomiast."

In his "History of England," chap. 64, Hume also speaks of the Chancellor's house as "A building likewise of more expence and magnificence than his slender fortune could afford, being unwarily undertaken by him, much exposed him to public reproach, as if he had acquired great riches by corruption."

Sir Roger has many memoranda about the building materials area, &c., and now when even the memory of the splendid mansion has gone it is interesting to learn that "Ye middle point of ye house is to bee putt exactly to ye middest of St. Jameses Streete and care to bee had, yt ye house bee sett in a right angule to ye streete and allsoe parallel to ye court wall before it."

Although the final results were so satisfactory they were not attained without much worry and trouble to the architect. We hear of "repaires of glasse broken, 65*l.* 4s. : *ergo cave*"; and "some certaine agreement to bee made as to ye soder to be used for in delivery and use of this there is great deceite, plummers, etc., can make their own sodder." But it was not alone trifles like "sodder and glasse" that he had to contend with. We gather from a letter to my Lord Chancellor (who appears to have complained of him exceeding his estimate) that

"this calculation was made upon this supposition . . . that all materialls should bee served in according as they were then offered to mee, and ye worke finished according to ye bargaines then made" but "ye brickes (which) were all assured mee to bee made on yr. lordshippe's grounde at 8sh. 6d. p. thousand, but ye brick earth in my Ld. Bartlett's grounde being at first long disputed and two of our master brick makers dying successively of ye plague and many other of theire servants who were most active in it, the bricks made upon yr. lordshippe's grounde were verry few, in regard of the whole and most of them beeing unseasonably made, verry defective, soe yt wee were forced to sollicite Sr. Nicholas Crape to furnish us from his clamps wch . . . cost at leist 15sh. p. 1,000.

As for ye tymber ye Dutch warre comeing on ye price of it increased ; ye carpenter by yt time hee had framed and raised ye 1st floore professed himself to bee utterly undone by soe greate an undertaking, refused to goe forward, and humbly submitted himselfe to yr. Lordshippe's mercy, to deale with him as you pleased."

One might suppose from the above that this workman was of a humble mind, but the sequel proves the reverse. It reminds one rather of a modern strike leader to read of his conduct when as

"At this time ye towne was highly infected, ye workemen everywhere dyed, and where to finde a more active or able master carpenter was verry difficult and uncertaine, but most assuredly wee should have bin obleeged to ye rates hee had refused. Whereupon twas thought ye best by faire wordes and promises [Oh, Sir Roger !] to encourage him to persist in his begunn undertakeings, wch yett hee would not doe without first makeing new propositions to wch though wee would not hearken least wee should heve given an ill example to our other workemen, yett were wee necessitated from time to time still to supply his occasions with money wch thing hath now brought his accounts to one third at ye least more than his former bargaine."

* His friend Evelyn, who has been described as a "thorough, if prudent, Royalist," also found it expedient to travel lest he "should be exposed to ruine, without any advantage to his Majestie."

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It is melancholy to think that this splendid building was levelled to the ground in the year 1683. Referring again to Evelyn's Diary, under the date August 18 of that year, we find :—

"After dinner I walked to survey the sad demolition of Clarendon House, that costly and only sumptuous palace of the late Lord Chancellor Hyde, where I have often ben so cheerfull with him and sometimes so sad, happening to make him a visite but the day before he fled from the angry Parliament. . . . . The Chancellor gone and dying in exile, the Earl, his successor, sold that which cost 50,000*l.* building to the young Duke of Albemarle for 25,000*l.*, to pay debts which how contracted remains yet a mystery.

However it were, this stately palace is decreed to ruins, to support the prodigious waste the Duke of Albemarle had made of his estate since the old man died. He sold it to the highest bidder, and it fell to certain rich bankers and mechanics, who gave for it and the ground about 35,000*l.* Tis said they have already materials towards it (St. James-square ?) with what they sold of the house alone more worth than what they paid for it.

See the vicissitudes of earthly things."

A. S.

PARIS EXHIBITION AWARDS.

THE following are some of the awards to British exhibitors at the Paris Exhibition. The Exhibition has been divided into eighteen groups, which are subdivided into 121 classes :—

Group IV., Class 19, Mechanical Engineering.—Grands Prix : Parsons & Co. ; Willans & Robinson ; Galloways, Limited. Gold Medals: Marshall, Sons, & Co. ; Ruston, Proctor, & Co. ; Ransomes, Sims, & Jefferies ; Garrett & Sons, Limited ; Robey & Co. ; G. & J. Weir, Limited ; Patent Exhaust-Steam Injector Company.

Class 20.—Grand Prix : Crossley Bros. Gold Medals: Hornsby & Sons; Priestman Bros. ; Tangyes. Silver Medals : Ruston, Proctor, & Co. ; Robey & Co. ; Blackstone & Co. Bronze Medal : Duke & Occkendon.

Class 21.—Gold Medal : Merryweather & Sons, Limited.

Class 22, Machine Tools.—Grands Prix: Kirchner & Co. ; Smith & Coventry. Gold Medals : Kendall & Gent ; A. Ransome & Co. ; B. & S. Massey ; T. Robinson & Son. Silver Medals : J. Holroyd & Co., Limited ; Brunton & Trier ; Samuelson & Co. ; J. Bertram & Sons.

Group V., Electricity.—Grand Prix : Siemens, Bros., & Co., Limited. Gold Medals : C. A. Parsons & Co. ; Mather & Platt, Limited. Silver Medal : Robey & Co., Limited.

Group XII., Class 66, Fixed Decorations of Public Buildings and of Dwelling Houses.—Grands Prix : E. Lutyens ; Waring & Gillow, Limited. Gold Medals : Bertram & Sons ; Clowes, Limited ; Howard & Sons, Limited ; Starkie Gardner, & Co. ; Jeffrey & Co. ; Wall Paper Manufacturers, Limited ; Wright & Co. Silver Medals : Johnson & Appleyards, Limited ; Parquette ; Thompson & Co. ; Bromsgrove Guild Applied Arts ; Arrowsmith. Bronze Medals : British Non-Flammable Wood Co., Limited ; Burt & Potts ; Gooddy, Cripps, & Sons ; Wragge; Hope, Limited ; Needs & Co.

Class 67, Glass.—Silver Medal : Heaton, Butler, & Bayne. Bronze Medals : George Wragge ; Guthrie & Wells.

Class 68, Wall Papers and Paper Hangings.—Gold Medals : Jeffrey & Co. ; Wall Paper Manufacturing Company. Silver Medals : Essex & Co. ; Watson Foster Company. Hon. Mentions : Bromsgrove Guild of Applied Arts.

Class 69, Household and Art Furniture.—Grand Prix : Waring & Sons. Gold Medals : Howard & Sons, Limited ; G. Wright & Co. ; Bath Cabinet Makers' Company ; Johnson & Appleyards, Limited. Silver Medals : Heal & Son ; W. T. Ellmore & Son ; Powell & Powell, Bath ; Ives & Co. ; Bertram & Son ; S. May & Co. Bronze Medals : Lavertons, Limited ; C. Rogers, Son, & Co.

Class 70, Carpets, Tapestry, &c.—Grands Prix : Morris & Co. ; Dauvergne & Co. Silver Medal : Bromsgrove Guild of Applied Arts.

Class 71, Decoration.—Silver Medals : Waring & Gillow ; Howard & Sons, Limited ; Heal & Sons. Bronze Medals : Bromsgrove Guild of Applied Art ; Johnson, Appleyard, & Co., Limited.

Class 72, Pottery and Porcelain.—Gold Medal : Farnley Iron Company. Silver Medals : Harrison & Son ; Belleck Pottery Works, Limited ; Medmenham Pottery. Bronze Medals : Elton; Major, Limited ; Tooth & Co.

Class 73.—Gold Medal : Riley Manufacturing Co., Limited.

Class 74, Apparatus and Processes for Heating and Ventilation.—Gold Medals : Musgrave & Co., Limited ; Hartley & Sugden, Limited; Lumby, Son, & Wood, Limited ; Blackman Ventilating Company, Limited ; McClary Manufacturing Company. Silver Medals : Adshead & Smelling ; Cartland & Son, Limited. Bronze Medals : Evered & Co. ; Gasorcoal Stove Company, Limited ; Star Iron Company ; Chaplean & Son.

Class 75, Apparatus, &c., for Lighting.—Silver Medals : A. C. Wells & Co. ; Haynes & Co. Bronze Medal : Evered & Co. Hon. Mention : A. C. Wells & Co.

Group XVI., Class 106, Workmen's Dwellings.—Grand Prix: Lever Brothers. Gold Medal : London County Council. Hon. Mention : Humphreys, Limited.

Class 111, Hygiene.—Grand Prix: George Jennings, Lambeth. Gold Medals: Brown-Westhead, Moore, & Co. Silver Medal . Ramsom ; Jeye's Sanitary Compounds Company ; Septic Tank Syndicate, Exeter ; Lambton Collieries, Limited.

NATIONAL UNION OF SANITARY INSPECTORS.

THE fourth annual conference of the National Union of Sanitary Inspectors was held at the Town Hall, Leamington, on Friday and Saturday, August 24 and 25. On Friday morning the members attending the conference were received by Dr. H. Mason, Chairman of the Health Committee, who expressed the opinion that the Union was a very useful one. Mr. J. K. Anderson, sanitary inspector, read a paper on Leamington as a health resort ; Mr. J. Peers, Wolverhampton, on the difficulties attending the seizure of unsound meat ; and Mr. A. Kent, Hanley, on the responsibilities of occupiers for the abatement of nuisances.

The proceedings of the conference were resumed on Saturday morning, when Miss Constance Cochrane, of the Parish Council, St. Neots, Hunts, contributed a paper on the housing of the working classes in rural districts. In the absence of Miss Cochrane Mr. Spears read the paper, which stated that Miss Cochrane had been actively engaged for the past two years in collecting facts as to the present condition of rural housing, and had personally inspected forty-five of the worst villages.

As a result of her investigations she realised more forcibly than ever the desirability of making medical officers of health, and, perhaps, inspectors of nuisances, independent of the Rural District Councils, and with salaries sufficient to secure good men. Inspectors of nuisances should be properly qualified men, not publicans, broken-down farmers, and men who have failed and whose friends desire them to be pensioned off at the public expense. She also considered it desirable that rural inspectors should not remain in one district for more than three years. When she first commenced her inquiries she was prepared to find the small owners the worst offenders as to cottage property, but experience had shown that this is not the case, and that there is no difference between these and many of the county squires, especially if these latter are non-resident. In three typical and recent cases the worst offenders were (*a*) a large owner who is a magistrate, chairman of a Rural District Council, and a County Councillor ; (*b*) a County Councillor ; and (*c*) a Rural District Councillor, who is agent to the owner of the neglected and dilapidated village which he himself represents. In many country districts men apparently get themselves elected on Rural Councils with the object of obstructing sanitary reform.

There were good laws, but they were not enforced. Why did not the Local Government Board compel Rural District Councils to carry out their legal obligation ? and why did the Board consent to the appointment of thoroughly incompetent sanitary inspectors ? But granted efficient sanitary inspection, much would remain to be done in the matter of providing additional cottages for agricultural labourers, unless the land was to go out of cultivation.

Mr. R. John Hughes, sanitary inspector, Rhyl, read a paper on the housing problem as affecting the casually employed of urban districts. He said the casually employed are more affected than any other class. The frugal artisan could to a large extent solve the difficulty for himself. The tenement houses were generally overcrowded, dilapidated and sub-let in rooms, with conveniences used in common, and no responsible oversight. The habits of the occupiers suffer in consequence, and were a menace to the community. Their needs were but small, and a successful housing scheme for them must not attempt too much, but only provide for their wants. These would consist of a living-room, also used as a sleeping-room, a bedroom and a small scullery. An experiment on these lines had been successfully carried out at Liverpool. Overcrowding had only been dealt with in a half-hearted manner in the past, but with the awakening of public interest in the housing question further action would be possible in the future.

The necessity for doing something to ameliorate the condition of the poorer classes had long been recognised. The Legislature had sought in the Torrens Acts, Cross Acts, the Public Health Act, 1875, and the Housing of the Working Classes Acts, 1885 and 1890, to equip authorities with powers to this end. With the exception of the 1890 Act the cost of these was prohibitive.

The 1890 Act had been sufficiently adopted to afford an abundance of statistics, showing that its provisions could be satisfactorily enforced. The advantage of municipal *v.* private enterprise in building houses for the working classes was that the former built for health and the latter to secure the greatest profit. Part 1 of the 1890 Act dealt with large unhealthy areas ; part 2 with small unhealthy areas, and part 3 enabled authorities to build houses when they thought fit. Part 1 was found to be costly in operation, and action in the future as far as practicable might well combine parts 2 and 3 ; building new houses under part 3, and closing and demolishing under part 2. Co-operative Societies and employers of labour might also do much. "Trusts" and "Artisans Dwellings Companies" had done much in the past, and a further extension of them was desirable.

The rents of the new houses erected for the poor should be fixed at the lowest possible figure. They could be lower than at present if the Local Government Board were to extend the period for repayment of loans to 100 years for land and sixty years for buildings, postpone the operation of the sinking fund, and lend money at 2½ per cent. Hygiene should be taught the rising generation in schools and elsewhere. The improved habits of the people rehoused under clearance schemes was gratifying and encouraging, and care should be taken that the new houses should only be made sufficiently attractive to induce the poorer classes to live in them.

Mr. Pearce, Wolverhampton, said they had some back-to-back houses in his district, but they had been successful in persuading the owners to alter them into through houses.

Mr. Davis, Clitheroe, said the great need in his district was for houses at 2s. 6d. per week rent ; but, unfortunately, houses could not be built to be let at that rent.

Mr. Lowery considered the chief need of the rural districts to be an improved water supply ; but he admitted that there were more filthy and dilapidated houses than there ought to be in such districts.

Dr. Berry, Wigan, considered the existing law as to closing dilapidated houses sufficiently strong if properly enforced.

Mr. Spears, West Bromwich, cited an instance in which there were sleeping in a single room an aged woman, the occupier, her unmarried son, aged forty-five, a married son with his wife and four children, the two eldest, a boy and girl, being eighteen and sixteen years of age.

Mr. J. Sumner, Wigan, read a paper on the new Food and Drugs Act, and Mr. J. S. Lloyd, M.R.C.V.S., Manchester, contributed a paper on the construction and regulation of dairies and cowsheds.

The members visited Warwick Castle, Guy's Cliffe, Kenilworth Castle, and Stoneleigh Abbey and Park during their stay in the district.

CONDITIONS NECESSARY FOR SUCCESSFUL PURIFICATION OF SEWAGE BY LAND TREATMENT.

THE following paper by Mr. H. Royle, Assoc. M.Inst. C.E., was read before the Incorporated Association of Municipal and County Engineers, at the annual meeting held in London in July :

"The author desires to endorse the remarks made by Colonel Jones in his paper on 'Sewage Farm Management,' read at the annual meeting at Halifax in 1895, in regard to the very limited knowledge possessed by sewage-farm managers as to the proper treatment of sewage, and how few there are who thoroughly understand the matter. Colonel Jones said he could count on his fingers the self-educated sewage-farm managers who did justice to their charge, and we know that if any authority requires such a manager he is rarely to be found. Colonel Jones suggests technical education at model sewage farms for managers and watermen, where a register of qualified persons could be obtained.

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The author, having had fifteen years' experience in sewage farming with crude sewage on the broad irrigation principle, after having laid out a farm of 40 acres, is desirous of imparting his experience and knowledge for the benefit of the members of this Association. In the first place, it is well known that a good soil is of the utmost importance for the due and proper treatment of sewage, and must be combined with efficient under-drainage in order to produce a good effluent; nevertheless, when these two essentials are at hand the desired results are not always obtained. This may appear strange, yet such is the fact; and why is this so? The author's object is to endeavour to supply this information from the experience gained on the Stretford sewage farm, which is undoubtedly a first-class farm, and is justly considered as the model sewage farm in the watershed of the joint committee of the rivers Mersey and Irwell.

The scheme is a pumping one, and the sewage is received into a large receiving tank. It is then pumped into a cistern, from which it flows through an underground cast-iron rising main, and underground earthenware carriers, having hydrant chambers and penstocks for distribution of sewage over the land as may be desired; thus, so far, this arrangement is common to most sewage farms. The land varies as to quality, the soil being an alluvial deposit, and has a gentle fall from the west to the north; the under-drains on the northerly half of the farm are not so deep as on the westerly half and the soil is of a slightly stiffer nature; it is therefore not so suitable for sewage treatment as the westerly half.

On first draining the land, agricultural draining tiles, some of 6 in. and some of 4 in. in diameter, were laid at a distance of 20 yards apart (agricultural tiles the author considers are the best on account of their porosity); these, after a time, were found to be inadequate, so that intermediate drains are being laid as time in winter permits. Originally the whole of the land was in grass (old meadow-land), and in covering up the drains the green sod was turned upside down and laid immediately on the tiles, and the filling in well rammed up to the surface. Twenty-five acres of this original surface was sewaged for three years without any tillage whatever, and during this period a first-class effluent was produced. In due course the herbage became coarse under sewage treatment; the land was then ploughed up, and a regular rotation crop has been carried on up to the present time. After ploughing, defects began to show themselves: occasionally there was not so good an effluent as before when in grass. This was found to be due to the rotting of the fibres of the sods, which caused a small cavity between the earth and the tiles; these drains have since been opened out, the sod portion removed, and the ground thoroughly well rammed from bottom to top as solid as possible. The drains on the farm vary in depth from 3 ft. 6 in. on the northerly side to 5 ft. on the westerly side. Previously to taking out the rotted sods on the drains it was necessary carefully to avoid putting sewage over the line of some of them. This was easily done, as the whole of the drains on the farm are laid in parallel lines, not in herring-bone fashion—which latter is, in the opinion of the author, on a sewage farm a decided mistake—in which case keeping the sewage off the line of pipes would have been an impossibility.

On sewage farms worms and rats occasionally are a source of great trouble and annoyance by their burrowing, especially where the drains are shallow, causing small holes which allow the sewage to get into the drains without having been filtered through the land, and thus a bad effluent is the result. In dealing with an infected worm area, of which we have had numerous experiences, we pump the very strongest sewage we can from the bottom of the tank, and on some occasions, previous to closing the land with strong sewage, have sunk down to the drains and temporarily blocked them up, and have thus been so far successful in killing the worms that the land has again continued to produce as good an effluent as before. The worms do not die in their holes, but come to the surface. They have caused an imperfect effluent, even when the drains have been as much as 4 ft. 6 in. in depth.

It is often stated that land becomes sick through the application of sewage; this is no doubt a fact, for if sewage is applied continuously week after week and month after month without aëration and rest, it will become sick as the micro-organisms in the soil cannot live in waterlogged ground. In consequence many farms have been condemned unjustly as not being successful. As a matter of fact, a recent analysis of the soil of the Stretford sewage farm has proved it to be of better quality after fourteen years of regular sewaging than that of the extension land which had only been sewaged a few times during twelve months.

Having thus in a general way described our mistakes, the author desires to say what he considers essential in making a sewage farm or filtration area successful.

No drain should be laid if possible less than 5 ft. deep, as it is found that worms will burrow as far as 3 ft. 6 in. in depth. In cutting drain trenches through land, it will invariably be found intersected with old draining tiles and spit drains. It is of the most vital importance that these should be carefully noted when cutting the trench, and great care taken to cut them off at least 4 ft. on either side of the new trench, otherwise trouble will begin as soon as the sewage is put on the land. As these old trenches will be found to be only about 18 in. or 2 ft. in depth, it will be seen that a ready unknown carrier is there to convey the sewage to the drains without its having gone through sufficient depth of land to ensure proper filtration.

Again, it is important that the drains should be well and truly laid and with close joints, and in filling in the earth it is of the utmost importance that a layer of the best soil should be placed on the tiles. As to filling in and ramming, this cannot be too well done; in fact, the ground over the newly-laid tiles should be made as solid as before displacement; this precaution is of the utmost importance, as afterwards, if not properly rammed and made solid, no amount of sewaging will suffice to consolidate the land sufficiently for effectual sewage treatment.

Having already pointed out the great importance in making the ground over the drains perfectly solid, and cutting off all lateral old drains, the author desires to point out another fatal error that is made on some sewage farms and filtration areas, viz., the placing of gravel, sand, or cinders on the tiles, or using perforated pipes, with the object of giving, as is generally supposed, a better filtrating medium. This practice is, of all the mistakes that can be made in regard to sewage treatment, the most disastrous; errors of judgment like these have caused many sewage farms to be failures in producing good effluents.

This question of putting cinders on drains must not be confounded with bacteria beds formed of cinders or coke breeze, as the two operations for producing good effluents are not identical. The fact must not be overlooked that the drains are always acting and in operation soon after the application of sewage on the land, whereas bacteria beds have no under-drainage, except such as is required at the bottom of the beds, for the purpose of draining them after complete saturation and aëration, being regulated at will by penstocks after the prescribed time required for filling, saturation, emptying and rest. Unless drains are laid as pointed out, failures are bound to occur; even when laid as suggested they will require frequent examination and repunning, as and when they suddenly go wrong. Want of knowledge in regard to badly-laid drains has undoubtedly been the cause, in some cases, of sewage-farms failing to produce a good effluent, although having ample and suitable land for the purpose. Treatment by chemicals before applying the sewage on the land is then resorted to instead of first putting the drains in order. No doubt many sewage farms are in disrepute solely from want of this drain knowledge, it being a great mistake to suppose that when drains are once laid they will act properly for all time to come, even when in the first instance well laid and well rammed.

In the management of a sewage farm or filtration area it is essential that the manager should keep a strict watch on his effluent and his drains. This can be done if the drains are laid in parallel lines, having examination pits or eyes at the junctions with the main effluent drains, or where they may enter separately into an open channel; it is then possible to ascertain the whereabouts of any drain that may be working imperfectly, and at once to take steps to remedy it, viz., by taking out the soil immediately over the drain and repunning it as if a new drain was being laid. This is a necessity that will frequently occur, and must be attended to if a good effluent is to be maintained.

In laying out a sewage farm or filtration area, the author would impress on all who are called upon to undertake these important works that all drains should be laid in parallel lines, and in the direction of the greatest slope of the land. On no account should the work be let by contract, except the trench cutting; also every care should be taken in laying the tiles and the filling in and ramming solid as before mentioned, for unless this be done a satisfactory effluent is an impossibility; and even after these precautions have been taken it will be found that frequent imperfections and unsatisfactory effluents will occur during sewaging of the land, through worms, rats and other causes, and the remedies mentioned must be resorted to.

As regards a sewage farm manager, Colonel Jones remarked there are few who do justice to their charge. This is undoubtedly true, for unless a manager is thoroughly well up in land drainage—and this, in the opinion of the author, combined with good land is the main secret of producing a good effluent—however well he may be qualified as an ordinary farmer, unless he is well versed both as land drainer and farmer, and takes a pride and interest in his work, trying to produce suitable crops combined with a good effluent (the latter not to be sacrificed for crops), he will never succeed as a sewage farm manager, as such an occupation is so different to ordinary dry land farming as generally understood.

The Stretford sewage farm consisted of forty acres up to two years ago; since then it has been extended to seventy-seven acres. Fifty-seven acres are sewaged on the broad irrigation principle with crude sewage with a dry-weather flow of two-thirds of a million gallons a day, from a population of about 10,000 people, and since the joint committee of the rivers Mersey and Irwell began analysing sewage effluents six years ago, the average analysis of twenty-three samples was ·30 of a grain per gallon on the four hours' test."

ARCHÆOLOGICAL SOCIETIES.

ST. ALBANS ARCHÆOLOGICAL SOCIETY.—A number of the members of the St. Albans Archæological Society recently visited Royston and Ashwell. Royston Parish Church, the nave of which, before the dissolution of the monastery, formed the chancel of the parish church, was first examined under the guidance of the Rev. Joseph Harrison, the vicar, who read many extracts from the paper by the late Rev. Henry Fowler, printed in the Society's Transactions. The remains of the Early English work were much admired, and the late fourteenth-century recumbent effigy of a knight and the brasses were examined. Since the previous visit of the Society to Royston, a chancel has been added to the church. The party next visited King James's Hunting Lodge, which, by the kindness of Mr. Banham, they were allowed to examine. Mr. W. J. Hardy here read some notes founded upon the accounts of the expenses for preparing the buildings for King James's reception, and a survey taken in the time of the Commonwealth. Some discussion ensued as to the portions of King James's buildings which were now standing, as it was apparent that no part of the external brickwork of Mr. Banham's house was of the seventeenth century. The members went on to see the celebrated Royston Cave. This interesting object, of which there is practically little or no tangible record, is supposed to date back, as regards its upper part, to Roman times, and was deepened and converted into a chapel or oratory in the twelfth century. The curious figures representing saints and kings carved in high relief in the chalk on the sides, which were originally coloured, are not possibly all of the same date. Some criticisms were made on the use of Arabic numerals in the date, 1347, which is cut in the chalk, and is supposed to be contemporary. At Ashwell Church the members were taken under the guidance of the Rev. Canon Davy, who pointed out the objects of interest in that church, which was built and altered at a time when Ashwell was a town of some wealth and importance. Canon Davy took the opportunity of referring to the loss which the Society had sustained by the death of the Rev. Henry Fowler, for so long his fellow secretary, and from whose paper on Ashwell

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Church, which is printed in the Transactions, he had so largely quoted. The earliest record, said Canon Davy, of the church was in 1223. The Abbot of that day, Richard de Berkyng, was Chief Baron of the Exchequer and Lord Treasurer of England. He was a great appropriator of rectories, and amongst others it is stated by Sporley, the monkish chronicler of Westminster, that he acquired the Church of Ashwell. The patronage before this appeared to have been in the hands of laymen. The church appeared from earliest times to have been dedicated to St. Mary the Virgin, whilst the neighbouring church of Newnham has the rare and probably very early dedication of St. Vincent, the Spanish deacon who suffered martyrdom, like St. Alban, in the Dioclesian persecution. It was believed that only four churches in England had this dedication. With regard to its architectural part, the church was one of the finest in the county, the chief feature being the tower, which is the highest in the county, standing 175 ft. high, or 10 ft. higher than Peterborough Cathedral, and 45 ft. higher than the central tower of St. Albans Abbey. No clue was afforded by any records as to the date of the construction of the church. In the eastern bays of the nave arcade there were to be seen some good specimens of Early Decorated work, but nothing of an earlier date was discoverable in the building. The nave appeared to be Perpendicular, but on closer inspection they found in the jambs of the blocked doorway (which once opened into a chapel on the north side) a Decorated moulding, also on the outside a piscina with a Decorated canopy. The chapel was extant when Salmon wrote his history of Herts in 1728, and there were good grounds for believing it to be the chantry of Thomas de Stanton, whose "grant of 12 acres of land to provide for the singing of daily masses for h s soul" was made in 1306. The chancel was probably reconstructed about 1306, the window features being transformations of a much later period effected without pulling down the walls. It was probable that the reconstruction of the whole church commenced about the time of the accession of Edward II., and the work was carried on progressively towards the west. Canon Davy then turned to the tower. The top stage, he observed, was clearly no part of the original structure, but an addition of Perpendicular times. The original tower consisted of three stages, the upper one being furnished with a coping which now does duty as a string. The walls were extremely massive, being 7 ft. thick at the base, and this, combined with the bulkiness of the tower, suggest that it was built to carry a spire. An inscription in the church recorded the extraordinary storm of wind which began on St. Maur's day, 1361-2, following the great pestilence of Edward III.'s reign. The late Rev. H. Fowler used to be of opinion that the inscription commemorated a catastrophe which occurred at Ashwell during that storm. The gale brought down the spire and a mass of masonry from the top of the tower, and the débris fell on the western part of the nave with destructive effect, and the shattered arches were then reconstructed. This would account for the Early Perpendicular work to be observed. This same gale also blew down the spire from Norwich Cathedral. The walls of the baptistry (which serve as buttresses to the tower) received their panelling at the time of the reconstruction of the tower arch. The Tudor windows on the south side suited the date of John Bill's bequests, and were probably his gifts. The Perpendicular windows in the north aisle were probably the gifts of John Harrison (of Hinxworth), whose tomb stands behind the organ. The east window has good Decorated tracery, and appeared to be the only unaltered one in the church. The Canon then spoke of the various interesting inscriptions, and finally pointed out the decayed state in which the tower is now owing to the softness of the stone, and the urgent necessity for restoration which now exists to preserve it. A new and more correct reading of the well-known inscription in the tower of the church, supplied by Mr. Charles Johnson, was read by Mr. Page. With regard to the tower of Ashwell Church the hon. secretaries have supplied the following note. The tower roof and the spire are at the present time subjects not only of great local, but of much more than local, interest. It is a matter for some regret that the finest tower belonging to any parish church in the county is in a tongue running into Cambridgeshire, but it has always belonged to Herts, and is a subject for legitimate pride. The secretaries write:—It is a good climb up the much-worn stairs to the top of the tower, but a fair number of the members did climb, and this led to much interesting discussion. In the result there was general agreement that the oldest parish church tower in Herts and its characteristic skyline do not differ greatly from what was seen in mediæval times. Steep roofs lead from the gutters inside the tower parapet to an octagonal top, with vertical sides, each side being 4 ft. 3 in. in width. At the top of each of the sides there is a band of three quatrefoils, and a moulded cornice. Small pinnacles exist at the angles of the octagon. From the flat roof covering in this octagon, with vertical sides, starts a small stump spire (a "spike" in idea). The timber construction is simple. . . The roof of 1714 was apparently a reconstruction of previously existing framework, with some new and many old timbers. The decorative details are of Perpendicular date. The names of the persons engaged in carpenters', joiners', and plumbers' work in 1874 are recorded on the lead work below one of the sides of the vertical octagon. In general form, the leaded construction on the tower of Baldock Church resembles that at Ashwell; but Ashwell has the lead—is, in fact, far ahead of Baldock—in general form and in details. Such rare work as Ashwell retains should be forthwith well illustrated, and should be preserved with great care for all time. The idea of getting rid of the roof and spire in place of repairing them is said to be in the air; but the destruction of such work, or even acquiescence in rapid decay, should be rendered impossible. —*Bedfordshire Express.*

Illustrations.

OLD BAILEY SESSIONS HOUSE.

THAT a good architectural work should express externally the disposition of that which it enshrines is an acknowledged axiom, and in the case of the Old Bailey Sessions House the difficulty which confronted the competitors was so to arrange the accommodation required on the limited site as to present a homogeneous and complete building. The difference in the depth of the ground suggested the cutting the site into two parts, and in the event this has proved the most successful arrangement.

In the design illustrated, however, the building has been designed as one. The centre of the frontage in the Old Bailey is in this design the centre of the plan as well as of the elevation. The rounded corner was suggested by the committee, and was developed on plan into a State entrance for the Lord Mayor and judges, whose rooms are grouped at this, the widest, end of the site where the large court is placed.

This court, with the others, has been placed as far away from the noise of the traffic as possible. A scheme for keeping the witnesses together in one group was worked out, which should have certain advantages. On the ground floor they are assembled, and from here they can be drafted by a special staircase to the rooms on the court floor when they are immediately required. These open again on to the large central hall communicating with each court.

On the floor above are placed the witness and solicitors' consultation rooms, &c. This system of concentration has been adopted throughout, and intercommunication ensured by ample and direct corridors.

The present unique and magnificent prison buildings have no doubt more or less influenced the competitors, but in the elevations illustrated a somewhat lighter vein has been introduced, without, it is hoped, departing from their dignified and monumental character.

J. BELCHER.

ABERDEEN CITY ARCHITECTSHIP.—At a recent meeting of Aberdeen Town Council, it was resolved "That in view of the great increase of architectural work devolving upon the council, it be remitted to the Special Committee in connexion with the Borough Surveyor's department to consider and report on the duties of the city architect, and whether an arrangement can be carried out to combine the whole of the city's architectural work under one official and one office." There was considerable discussion, in the course of which several members urged that Mr. John Rust, jun., city architect, had done his work well. Ultimately the motion was adopted by sixteen votes to eight.

BOOKS RECEIVED.

ORNAMENTAL DETAILS OF THE ITALIAN RENAISSANCE.—Measured and Drawn by G. A. T. Middleton and R. W. Carden. (B. T. Batsford.)

AN EPITOME OF THE LAW AND PRACTICE CONNECTED WITH PATENTS FOR INVENTIONS.—By J. Johnson and J. H. Johnson. Third edition. (Longmans, Green, & Co.)

Correspondence.

To the Editor of THE BUILDER.

PARIS EXHIBITION AWARDS.

SIR,—Will you kindly note in your next issue that the name of Mr. E. Ingress Bell should be coupled with mine in the list of awards at the Paris Exhibition.

ASTON WEBB.

STOWE HOUSE, BUCKINGHAM.

SIR,—Your interesting account of Stowe is very good reading, but I fancy much extra information could be gleaned from the perusal of an excellent paper on the "History of Stowe," by the late (and last) Duke of Buckingham and Chandos, G.C.S.I., which is printed *in extenso* in the *Bucks Archæological Magazine*, Vol. V., No. 7, 1885. I had the pleasure of hearing it read on August 11, 1884, on the south front of the mansion by the Duke himself (after the members of that society had been entertained to luncheon by his Grace in the "state dining-room, 70 ft. by 20 ft.," which you quote). The late Duke called his place "Stowe" (not "Stowe House").

The present mansion is supposed to have superseded or been grafted on to a sixteenth century house of the Temples of Stowe, and the grand entrance hall was built under Lord Temple, and "there were still preserved sketches in his own hand, and emendations upon the architect's plans. He employed several architects to carry out his ideas, and apparently gave the internal arrangements to one and the external to another." I quote from the Duke's own words, which support some of the tenets of your article. To read the whole of it would, I think, be profitable to those who visited the building.

E. SWINFEN HARRIS.

SIR,—I think it may interest the author of the article appearing in the *Builder* of this day's date on the above subject to know that on the 2nd inst., at a bazaar then held, there were on sale sundry early prints—among them "prospects" of the house at varying epochs.

If they are not all sold, no doubt particulars of any still undisposed of might be obtained on inquiry by letter to the Secretary of the Bazaar Committee at the house.

E. HOWE.

August 25.

THE ARCHITECTS AND THE DEAN AND CHAPTER OF ST. PAUL'S.

SIR,—It may possibly be deemed presumption by some that one who ranks only as an Associate of the Royal Institute of British Architects should write to you on so important a subject as this. But, since the last formal protest of the principal architects of the day has failed to produce any effect, it appears only too evident that other means of influencing the Dean and Chapter must be tried, in which, directly or indirectly, all must bear a part. For, from the amount of scaffolding to be seen in the interior of the Cathedral, the work promises to proceed with unabated vigour, till every cornice is surmounted by a railing, and texts are stencilled on every available space; till the dignity and the repose of the building is seriously affected, or possibly destroyed.

The erection of the railing which elicited the last protest is so palpably a mistake that one wonders how so eminent an artist could have committed it. The railing in question is an iron one, of so close a pattern and so thickly gilt as to be practically opaque. It appears to be some 4 ft. in height, and is fixed on the extreme upper edge of the main cornice. From its great projection the knobbed ends of the standards appear, when one is standing immediately under the centre of the dome, to cut the line of the chancel attic cornice. From this position it seems to the spectator as though a gilded parapet wall had been built above the cornice behind which the pilasters which support the vaulting ribs disappear. This railing extends around part of the chancel, and preparations are apparently being made to carry it around the whole of the interior.

Some time ago the light of opposition flared up, and finally died out. The erection of this new railing seems to have rekindled it. But the isolated protests of individuals, however eminent, have proved ineffectual in the past, and will be so again. The time has at last arrived when this great matter must be taken in hand by some organised body of recognised position.

Fortunately we possess in the Royal Institute an

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organisation which is able to secure the services of men who are possessed not only of commanding personality but of tact and experience, and who are well fitted to arouse and direct public opinion.

The only hope of saving any portion of the Cathedral in its unsullied grandeur is to induce the Dean and Chapter to submit a definite scheme for the approval or condemnation of the very highest men of the day. Or, if this be impossible, to gain their consent to the collaboration of some experienced architect with the artist who up till now has alone had charge of the work. It is obviously futile to formulate protests after the completion of some portion of the work. The authorities, after having expended the public money upon it, cannot be expected to stultify themselves by immediately giving orders for its removal.

That the great influence of the Royal Institute, if properly applied, can prevent much further injury I believe. That they will attempt to use it I hope. That it is their duty to attempt to use it I feel certain. For St. Paul's is no mean relic of a past age. It is the greatest work of the greatest architect that England has ever produced. The noblest and the last of the great English cathedrals; the crowning work of centuries of effort. The ancient works of other lands do not excel it; few are its peer. There is that in its stern and solemn grandeur that should stay the hand of reckless alteration, and strengthen every feeling of reverent care, lest the religion, the peace, of the building cease to be felt; and we sigh in vain, amidst the restless mosaic and the shimmering gilt, for the calm touch of the master's hand, and the strength of the mind that is still.

HAROLD SMITH, Associate R.I.B.A.

SOUND-PROOF FLOORS.

SIR,—In a building I am shortly erecting for dwellings I wish to make the ordinary floors as sound-proof as possible. I purpose putting felt ½ in. thick, the width of joists, on top of same before laying on the floor-boards.

Would you please say if this will be a successful treatment, or is it necessary to fill in the space between joists to prevent the noise going through the air space? ARGUS.

*** The space between joists should also be filled with sound boarding, and pugging of lime and chopped hay used dry.—ED.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

8. THE THEORY OF THE ALTERNATING CURRENT TRANSFORMER — BOOSTERS — COMPENSATORS—ROTARY CONVERTERS.

THE alternating current transformer, considered mechanically, is a very simple piece of apparatus. If we have a bundle of iron wires arranged in the form of a ring (fig. 1), and wind round it two

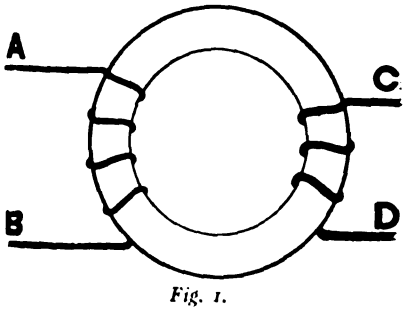

Fig. 1.

coils of insulated copper wire—A B and C D in the figure—then this will be a transformer for alternating currents. If we apply an electric pressure E_1 to the terminals of the coil A B, which we shall call the primary coil, then there will be an electric pressure E_2 at the terminals of the coil C D, which is called the secondary coil. If there be n_1 turns of wire in the primary coil and n_2 turns of wire in the secondary coil, then

$$\frac{E_1}{E_2} = \frac{n_1}{n_2}.$$

For example, if n_1 be 100 and n_2 be 10, then if the applied pressure E_1 be 1,000 volts, E_2 will be 100. From this formula also it is obvious that a transformer can either be used for raising or lowering the pressure. According as the ratio of n_1 to n_2 is greater or less than unity, then E_1 is greater or less than E_2.

A transformer may be compared to a lever. The ratio of the pressures at the terminals of each coil is constant just as the ratio of the forces at each end of a lever is constant. If the electric pressure applied to the primary coil be too high, then the transformer will burn out just as a lever breaks down when the applied force is too great. If copper offered no resistance to the passage of an electric current and there was no magnetic molecular friction in iron, then a transformer would be mathematically perfect, absorbing power at one pressure at the primary terminals and giving it out at another pressure at the secondary terminals, just as a lever would be perfect if it had no weight and was absolutely rigid.

The theory of the alternating current transformer has been worked out with great success during the last few years, and as it is in perfect accordance with experiment and an indispensable introduction to the theory of many other kinds of apparatus, we will give an elementary sketch of it.

When an electro-motive-force (E.M.F.) is applied to the primary terminals A and B (fig. 1) a current at once begins to grow in the primary coil, and this being wound round a bundle of iron wires magnetises them strongly. In modern language it produces a large number of lines of induction or a flux of induction in the iron core common to both coils. This flux passing through the secondary coil creates an E.M.F. in it proportional to the rate at which the flux grows. As this flux also passes through the primary, it creates an E.M.F. in it which is opposed to the applied E.M.F. Now in the primary coil we have three pressures in equilibrium—the applied pressure E_1, the back pressure caused by the varying magnetic flux in the core, and the pressure C_1R_1 required to drive the magnetising current C_1 through the resistance R_1. Just as in statics, these three pressures form a "triangle of forces." In practice the applied E.M.F. E_1 is at least a thousand times greater than C_1R_1, hence the third side of the triangle, *i.e.*, the back E.M.F. caused by the flux in the core, must be almost exactly equal to E_1. Now if the flux through each coil is the same, *i.e.*, if there is no magnetic leakage, then the back E.M.F. in the primary will be to E_2 as n_1 is to n_2. But we have shown that this back E.M.F. is practically equal to E_1, hence

$$\frac{E_1}{E_2} = \frac{n_1}{n_2}.$$

In the above we have assumed that the secondary terminals C and D are open circuited, and hence that there is no current in this coil.

As the applied E.M.F. is an alternating E.M.F., the flux in the core is continually altering in direction, the iron during half a period of the alternating current being strongly magnetised in one direction, and during the other half period as strongly magnetised in the other direction. It is because the flux is always varying that we can get an alternating E.M.F. from the secondary terminals. If we connected the primary terminals to a direct current source of supply, then, during the fraction of a second whilst the core was being magnetised, we would get an E.M.F. from the secondary terminals. Once, however, the flux becomes constant, then there is no E.M.F. generated. It is the continual variation of the magnetic flux in the core that keeps the secondary terminals of the transformer "alive."

The magnetic flux produced in the core of a transformer when there is no load on the secondary is proportional to n_1C_1, *i.e.*, to the number of turns multiplied by the current (the ampere turns) in the primary. Consider what happens when a load is put on the secondary. We have now a current flowing in both the primary and secondary coils. The magnetic flux in the core is the resultant of the magnetising currents in both the coils. Since E_1, C_1R_1, and the back E.M.F. in the primary coil caused by the flux can be represented graphically by a triangle, and since even at full load C_1R_1 is very small compared to E_1, therefore the back E.M.F. in the primary is always nearly equal to E_1. If E_1 be kept constant, as in the commercial transformer, then this back E.M.F. is constant, and therefore the magnetic flux in the core of the transformer is constant at all loads. Whatever the load on the transformer, the number of magnetic lines linking the two coils is constant. It therefore follows that the resultant of the magnetising turns is constant.

This resultant, being equal to the magnetising turns at no load, must be a very small quantity, but n_1C_1 and n_2C_2 are large when the transformer is loaded; hence they must be nearly in opposition in phase, *i.e.*, when n_1C_1 is magnetising the core n_2C_2 is demagnetising it, the difference between the two being the small number of ampere turns required to produce the flux. Hence at heavy loads n_1C_1 is very little greater than n_2C_2.

If C_0 = the current in the primary at no load and f_0 = the power factor of the primary circuit at no load, then the equation connecting C_1 and C_2 is

$$n_1(C_1 f_1 - C_0 f_0) = n_2C_2 \ldots\ldots\ldots (1)$$

This equation can be proved trigonometrically from the diagram (fig. 2) given below. The power factor in the primary circuit (f_1) is the cosine of the angle B A C. In practice f_1 may be taken as unity for all loads greater than a tenth of the maximum, and f_0 is generally about 0·8.

Let A C (fig. 2) equal E_1, the applied E.M.F. at the primary terminals. Let A B equal C_1R_1, the E.M.F. necessary to drive the primary current C_1 through the primary resistance R_1, and let B C equal the back E.M.F. caused by the magnetic flux in the core of the primary. These three forces form the triangle A B C, and the angles of this triangle are defined as the phase differences between these E.M.F.'s. Since A B is very small compared to A C, the angle B C A is very small, and B C and A C are practically equal to one another. Produce

C B to D and make B D $= \frac{n_2}{n_1}$ B C, then B D

will be the E.M.F. generated in the secondary coil. If V_2 be the pressure at the terminals of this coil and R_2 its resistance, then B D $= V_2 + C_2R_2$. Fig. 2 is the fundamental diagram of

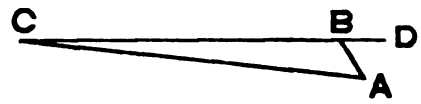

Fig. 2.

a transformer and deserves the most careful study. By trigonometry we can deduce the following formulæ from this figure:—

$$V_2 = \frac{n_1}{n_2}V_1 - \frac{n_2^2}{n_1^2}Q\,C_2 \ldots\ldots\ldots\ldots (2)$$

$$\text{where } Q = R_1 + R_2\frac{n_1^2}{n_2^2}$$

Also the efficiency ϵ of the transformer when the power taken by the primary is W_1 watts is given by

$$\epsilon = \left(1 - \frac{QW_1}{V_1^2}\right)\left(1 - \frac{W_0}{W_1}\right) \ldots\ldots (3).$$

W_0 being the power taken by the primary at no load—*i.e.*, the watts required to magnetise the transformer.

The following examples illustrate the great accuracy of these formulæ:—

(1.) In a Ferranti 20-h.p. transformer R_1 = 2·75 ohms, R_2 = 0·0061 ohms, n_1 = 1,200, n_2 = 50, and E_1 = 2,400.

In this case $Q = R_1 + \left(\frac{1,200}{50}\right)^2 R_2 = 6·26$.

Hence $V_2 = 100 - 0·111C_2$.

For example, when the secondary is supplying 50 amperes, the pressure at the secondary terminals is

$$100 - 0·011 \times 50 = 98·35.$$

In practice the maximum permissible load on the transformer is reached when the secondary pressure drops 2 per cent., hence by (2) the smaller Q the greater the power the transformer will convert.

(2.) In a Swinburne "Hedgehog" transformer Q = 16·3, W_0 = 151, and V_1 = 2,400. The efficiency at any load W_1 is therefore

$$= \left(1 - \frac{151}{W_1}\right)\left(1 - \frac{16·3\,W_1}{5,700,000}\right)$$

by formula (3).

The following table compares our calculated efficiencies with the efficiencies as actually measured by Dr. Fleming.*

Watts taken by primary (W_1)	469	1,804	2,583	3,632	4,571	5,297
ϵ determined by Dr. Fleming	0·6;	0·92	0·94	0·95	0·96	0·97
ϵ calculated by (3)	0·6	0·91	0·94	0·95	0·96	0·96

* "Experimental Researches on Alternate-Current Transformer." By Dr. J. A. Fleming, F.R.S. *Journal of the Institution of Electrical Engineers*, Vol. 21, p. 649.

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If we join the terminals A and C (fig. 1) by a piece of wire, and connect A and B to the mains, then the electric pressure between B and D is the difference between the primary and secondary pressures. If V be this pressure, V_1 the pressure between the mains, and V_2 the pressure between C and D, then

$$V = V_1 - V_2 = \frac{n_1 - n_2}{n_1} V_1.$$

Similarly, if we join the terminals A and D (fig. 1), and connect A and B to the mains, then the pressure between B and C will be the sum of the primary and secondary pressures, and will therefore be equal to $\frac{n_1 + n_2}{n_1} V_1$.

When a transformer is used in this manner it is called a "booster," and it can be used either for raising or lowering the pressure.

Another method of connecting up the transformer is to join B and C, and connect A and D on to the mains. In this case the pressure between A and B is $\frac{n_1}{n_1 + n_2} V_1$, and between C and D it is $\frac{n_2}{n_1 + n_2} V_1$. Mains may be taken off A and B to supply apparatus at the pressure $\frac{n_1}{n_1 + n_2} V_1$, and another set of mains may be taken off C and D to supply a circuit at the pressure $\frac{n_2}{n_1 + n_2} V_1$. A transformer used in this manner is called a compensator, and in many cases great economy can be obtained by its use. Professor Elihu Thomson has used this system in America for distributing electrical energy. For example (fig. 3), we can have an

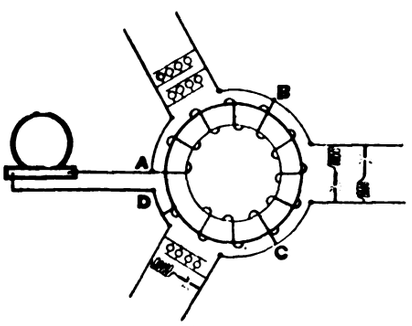

Fig. 3.

alternator feeding a compensator at A and D at 600 volts, and three circuits, A B, B C, and C D, taken from this compensator, feeding circuits at 200 volts. Even when there is no load on two of the circuits the voltage is still kept at 200 on the third. The reason of this can be explained in the same way as we explained the action of the transformer, for we can show that the magnetic flux inside the iron core remains constant no matter what the loads on the various circuits are.

Suppose that we have a transformer (fig. 1) with thirty turns of wire on the primary coil and twenty turns on the secondary, and that the pressure of supply is 100 volts, then by connecting this on to the mains we can get nine different pressures. Using it as a transformer we get 150 volts one way and 66·7 the other. Boosting up we get 250 or 167 volts. Boosting so as to reduce the pressure we get 50 or 33·3 volts. Finally, using it as a compensator, we get 60 or 40 volts. Hence, counting the original 100, we get in all nine different voltages.

In practice, however, we generally want to connect it up permanently, and the question arises, which is the most economical way of transforming the pressure? It can be proved that if we wish merely to lower or increase the pressure by less than 50 per cent., then to connect the transformer as a booster is the most economical way. If the pressure has to be altered by more than 50 per cent., then we use an ordinary transformer. If we wish to subdivide the pressure into several different circuits, then it is always best to use a compensator.

The apparatus hitherto described for altering the pressure of alternating currents has no rotating parts in it. We could, however, use an alternating current motor-generator, *i.e.*, an alternating current motor directly coupled on to an alternator, or we could use an alternating current dynamotor, *i.e.*, a motor-generator in which both the motor and alternator windings are on one armature, the current being supplied to the motor windings from two slip rings on one side of the armature, and given out from two slip rings on its other side. A piece of apparatus of this nature is called a rotary converter. As the efficiency of transformers is so high rotary converters are not used for converting alternating current at one pressure into alternating current at another, but they are largely used for converting direct current into alternating or *vice versa*. In order to do this the only change necessary is to provide a commutator instead of two of the slip rings on one side (fig. 4).

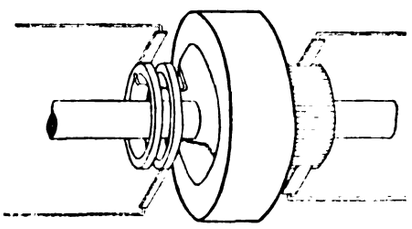

Fig. 4.

Instead of having two separate windings in the armature (fig. 4), a single ordinary continuous winding can be used, the collector rings for the alternating current being connected to two opposite points on this winding. The armature windings will thus carry both an alternating and a direct current, each of which heats the armature conductors exactly as if the other were absent. In rotary converters no lead has to be given to the brushes, just as in dynamotors, and the mechanical strains on the armature are very small.

Rotary converters are largely used in electric traction work. The alternating current from the power station is transformed by their means into direct current at a sub-station, and this direct current is conveyed to the trams by a trolley wire at a pressure of 500 volts. They are in use at the Central London Railway, and have been used for the Dublin electric tramways for several years. They are also largely used abroad. In the Central London Railway each rotary can convert 1,200 h.-p. received in the form of alternating current and pressure into over 1,100 h.-p. given out in direct current and pressure.

GENERAL BUILDING NEWS.

CATHOLIC CHURCH, TRANMERE, CHESHIRE.—The new Church of St. Joseph, in Devonshire-park, Higher Tranmere, was opened on the 19th ult. The building is of red Ruabon brick and terra-cotta, and accommodates 700 persons. Mr. Edmund Kirby was the architect and Mr. Peter Rothwell the builder.

CATHOLIC CHURCH, LOWESTOFT.—The foundation-stone was laid on the 23rd ult. of a Catholic church to be erected on a site in Gordon-road. The building will be of red brick, with Cossey dressings, and will accommodate 600 persons. The length will be 116 ft. and the width 53 ft. The nave will be 22 ft. and the aisles 13 ft. in width. The architects are Messrs G. & R. Baines, of London, and F. W. Richards, of Lowestoft. Messrs. G. Hawes & Son, of Norwich, are the builders.

METHODIST CHURCH, LOSTWITHIEL, CORNWALL.—Lostwithiel Free Methodist Church has been erected at a cost of 2,500*l*. The blocks of buildings consist of new chapel and the original schoolroom with new front, the two being connected by new classrooms. A lobby on each side gives entrance to the chapel. One entrance is surmounted by an hexagonal tower, the dome being covered with copper. The tower is flanked on each side with a turret, one being over the opposite chapel entrance and the other over the schoolroom lobby. The front windows of the chapel and the orchestra are of ornamental cathedral glass in leaded lights, the lower light of the front being painted. The interior provides seating accommodation for about 350, arranged on ground floor and gallery. A recessed orchestra will accommodate choir and organ. A high-pressure hot-water apparatus has been fixed. Mr. Samson Hill, Redruth, is the architect.

RESTORATION OF ORFORD CHURCH, SUFFOLK.—This church has just undergone restoration. The work was carried out by Messrs. Cornish & Gaymer, of North Walsham, Mr. J. T. Micklethwaite having been consulting architect.

ST. NINIAN'S CHURCH, ABERDEEN.—The Church of St. Ninian at Mile End will be dedicated on the 5th inst. The church covers an area measuring 63 ft. by 120 ft. The front is to Mid Stocket-road. On either side of the main entrance is a projecting buttress. A square tower rises on the south-west corner to a height of 53 ft. from the ground level, and this is crowned by a short pyramidal spire with a weather-vane terminal. The exterior masonry is entirely of granite from Rubislaw Quarries. Entering by the main doorway, side doors with leaded glass panels give access on either side to a tiled vestibule. The chancel arch has a span of 25 ft., and its apex is 29 ft. 7 in. from the floor. The pews and most of the interior finishings of the church are of pitchpine. The west gallery has a panelled front, and is supported in the middle by two pitchpine pillars, with capitals of carved foliage. The chancel has a tiled floor, which is reached by four granite steps rising from the nave. The walls are panelled with oak to a height of about ten feet. In the centre of the north wall a stone platform is erected, on which the communion tables will be set, and immediately above is a carved oak canopy. The canopy is divided into four pendant panels, each panel being filled with tracery. The communion table, of oak, measures 7 ft. 6 in. in length. The pulpit, which is situated in the right side of the chancel, looking from the nave, is also of oak. All the carved woodwork is from the workshops of Messrs. J. and D. Ogilvie. All the walls of the interior of the church are lined with pitchpine to a height of about 5 ft. The church will be lighted throughout by electric light. The vestry, session-house, &c., are situated at the north-east corner of the building. The edifice has been designed and erected under the supervision of Messrs. W. & J. Smith & Kelly, architects. The contractors for the work were:—Mason work, Mr. John Morgan, Charlotte-street; joinery, Messrs. Hendry & Keith, Gilcomston Park; plastering, tiling, &c., Messrs. James Scott & Son, John-street; painting, Mr. Edward Copland, Rosemount Viaduct; slating, Mr. George Farquhar, Union Row; plumbing, Messrs. J. Blaikie & Sons, Littlejohn-street; lighting, the Aberdeen Electrical Engineering Company, Limited; heating, Mr. Robert Tindall, Loch-street; woodcarving and furniture, Messrs. J. & A. Ogilvie, Union-street. The total cost of the new church is between 5,000*l*. and 6,000*l*.

PARISH CHURCH, CARNOUSTIE.—The foundation-stone of Carnoustie Parish Church was laid on the 25th ult. The building will be of dressed stone from the Carmyllie quarries. Mr. P. M'Gregor Chalmers, of Glasgow, is the architect, and the contractors are:—For masonry, Mr. George Robertson, Carnoustie; joinery, Messrs. Miller & Fleming, Glasgow; slating, Mr. Alexander Hogg, Carnoustie; plumbing, Mr. Joseph Anderson, Carnoustie; glazing, Mr. N. M'Dougald, Glasgow; and ironwork, Mr. Andrew M'Call. Mr. Thomas Neill is the clerk of works.

PRIMITIVE METHODIST CHURCH, HARTON, DURHAM.—On the 18th ult. the foundation-stone was laid of a new Primitive Methodist chapel in Wenlock-road, Harton Green-lane. Mr. T. E. Davidson, of South Shields, is the architect, and Messrs. Summerbell & Sons, Tyne Dock, are the builders.

SCHOOLS, SHEFFIELD.—On the 27th ult. the foundation-stone was laid of a new school, to be erected on a site adjoining the Primitive Methodist chapel, and to accommodate, at a cost of over 1,600*l*., between 350 and 400 teachers and scholars. The architect for the new schools is Mr. W. Wray, of London, and the premises comprise one large room on the ground floor, with ten or twelve classrooms above. Mr. Hancock is the contractor.

BOARD SCHOOL, BRIDGE OF WEIR, RENFREWSHIRE.—A new school, which has been erected at Bridge of Weir by the Kilbarchan School Board, was opened on the 25th ult. The building consists of a central hall, surrounded by six classrooms. The central hall has an open timber roof. The classrooms accommodate from twenty to fifty children each. The architect was Mr. James Miller, of Glasgow.

NEW BLOCK, BANFFSHIRE ASYLUM, LADYBRIDGE.—The following tenders have been accepted:—Masonry, David Forsyth, Elgin; carpentry, James Dey, Botriphnie; plastering, Sellar & Co., Aberdeen; slating, John Hutcheson, Banff; iron and smith work, Thomas Paton, Banff; painting and glazing, Charles Innes & Co., Banff. The accommodation is for fifty male patients, and the total estimated cost, 3,900*l*. Mr. W. Kelly, of Aberdeen, is the architect.

RECONSTRUCTION OF ABERDEEN MUNICIPAL BUILDINGS.—These buildings are to be reconstructed from designs by Mr. R. G. Wilson, architect, Aberdeen, at a total cost of about 20,000*l*. The Broad-street front will be set back to the line of the great tower, so as to widen the street at that place, and correspond as far as possible with the proposed widening in front of Marischal College and the new Greyfriars Church, extending from Queen-street to Littlejohn-street. The reconstructed buildings will extend across Concert-court, and include rebuilding of the house beyond, so that a new access will have to be provided for the Advocates' Hall and Library (in Concert-court). It is expected the work will be commenced in six or eight weeks, the various departments having now agreed as to the accommodation they respectively require.

HOTEL, BRAY, DUBLIN.—Breslin's Royal Marine Hotel, Bray, which some time ago became the property of the Dublin, Wicklow, and Wexford Railway Company, was opened on the 18th ult. after reconstruction. The building has been renamed the

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Station Hotel. Mr. J. J. Farrell was the architect. The contractors for the building work were Messrs. Meade & Son, and Messrs. Keatinge & Son executed the painting and decorative work.

POST-OFFICE, HAMILTON, LANARKSHIRE.—A new post-office is in course of erection in Brandon-street, Hamilton. The cost is estimated at 5,000*l.* Mr. W. W. Robertson, H.M. Office of Works, Edinburgh, is the architect, and Messrs. Miller & Ferguson, of Motherwell, are the builders.

FREEMASONS' HALL, OKEHAMPTON.—The corner-stone of a Freemasons' Hall was laid at Okehampton on the 27th ult. The building will cost about 700*l.* Mr. J. Archibald Lucas, of Exeter, is the architect.

HOME OF REST FOR CRIPPLES, BANGOR, BELFAST.—The foundation-stone of the Stewart Memorial Home for Cripples at Bangor, near Belfast, was laid on the 25th ult. The home is intended principally for children. On the ground floor will be a wing with separate wards for boys and girls, and nurses' room, giving accommodation for those unable to go up and down stairs. There will be a common day-room, with large bays. On the upper floor wards, with nurses' rooms attached, will be provided. The building will accommodate thirty visitors. Mr. W. J. W. Roome is the architect, while the builder is Mr. James Kidd.

TIVOLI VARIETY THEATRE.—In view of the ninth anniversary of the opening of the Tivoli Variety Theatre, various alterations have lately been made in the building. The buffet, between the main entrance hall and the Tivoli Restaurant, has been merged into the theatre, and the space utilised in making a grand entrance hall, 30 ft. by 17 ft., and a vestibule 27 ft. by 9 ft. Additional exits have also been made direct into the Strand. In the centre of the new entrance hall and vestibule ornamental arches have been formed, and this work, which is in the Indian style, harmonise with the other decorations. The doors leading to the grand circle, which formerly extended several feet into the auditorium, have been brought in line with the entrance hall. A new box office and "gentlemen's cloakroom" have been formed, and the "ladies' cloakroom" enlarged, remodelled, and redecorated. The grand circle saloon is newly decorated in the style of Louis XVI., and the ventilation improved by adding an alcove, with a window opening direct into the open air, whilst an air-shaft has been carried above the roof. Electric fans are fitted at each end of this saloon, one bringing in fresh air and the other expelling the hot air. A glass awning has been fixed over the new entrance, which, with the other improvements, will secure greater comfort to the public frequenting the hall. These alterations have been carried out under the direction of the architect, Mr. Walter Emden. The structural works have been executed by Messrs. Howard & Co., and the glass awning by Emanuel & Co. The decorations are the work of Mr. J. M. Boekbinder.

WELLINGBOROUGH COTTAGE HOSPITAL.—On the 28th ult. the Cottage Hospital, Wellingborough, was opened. The building is located on the Doddington-road. The plans for the building were prepared by Messrs. Sharman & Archer, and the contract of Messrs. E. Brown & Son (2,140*l.*) having been accepted a start was made with the building last autumn. The hospital proper consists of two six-bedded wards, with rounded ends, extreme length 29 ft. and width 20 ft., forming the wings of the building, with lavatory accommodation in connexion with each ward, but isolated by a cross-ventilated lobby. The intervening central block contains a hall, small separation ward, bathroom, an operating-room, lighted both from the roof and side, and drug and linen stores, the roof having been made to serve the purpose of a general storeroom. In the centre of the building on the garden front is an open verandah, 40 ft. long and 7 ft. wide, affording shelter and shade for convalescent patients. The floors throughout, excepting in the operating-room and lavatories, are of pitchpine blocks on cement concrete. Each of the principal wards is heated by a central warm fresh air stove with descending flue, and hot and cold water is laid on to each lavatory and sink and to the bath. The administrative block, which is placed between the Doddington-road and the hospital, and connected with the latter by a glazed covered way, contains on the ground floor: Matron's sitting-room, nurses' dining-room, kitchen, scullery, larder, china pantry, and hall, and opening from the courtyard adjoining are a wash-house, laundry, coal place, and disinfecting chamber. The first floor accommodation consists of matron's and four nurses' bedrooms, with bathroom, lavatory accommodation, and linen store, all opening on to a central landing. The buildings throughout are of brick, with Sileby brick facings and pebble-dashed cement panels in the upper part, stone being used only for a canopy and dressing at the front entrance and at the courtyard doorway. The roofs are of steep pitch, and are covered with Broseley tiles, the hospital having overhanging eaves, and the house moulded and enriched cornices.

BUSINESS PREMISES, ANNAN, DUMFRIESSHIRE.—A block of business premises, to be known as Regent House, has been erected at the corner of High-street and Bank-street, Annan. The upper portion of the building is of polished sandstone, and rests on iron girders and pillars. At the angle of the building bay windows are formed and these are surmounted by a double deck open circular turret, the top being 55 ft. high. The principal entrance is beneath these projecting bay windows, but there are also entrances from the two streets. The building, which will be occupied as a drapers' and outfitters', has four floors and a basement. The drapers' department, on the ground floor, is 46 ft. long, the shop windows being of plate-glass. The exterior and interior fittings are of polished mahogany. A milliner's shop is situated at the west-end of the block, in High-street. On the first-floor, access to which is by a staircase of pitch-pine and mahogany, are situated the show rooms, &c. The second floor is occupied by work rooms. The third floor contains work rooms, stock rooms, &c., part of this floor being let as a photographer's studio, with a separate entrance from High-street. The architect was Mr. T. Taylor Scott, of Carlisle, under whose supervision the work was carried out by the following contractors.—Masonry, Mr. G. M'Ildowie, Annan; joinery, Mr. E. Musgrave, Carlisle; slating, Mr. J. Richardson, Annan; plastering, Mr. J. Laidlaw, Ecclesfechan; plumbing, Messrs. J. Dickson & Son, Dumfries; painting and glazing, Mr. William Irving, Annan; heating, Messrs. Musgrave & Co., Belfast. The lead lights were supplied by Messrs. Swain, Bourne & Son, Birmingham, and the mosaic tiles by Messrs. Carter & Co., Poole. Mr. Douglas, of Newcastle, executed the carving.

BANK BUILDINGS, CONSETT, CO. DURHAM.—The new premises erected at Consett for Messrs. Lambton & Co., Bankers, of Newcastle-on-Tyne, have just been opened for business. They comprise bank, manager's room, and strong-room in basement, house of ten rooms for manager, and in the back portion of the site three shops and dwelling-rooms over. The walls are faced with Penshaw pressed bricks, and the stone for cornices and dressings is from the Penshaw quarries. The banking-room and manager's room are fitted up entirely in oak. The general contractor has been Mr. C. Groves, of Chester-le-Street, and the strong-room doors are by Messrs. Chatwood's Safe Company, Limited. The buildings and fittings have been designed by, and erected under the superintendence of, the architect to the bank, Mr. John W. Dyson, Newcastle-on-Tyne.

TEMPERANCE HALL, HUDDERSFIELD.—A new hall is to be erected in Princess-street, Huddersfield, for the local temperance society. The memorial stone was laid on the 25th ult. Mr. B. Stocks, of Huddersfield, is the architect.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, SELKIRK.—The Selkirk Town Council have adopted a scheme, prepared by Mr. Harry W. Taylor, of Newcastle-on-Tyne, for a new water supply for the burgh. The cost will be about 12,500*l.*

SEWAGE SCHEME, BELPER, DERBYSHIRE.—A Local Government Board inquiry was held on the 24th ult. in the Council Room, Belper, into an application by the Urban District Council for sanction to borrow 48,144*l.* for the construction of a sewage scheme for the town. The inquiry, which was conducted by Mr. Percy Boulnois, was attended by the engineer for the scheme, Mr. Lomax, of Manchester.

FOREIGN.

FRANCE.—In connexion with the Paris Exhibition, and at the proposal of the Minister of Fine Arts, the Grand Cross of the Legion of Honour has been promised to M. Hébert (painter) and to M. Guillaume (sculptor); the rank of "Grand Officer" to M. Gérôme and M. Carolus-Duran (painters) and to M. Fremiet (sculptor); and that of "Commander" to MM. J. P. Laurens and Roll (painters), M. Ernest Barrias (sculptor), and M. Vaudremer (architect). Among the new "Officers" of the Legion of Honour are M. Alfred Normand (architect), M. Bartholomé (sculptor), and M. Roybet (painter). Among the new "Chevaliers" are M. Tournaire and M. Defrasse (architects).——The competition for a school of industrial work, to be erected at Marseilles, has been decided in favour of the design by MM. Pacaud and Cravio.——The jury in the competition for a group of schools for the municipality of Havre has awarded the first premium to M. Poupel; the second to M. Charles, and the third to M. W. Cargill; all of Havre.——A committee has been formed to erect a monument to Du Guesclin at Dinan.——The death is announced, at the age of eighty-three, of M. Cauvin, painter, who for many years was instructor in painting, sculpture, and drawing at the naval arsenal of Toulon, to which he has left an interesting collection of models of the poops of ancient ships, some of them after designs by Puget.——We have to announce also the death, at the age of forty-four, of M. Camille Gate, sculptor, author of the monument to the poet Remi-Belleau on the Place de Nogent-le-Rotrou; that of M. Francis de Saint-Vidal, a sculptor who studied under Carpeaux, and executed the monumental fountain under the Eiffel Tower and the statue of De Neuville on the Place de Wagram; and that of M. Pucey, architect and member of the Société Centrale, and who was general secretary of the "Société des Ingénieurs et Architectes Sanitaires" of France.

MISCELLANEOUS.

ABERDEEN CORPORATION TRAMWAYS.—With reference to the new tramway extensions authorised by private Act of Parliament, Aberdeen Town Council has resolved that the tramway from Castle-street to the sea-bathing station should first be proceeded with, on the overhead trolley system; that the section of the existing tramway in Union-street between St. Nicholas-street and Castle-street be electrically equipped on the same system; and that tenders be invited for 800 tons of steel rails, 10,000 tons of causeway setts, and the necessary poles. It was also agreed to ask a quotation from the Westinghouse Electric Company of the cost of electrically equipping the tramway in Union-street on the underground system. It is desired by the Town Council that the line of building of the new post-office be set back from 8 ft. to 10 ft., in Crown-street, so as to allow of a double line of tramway rails, but the Post Office authorities have not yet agreed to this.

LAYING OUT NEW STREETS.—A special general meeting of the Association of Borough Officials of Scotland was held on the 24th ult., in the Sheriff Courthouse, Elgin, Lord Provost Young, of that city, presiding. In the course of the proceedings Mr. F. G. Holmes, C.E., Borough Surveyor, Govan, read a paper on "Laying Out New Streets," in which he contended that in all towns and boroughs a system of well-designed, broad, and regular streets is necessary, and that Borough Commissioners should have their powers extended. He held that Commissioners should have the power to regulate the lines as well as the levels of proposed new streets. In towns the width should not be less than 80 ft. for carriageways and footways, unless in short streets which could not be extended, or in other exceptional circumstances. Where tramways, &c., were contemplated, 60 ft. was required, which would be an ample minimum for all modern requirements for streets in general. In some of our cities, he said, they had instances of streets 70 ft., 80 ft., and 100 ft. in width, and it was to be regretted that these widths were not more frequently adopted. Mr. W. F. Mackintosh, clerk, Arbroath, having read a contribution on "Legal Procedure in Making Streets," both papers were discussed together, and several members supported the view that commissioners should have power to acquire land for the purpose of improving and widening streets. Mr. James Campbell, Town Clerk, Saltcoats, read a paper on the "Cost of Compulsory Acquiring Ground for Public Purposes," urging that the Borough Police Act should be brought into line with the Public Health Act. A discussion also took place as to where the line should be drawn, as to new erections with reference to the lodging of plans with deans of guild or commissioners.

DRINKING-FOUNTAIN, KENSINGTON.—A drinking-fountain is to be erected in the High-street, Kensington, from a design by Mr. Herbert W. Mackinney. The fountain will be of Portland stone on a hard York stone step. The work is being executed by Mr. G. Hawkins, of Shepherd's Bush.

REFUSE DESTRUCTOR, HARTLEPOOL.—The refuse destructor at Hartlepool was opened on the 22nd ult. The destructor consists of six cells, capable of dealing with sixty tons of refuse in twenty-four hours. The contractors were as follows:—Messrs. Goddard, Massey, & Warner, Nottingham, for the destructor cells, blowers, and machinery; and Mr. R. J. Marshall, of Hartlepool, for the buildings, chimney shaft, boundary wall, and house. The whole of the work was executed under the superintendence of the Borough Engineer, Mr. H. C. Crummack. The cost was over 5,700*l.*

THE HOUSING QUESTION, WOOLWICH.—In consequence of the activity in Woolwich Arsenal and the influx of so many additional families, the scarcity of houses in the district has become acute, and a demonstration was held on Saturday last week to discuss the remedy. A procession perambulated the different streets in the neighbourhood, ultimately wending their way to Plumstead Common, where an open-air meeting was held. Mr. Alfred Hall, of the Woolwich District Trade and Labour Council, presided, and said the meeting was the outcome of a conference of all the organised bodies of the district, convened by the Woolwich District Trade and Labour Council, who were fully convinced that the time had arrived for the working classes to do something for themselves in the way of better house accommodation. Mr. J. Steer moved the first resolution, as follows:—"That this meeting of trade, labour, co-operative, temperance, friendly, and other working-class societies of the Woolwich district calls upon the Government to take steps without delay to find housing accommodation for the military at present residing in private houses, to assist local bodies to build municipal dwellings by granting cheaper loans for housing purposes, and to check excessive rents by the establishment of fair

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rent courts. This meeting also calls upon the London County Council to make greater use in the near future of their powers to assist in housing the people by increasing the supply of houses, independently of dealing with slum areas." House jobbers from London, he said, were taking advantage of the scarcity of houses in the district by buying up all they could and immediately raising the rents. Mr. A. Allison seconded the resolution, which was supported by Mr. F. Knee, Secretary of the Workmen's Housing Council, and carried. Mr. J. T. Brownlie, Chairman of the Educational Committee, Royal Arsenal Co-operative Society, moved the second resolution:—"That this meeting of working men and women of Woolwich district resolves not to support any candidate at the Borough Council election who will not definitely promise to urge the adoption of Part III. of the Housing Act, 1890, and the speedy erection by the Council of good houses for the people in sufficient numbers to bring down rent, and to be let at rents which will suffice to meet the necessary cost of construction and maintenance." Mr. Charles Martin seconded, and Mr. James Walsh, President of the Iron Plate-workers, supported the resolution, which was also carried.

LEEDS MASTER BUILDERS.—The annual meeting of the Leeds Master Builders' Association has elected Mr. J. T. Wright President, and Mr. J. Pickard Vice-President. The report and balance-sheet were adopted. The retiring President (Mr. W. H. Dews) and the various committees of the organisation were thanked for their services.

TRADE NOTES.—The new workhouse infirmary, Wellingborough, is being warmed and ventilated by means of Shorland's patent Manchester stoves with descending smoke flues, &c. The same are being supplied by Messrs. E. H. Shorland & Brother, of Manchester.——The heating of the Shirehall, Hereford, has been placed in the hands of John King, Limited, engineers, Liverpool, who are employing their improved hot-water heating apparatus combined with ornamental "Rahnee" radiators. The Working Lads' Institute, Whitechapel, London, has lately been fitted with hot-water heating apparatus by the same firm.—— We stated last week that a tobacco factory has been erected at Liverpool for Messrs. Ogden. We omitted to mention that Messrs. Robert Dawson & Co., Limited, of Stalybridge, are erecting there a large heating and ventilating installation. The arrangements comprise a combination system of direct heating in conjunction with a system of mechanical heating and ventilation.

DUBLIN ELECTRIC LIGHTING.—At a meeting of the Dublin Corporation on the 28th ult. it was decided by a majority of thirty-eight to fourteen to carry out the electric lighting of the city as a municipal concern instead of accepting the proposals of the Electric Tramway Company.

BUILDINGS COLLAPSE AT TOTTENHAM.—A portion of some new buildings known as Vicarage Mansions, which are in course of erection at West Green, Tottenham, collapsed on the 28th ult., and three bricklayers, named Hodge, Howard, and Woolard, who were engaged on the works, were precipitated to the ground, a distance of 50 ft. They were more or less injured, and were conveyed to Tottenham Hospital.

SALE OF A SCOTTISH HISTORICAL RUIN.—There was sold at Edinburgh on Monday the remains of the interesting historic house in the ancient and Royal burgh of South Queensferry, on the Firth of Forth. It is a dilapidated, red-tiled building, and is known as Queen Margaret's Palace, and also as the Covenanter's House. The former name it owes to its supposed association with Queen Margaret, the grand niece of Edward the Confessor, and wife of Malcolm Canmore, who succeeded Macbeth on the throne of Scotland. The building is in the vicinity of the Bink's Rock, the old landing-place of the ferry used by Malcolm Canmore and his Queen in their journeyings across the Forth, and, according to tradition, it was made use of by the "Saintly Queen" of Scotland when storm-stayed on her way from Edinburgh to Dunfermline. Unfortunately, however, it is very doubtful, to say the least, whether the present building, or any portion of it, was in existence in the eleventh century. Indeed, it seems to belong to the early part of the seventeenth century. But the ground on which it stands was part of the ground conveyed by Malcolm Canmore, at the instigation doubtless of his pious wife, to the Abbots of Dunfermline, who again gave it to the Carmelite Friars. According to one of the traditions of Queensferry Mary Queen of Scots passed a night in the "palace" after her escape from Lochleven Castle. There is, however, little ground for the tradition. The name, "The Covenanters' House," by which the building is also known, rests on a surer foundation than the higher title. In the seventeenth century the building was the principal hostelry in the town. To it came two fleeing Covenanters seeking refuge. They were tracked, however, by their pursuers, and one of them was killed on the staircase while assisting his companion to escape. The Covenanter who was killed was Henry Hall, of Haughhead, and on his person were found the famous "Queensferry Papers," which the authorities afterwards caused to be printed and circulated throughout the country. The building occupies about 45 ft. by 30 ft. of ground, and consists of three stories—a ground flat and three flats above. About fifteen years ago it was condemned as unfit for occupation, and since then it has been allowed to fall into a still worse state of dilapidation. Last winter the burgh authorities gave public notice that owing to the building having become "waste and ruinous and a receptacle for filth," application would be made to the Court for a warrant to sell it, failing its being put into a state of repair within three months. The owners, however, seem to have given up all right and interest in it. Warrant to sell was granted by the Court, the upset price being fixed at 20*l*. At the auction on Monday the building and ground were sold for 41*l*.—*Times*.

CAPITAL AND LABOUR.

SETTLEMENT OF PAISLEY PLUMBERS' STRIKE.—The strike of the operative plumbers of Paisley and district, which commenced about four months ago, has now been settled. The men struck work owing to the refusal of the masters to grant them an increase of ½d. per hour in accordance with that granted to the Glasgow operatives, who, they held, were paid on the same basis of agreement as the Paisley men. At a meeting of representatives from both sides, held on the 23rd ult., under the presidency of Mr. D. D. Dickie, solicitor, Paisley, the following agreement was arrived at:—(1) That the rules and regulations of the working time for Paisley of date November 1, 1897, shall be re-agreed to by the parties; (2) that the workmen shall return to their work on Monday morning, August 27, 1900, and that at the same rate of wages as formerly until the beginning of the year 1901; (3) that from and after the beginning of the year 1901 until May 1, 1901, the masters shall give the workmen an advance of ½d. per hour; and (4) that from and after May 1, 1901, until May 1, 1902, the same advance of ½d. per hour shall be continued.

THE EDINBURGH AND LEITH MASONS.—While this struggle continues, batches of men are daily sent to different towns in England and other parts of Scotland. There is not the slightest sign of either side giving way, and everything points to the strike extending for a much longer period yet. The few employers who are said to have yielded since the dispute began are not in any way affecting the main body of the masters, or brightening the prospects of the men. At a meeting of the Master Masons' Committee, held on the 27th ult. in the Building Trades Exchange, Shandwick-place, reports, it appears, were presented to the effect that many of the men were returning to their work on the masters' terms, and that some employers had now got as many men as they required. It was also reported that owing to the united action of the Edinburgh and Glasgow masters, the boycott enforced by the men on an Ayrshire job being carried on by an Edinburgh contractor had now been removed, and the job supplied with men. Notice was taken of the fact that during the last ten years or so the masons had asked and received an increase of pay five times owing to the briskness of trade, and that now, when trade was dull and notice of a reduction of wages was given, the masters were forced into a fight, which was now running into its twelfth week. The masters declare themselves convinced that equity and right are on their side, and say they are as determined as ever to fight the strike out to a successful issue.—*Scotsman*.

GREENOCK HOUSE JOINERS.—A fortnight ago the joiners in the employment of Mr. A. Stevenson, to the number of over twenty, struck work on account of a machinist being employed who was not a joiner. The masters met, and agreed that should the men not return to work, a general lock-out would take place. On the 27th ult. a meeting of the men took place, Mr. Turnbull presiding. Mr. Galloway, Glasgow, addressed the men. After discussion, it was agreed that a deputation of the employees should meet the masters to discuss the matter under dispute.

LEGAL.

LEEDS LIGHT AND AIR CASE.

THE case of Hustler *v.* Fornsworth came before Mr. Justice Farwell, sitting as Vacation Judge, on the 29th ult., on a motion by the plaintiff for an interim injunction restraining the defendant from erecting a building at Leeds so as to obstruct the light and air coming to the plaintiff's premises.

Mr. Badcock, Q.C., in support of the motion, said that the plaintiff's shop was a furniture shop at Leeds. This building formerly had opposite to it a quite low building of about 20 ft. high. The defendant had recently bought the site on which the building stood, and pulled it down, and proposed to erect a building of 30 ft. high on the site, which would substantially interfere with the access of light and air to the plaintiff's premises.

Mr. Birrell, Q.C., for the defendant, said his client's case was that the damage done to the plaintiff was of so slight a character that no Court would grant an injunction.

In the result the motion, by consent, was ordered to stand till the trial, the defendant consenting that the motion should be treated at the trial as if the buildings were then in the condition in which they now are. Accordingly no order was made on the motion except that costs should be made costs in the action.

FOLKESTONE LIGHT AND AIR CASE.

THE case of White *v.* Flude came before Mr. Justice Farwell in the Vacation Court on the 29th ult., it being an application by the plaintiff for an interim injunction to restrain the defendant from erecting a building in Victoria-grove, Folkestone, so as to diminish the light and air coming to the plaintiff's building.

It appeared from the statement of Mr. Cave, who appeared in support of the motion, that the defendant was proposing to erect a mission hall on the site on which formerly stood a cottage about 20 ft. high, but which had lately been pulled down. The plaintiff's case was that the Mission-hall proposed to be erected by the defendant, according to the plans, was to be about 28 ft. high, which would materially diminish the light and air coming to one of the plaintiff's windows in a workshop and also another window which was a basement window facing the garden. For the purposes of the motion the defendant admitted that the plaintiff's lights were ancient.

Mr. Alexander, Q.C., for the defendant, said that the highest point of the mission hall would be about 25 ft., and contended that it was not a case for an interim injunction.

In the result his Lordship thought it was a case in which there was not sufficient evidence to justify his interfering in the way suggested. He was of opinion that the better plan would be to have the case referred to an architect.

The application was accordingly dismissed.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

8,854.—CLUTCHES: *H. H. Benn.*—Linked toggles pivotted upon a sliding sleeve press the discs which are mounted upon a feather on one shaft against the sides of a drum that is keyed upon the other shaft, and the pressure is maintained with springs; the side of the drum, screwed into its place, is adjusted for taking up wear, and is locked with a screw through its periphery, which is also in engagement with one of a set of notches cut at its edge.

8,883.—DRESSING SLATES: *G. Watson.*—The revolving knives used for dressing slates are covered with a guard of openwork or transparent material, which consists of a hinged or removable panel to which is attached wire netting in a curved or other suitable shape.

8,912.—ORNAMENTAL WOOD-BLOCKS: *W. H. Aston.*—A block is fashioned by glueing together slabs or plates of differently-coloured woods. It is then cut along the wood's grain into fresh plates which are glued together so as to form a new block, which, in its turn, is cut across the grain into parquetry slabs or sheets. In order to absorb the moisture of the cement or glue, to mark the divisions, and to prevent shrinkage of the finished work the inventor lays sheets of coloured paper or cloth between the plates as they are being glued together.

8,926.—MITRING MACHINES: *Steel Nut and Joseph Hampton, Limited, and S. Hampton.*—The cutters are mounted upon a radial arm which is pivotted on to a downward extension of the frame; the arm's end passes through a curved slot, and has a washer that presses against the frame's back in order that the cutter may be kept close to the face; the knife, which may be in one piece or in two, is joined with shouldered set-screws to the radial arm; a stud, together with the edges of the opening, supports the moulding, &c., that is to be mitred.

8,944.—COMPASS, DIVIDERS, AND CALLIPERS COMBINED: *W. C. Day.*—The legs, bent at an obtuse angle, are grooved on their outsides that they may take divider-legs, a compass pencil, or calliper-legs, fastened with set-screws, and are pivotted with ears and screws on to a block from which hangs a sleeve for guiding a vertical rod; the legs are joined to a socket which slides upon the rod by links. For purposes of a fine adjustment one turns the milled head of a screw which passes into an internally-screwed bore in the vertical rod, whose rotation is prevented by means of a groove and a screw, and a pin which engages with a grooved collar retains the former screw in its place.

8,946.—STONE SAWING: *F. W. Shuttleworth & E. J. Bell.*—On to the squared ends of the side bars of the frame are fastened I-beams, to which the saws are secured by pairs of forked bolts. Each corner of the frame is supported with three rods that run upon wheels which are mounted upon the saddle, adjustment being allowed for by the mounting of the lower wheels upon an eccentrical bearing-pin. The saddles are adjusted vertically with screws, and move upon the corner-posts or dovetail slides, having an adjustable bearing-strip. The connecting-

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rod is fastened to the end bar which is tied to the I-beam.

8,081.—FLUSHING APPARATUS: *F. W. Hancock.*—To the rocking lever's inner end is attached a link upon whose upturned end a ring works loosely within the enlarged inlet of the siphon. Under normal circumstances a disc rests upon the ring in such a manner than when the chain is pulled water flows over the siphon's crown, the disc rising to allow the ensuing flush to pass.

9,013.—FENCES, HURDLES, PALISADES, &C.: *L. Molley.*—The fencing is composed of parts which can be put together in a flexible form, so that upon an incline the posts will remain vertical whilst the bars will be parallel, more or less, to the sloping ground; holes in the horizontal bars take the droppers, on which are made stops that prevent their withdrawal from the bars when the fence has been put together; the bars are fastened to the standards with bolts, or with fish-plates that pass through the standards and are bolted to the bars.

9,028.—MANUFACTURE OF VARNISH: *S. Banner.*—The copal asphalt or gum is first fused and then linseed oil is added; when the mixture has been boiled it is allowed to cool to 240 deg.-270 deg. Fahr.. when is added a hydrocarbon boiling slightly above that temperature, and the admixture is cooled; next is added a mixture of high and low boiling point hydrocarbons which have the required flash-point; the light hydrocarbon ensures a rapid drying of the varnish, whilst, as the compound has a sufficiently high flash-point, a quantity of low flash-point hydrocarbon may be employed.

9,036.—WINDOW SASHES: *F. C. Carey.*—The halves of the sashes, which are vertically divided, are hinged to sliding stiles in order that they may be turned inwards as may be required; sliding bolts secure the halves of the sashes together, the stiles—attached to the sash-weights—slide upon metal strips; the stiles are rabetted, tongued, and grooved for the exclusion of draughts and wet, and a metal tongue on the sill fits into a recess in the sash's bottom rail.

9,047.—APPARATUS FOR CLOSING GATES: *J. Holden.*—This consists of a cranked lever pivotted to the gate-post, and having an adjustable weight upon its one end; a cord or chain joins the lever's other end to an arm which is clamped upon the gate-bars; the gate becomes closed when the weight descends. Instead of the weighted lever a spring can be used.

9,147.—PROPS FOR PITS: *J. Green.*—For holding up and liberating pit props, which are mounted upon a chock block that slides within a metal box fitted with sliding or hinged doors and filled with coal dust or sand. When it is desired to free the prop the doors are opened, either from a distance or otherwise, whereupon the prop's weight forces the sand or dust out of the box.

9,165.—A THEODOLITE: *J. Hermann.*—When the instrument, which may be freely swung round and raised or lowered in a split socket of the tripod head, has been clamped alfter a rough adjustment, a slow angular movement is effected by means of a screw and a ball that turns within a cup affixed to a projection upon a socket and within another cup fashioned in that projecting piece; the ball-shaped nut at the screw's end is mounted so that it shall swivel in a bracket of the central axis. A table having a bevelled and graduated edge supports a bearing-cup whose socket is clamped to the socket which carries the table. For taking direct observations the bearing-cup is clamped to the table, but when it is desired to take an observation at a right angle to the direct line of sight the bearing-cup is liberated, and is then swung round through 90 deg. in either direction until its projection strikes a fixed stop upon the table. Accuracy of adjustment is shown upon a scale, cut in the cover that carries the spirit level, by means of index fingers upon the socket and the bearing plate. The engagement of a pinion upon the spindle of a milled head with a toothed sector, which is affixed to the telescope's clamping-band, provides for making a fine adjustment in altitude, whilst a fine adjustment in azimuth is effected by the engagement between a worm and a worm-wheel upon the double-conical spindle, to which is clamped the socket to which the telescope is adjustably secured.

9,171.—A PRESERVATIVE COMPOSITION: *H. E. Julian.*—A composition or paint for ships' bottoms or submerged structures is made from an admixture of cocculus indicus, red mercury oxide, creosote, lime, shellac, or other gums, and methylated spirit; for iron or steel structures iron oxide is added, and for wooden structures copper arseniate is added.

9,250.—METHOD OF TESTING COLOURS: *G. K. Henderson.*—For determining the proper constituent colours of any desired shade or tint three discs, coloured and graded from the lightest to the darkest shade of yellow, red, and blue respectively, are pivotted upon a common base, to which are also affixed three correspondingly graduated circles, the red and blue discs being of some transparent material, and the yellow disc of paper. The relative amount of colour that is needed for any particular shade is denoted by the index-figures of the discs, and any shade required may be obtained at the shade-registering point by turning the discs round.

9,295.—WATER-SUPPLY COCKS: *J. Milne and H. Cheshire.*—The inventors devise supply cocks that shall deliver mixed hot and cold water through alternative outlets. In one form the discharge is made through either one of two pipes; the hollow plug has two openings that register with the two inlets, an opening that registers with one of the outlets, and an open-ended recess which in one position places one of the two pipes in communication with the two inlets.

9,302.—METHOD OF MEASURING WOOD: *E. Kavanagh.*—For indicating the lineal or superficial feet of boards, &c., that are passed through a sawing or similar machine, a case is attached to the fence by means of a spring which forces a wheel against the board as it traverses the machine, and in the case is set a train of wheels with a registering dial. The size of the wheel is such that it shall record upon the dial the superficial feet in a 3-in. board. Wheels of different sizes are adopted for registering the area of boards of different heights.

9,337-8.—REMOVAL OF PAINTS, PREPARATION OF DISTEMPER: *R. H. Mercer.*—A composition for removing paint is made of hydrate of calcium, caustic soda, water, and dextrin or starch. A white distemper for rendering canvas, plaster, or wood, &c., washable and fire-resisting, is made of carbonate of lime, infusorial earth, silicate of potash, carbonate of barium, zinc oxide, and water. If it is to be used as a paint the mixture is made of carbonate of lime, powdered glass, infusorial earth, silicate of potash, sulphide of lead or zinc oxide, dextrin, and water.

MEETINGS.

SATURDAY, SEPTEMBER 1.

Architectural Association.—Summer Visit to Colney Chapel Convent, near St. Albans, by permission of the architect, Mr. Leonard Stokes.

WEDNESDAY, SEPTEMBER 5.

Builders' Foremen and Clerks of Works Institution.—Ordinary meeting of the members, 8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 9.—By C. STRIDE (at Selsmore).

South Hayling, Hants.—Salters-lane, &c., 45 plots of freehold building land £463

August 16.—By G. B. HILLIARD & SON (at Brentwood).

Ingrave, Essex.—The Grange and 4 a. 1 r. 37 p.; also two cottages adjoining, f. 1,490
Blackmore, Essex.—Shop premises with stabling, f., r. 28*l.* 340

August 18.—By NEWMAN & NEWMAN (at Colchester).

Tolleshunt, D'Arcy Essex.—Tolleshunt D'Arcy Hall Estate, 248 a. 0 r. 7 p., f. .....
The Hill Farm, 65 a. 0 r. 33 p.; also a field of arable land, 4 a. 3 r. 2 p., f. 3,050
Ardleigh, Essex.—Crockleford Heath, Duncannon's Farm, also Little Field, 37 a. 1 r. 13 p., f. 800
Flowton, &c., Suffolk.—Flowton Brook Farm, 154 a. 0 r. 7 p., f. 528
Otley, Suffolk.—Otley Hall Farm, 208 a. 1 r. 19 p., f. 1,925
The Poplar Farm. 88 a. 2 r. 6 p., f. 2,650
The Grange Farm, 130 a. 1 r. 4 p.; also an enclosure of garden ground, 1 a. 2 r. 0 p., f. .. 775
The Wood Farm, 49 a. 2 r. 23 p., f. 1,430
660

August 20.—By ALFRED SAVILL & SON.

Chadwell Heath, Essex.—Cat-lane, two enclosures of building land, 7 a. 3 r. 9 p., f. 1,540

August 21.—By PERKINS & SONS (at Salisbury).

Upton Lovell, &c., Wilts.—Middle Farm, 558 a., f. 4,400
Codford St. Peter, Wilts.—The village school and 1 r. 4 p., f. 185
Idmiston, Wilts.—Porton, Church Farm, 292 a., f. 2,360

August 22.—By J. F. BUNTING & Co.

Haverstock Hill.—101, Queen's-cres., u.t. 55 yrs., g.r. 8*l.*, r. 44*l.* 490
Finsbury Pk.—25, Somerfield-rd., u.t. 66 yrs., g.r. 6*l.* 5s., r. 36*l.* 400

By H. R. FARNAN.

Pimlico.—188, Vauxhall Bridge-rd., f., r. 55*l.* 1,150
Oxford-st.—60, Poland-st., f. 1,685

By E. W. RICHARDSON & SON.

Muswell Hill.—1, Walery-villas, u.t. 84¼ yrs., g.r. 6*l.*, e.r. 45*l.* 400

August 23.—By C. P. WHITELEY.

Thornton Heath.—11 to 18, Garnet-rd.; also two plots of building land, f. 1,325

By NEWBON, EDWARDS, & SHEPHARD.

Barnsbury.—35 and 37, Bride-st., f., r. 56*l.* 920
Islington.—10, Cloudesley-st., u.t. 16½ yrs., g.r. 8*l.*, r. 50*l.* 310
Stoke Newington.—16, Shellgrove-rd., u.t. 72½ yrs., g.r. 5*l.* 10s., r. 28*l.* 325
Brixton.—14 and 20, Vidal-rd., u.t. 82½ yrs., g.r. 13*l.* 10s., r. 58*l.* 590
Kilburn.—9, 11, and 17, Chichester-rd., u.t. 57 yrs., g.r. 15*l.* 790
New Southgate.—125, High-rd., u.t. 66 yrs., g.r. 8*l.*, r. 40*l.* 425
Crouch End.—1 to 7, Edison-rd., u.t. 59 yrs., g.r. 42*l.*, r. 243*l.* 2,125
Edison-rd., f.g.r.'s 24*l.*, reversion in 60 yrs. 600
Crouch End Hill, f.g.r.'s 25*l.*, reversion in 60 yrs. 670

By STIMSON & SONS.

Shoreditch.—58 and 60, Great Cambridge-st., and 1 and 3, Holms-st., f. £1,140
Knightsbridge.—8, Montpelier-st., u.t. 53 yrs., g.r. 3*l.* 10s., r. 60*l.* 180
King's Cross.—5 and 6, Southern-st., u.t. 26 yrs., g.r. 10s. 515
Chelsea.—5 and 6, Smith-ter., u.t. 44½ yrs., g.r. 10*l.* 640
Forest Gate.—18, 20, 22, 24, and 26, Tower Hamlet's-rd., f. 1,100
Wandsworth.—19, Bennerley-rd., f., e.r. 28*l.* 385
Blackfriars.—8 and 8, Duke-st., u.t. 8¾ yrs., g.r. 16*l.* 110
Streatham.—115 and 117, Mitcham-lane, f., r. 11*l.* 1,930
65, 67, 69, and 71, Thrale-rd., f. 1,000
Anerley.—7, Oakfield-rd., f., r. 45*l.* 670
27, Station-rd., f., r. 30*l.* 445
Sydenham.—10, 12, 14, and 16, Acacia-rd., u.t. 67 yrs., g.r. 20*l.* 520
Norwood.—13 and 15, Whiteley-rd., u.t. 66 yrs., g.r. 12*l.*, e.r. 60*l.* 400
Brixton.—18, Stockwell Park-cres., u.t. 25 yrs., g.r. 7*l.*, e.r. 50*l.* 265

By WINDRUM & CLEAVE.

Cubitt Town.—26 and 28, Stebondale-st., u.t. 50¾ yrs., g.r. 7*l.* 4s. 505
32, Ship-st., u.t. 50½ yrs., g.r. 6*l.* 15s., r. 40*l.* .. 320
Mile End.—4 to 12 (even), Lindley-st., u.t. 17 yrs., g.r. 50*l.* 600
East Ham.—4, 6, 8, and 10, Lawrence-rd., u.t. 98 yrs., g.r. 22*l.* 725
13 to 29 (odd), Thackeray-rd., f. 3,095
Canning Town.—11 to 41 (odd), Carlton-st., u.t. 74½ yrs., g.r. 96*l.* 1,300
26, 28, and 30, Hoy-st., u.t. 96¾ yrs., g.r. 13*l.* 10s. 340

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	s.	d.		
Hard Stocks	35	0	per thousand alongside, in river.	
Rough Stocks and Grizzles	31	0	"	"
Smooth Bright Facing Stocks..	58	0	"	"
Shippers	42	0	"	"
Flettons.....	29	6	"	"
Red Wire Cuts ..	35	0	"	"
Best Fareham Red	72	6	"	"
Best Blue Pressed Staffordshire ..	87	0	"	"
Do., Bullnose	92	0	"	"
Best Stourbridge Fire Bricks	84	6	"	"
Best White Glazed Stretchers.....	260	0	"	"
Headers	240	0	"	"
Quoins and Bull-nose	340	0	"	"
Double Headers..	320	0	"	"
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	"	"
Quoins and Bull-nose	280	0	"	"
Double Headers..	280	0	per thousand at railway depôt.	
Seconds Quality White and Dipped Salt Glazed	40	0	per thousand less than best.	

at railway depôt.

	s.	d.	
Thames and Pit Sand	8	0	per yard, delivered.
Thames Ballast	6	9	" "
Best Portland Cement	36	0	per ton "
Best Ground Blue Lias Lime..	23	6	" "

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s.	d.	
Ancaster in blocks	2	0	per ft. cube, deld. rly. depôt
Bath "	1	7	" "
Beer "	1	6½	" "
Grinshill "	1	10	" "
Brown Portland in blocks	2	2	" "
Darley Dale "	2	1½	" "
Red Corsehill "	2	5	" "
Red Mansfield "	2	4½	" "
Hard York "	2	10	" "
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	7	per ft. super. at rly. depôt.
" " 6 in. Rubbed Ditto..	2	10½	" "
" " 3 in. sawn both sides slabs (random sizes)	1	3	" "
" " 3 in. self-faced Ditto	0	9	" "

SLATES.

in.	in.	£	s.	d.	
20 X 10 best blue Bangor..		11	5	0	per 1000 of 1200 at ry. dep.
" best seconds "		10	15	0	" "
16 X 8 best "		6	2	6	" "
20 X 10 best blue Portma-doc — —		19	18	0	" "

[See also page 203.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Cabmen's Shelter	Southport Corporation	20*l.*	Sept. 27
*Harbour Offices	Swansea Harbour Trustees	100*l.* and 50*l.*	Nov. 30

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Tar Macadam	Branksome (Dorset) U.D.C.	S. J. Newman, Architect, 3, Tennyson-buildings, Branksome	Sept. 4
Ironwork	Leicester Corporation	E. G. Mawbey, Civil Engineer, Town Hall, Leicester	Sept. 5
Iron Railings (2,100 yards)	Southampton Corporation	W. B. G. Bennett, Civil Engineer, Municipal Offices	do.
Police Station, Castleton, Mon.	Standing Joint Committee	W. Tanner, County Surveyor, Monmouth	do.
Six Cottages, Springfield Estate, Northfleet		G. W. Cobham, Surveyor, 1, Edwin-street, Gravesend	do.
Additions to Schools, near Pontefract	Glass Houghton School Board	Garside & Pennington, Surveyors, Pontefract	do.
Stores, East-avenue, Keighley	Keighley Industrial Society, Ltd.	J. Haggas, Architect, North-street, Keighley	do.
Schools	Kirby (Essex) School Board	C. E. Butcher, Architect, Queen-street, Colchester	do.
Additions to Workhouse, Knutsford	Bucklow Union Guardians	R. J. M'Beath, Architect, Birnam House, Sale	do.
Homes for Children, Fishponds	Bristol Guardians	W. S. Skinner, Architect, Baldwin-street, Bristol	Sept. 6
Additions to School, Adamsdown	Cardiff School Board	James & Morgan, Architects, Cardiff	do.
Additions to School, Ferryhill	Aberdeen School Board	T. Hector, 22, Union-terrace, Aberdeen	do.
Farmhouse, Bessingby, Yorks.	Mr. A. G. W. Wright	J. Earnshaw, Architect, Bridlington Quay	do.
Warehouse, &c., Cemetery-road, Bradford		J. W. C. Atkinson, Architect, 1, Ivegate, Bradford	do.
Sewerage Works, Cartsdyke Harbour	Greenock Police Commissioners	Town Clerk, Greenock	do.
Electricity Buildings, Fratton-grove	Portsmouth Corporation	E. Rotter, Civil Engineer, Town Hall	do.
Additions to Slaughter House, Dudley Hill	Bradford Prov. Indus. Soc., Ltd.	Bycroft & Firth, Architects, Manchester-road, Bradford	do.
Business Premises, King-street, Lancaster	Mr. E. Johnson	J. Parkinson, Architect, Church-street, Lancaster	Sept. 7
Schools	Benwell School Board	J. W. Thompson, Architect, 63, Grey-street, Newcastle-on-Tyne	do.
Septic Tanks	Chippenham R.D.C.	A. H. Lapham, Surveyor, Corsham	do.
*Coastguard Buildings at Cromer	Admiralty	See Advertisement	do.
Slating Works	Leicester Corporation	A. Colson, Civil Engineer, Millstone-lane, Leicester	Sept. 8
Church Restoration, Coley, Halifax		Boreham & Morton, Surveyors, 24, John-street, Sunderland	Sept. 10
Bandstand, South Park	Ilford U.D.C.	H. Shaw, Civil Engineer, 7, Cranbrook-road, Ilford	do.
Bridge Works, Witton (Contract 1)	Trustees of Mr. J. Deykin	J. E. Wilcox, Civil Engineer, 63, Temple-row, Birmingham	do.
Road Works, Back Weston-road	Jarrow Corporation	J. Petree, Borough Surveyor, Grange-road, Jarrow	do.
Alterations to Hall, Stradbroke	East Suffolk County Council	H. Miller, Civil Engineer, 16, Museum-street, Ipswich	do.
Sewers	Ripley (Derby) U.D.C.	R. Argile, Civil Engineer, Public Offices, Ripley	Sept. 11
Street Works, Crossley-street	do.	do	do.
*Sewering, Levelling, Paving, &c.	Bromley U.D.C.	Surveyor, Council Offices, Bromley, Kent	do.
Pier Extension	Harrington (Cumb'd) Harbour Bd.	J. Eden, Civil Engineer, 58, Port-street, Workington	Sept. 12
*Flooring at Baths, Walthamstow	Walthamstow U.D.C.	See Advertisement	do.
*Addition, &c., to Baths and Washhouses at Workhouse	Fulham Guardians	D. Matthews, Architect, 650, Fulham-road, S.W.	Sept. 13
*Breeze	Commercial Gas Company	See Advertisement	do.
*White Flare Burnt Chalk Lime	do.	Engineer, Commercial Gas Company, Stepney, E.	do.
*Improving the Sea Front at Minehead	Minehead U.D.C.	F. W. Roberts, Engineer, Taunton	Sept. 15
School, Meyrick-street	Pembroke Dock School Board	G. Morgan & Son, Architects, 24, King-street, Carmarthen	do.
School, Wolverhampton-road	Walsall School Board	Bailey & McConnall, Architects, Bridge-street, Walsall	do.
*Sanatorium in Great Sankey	Warrington Corporation	Borough Surveyor, Town Hall, Warrington	Sept. 18
Sewerage Works	Eastleigh and Bishopstoke U.D.C.	Lemon & Blizard, Engineers, Lansdowne House, Southampton	do.
Residence at Hospital, Limerick		W. H. Byrne, Architect, 20, Suffolk-street, Dublin	Sept. 21
*Infants' School	Merthyr Tydfil School Board	J. Llewellin Smith, Architect, Aberdare	do.
*School	Lichfield Grammar School	See Advertisement	Sept. 22
*Bridge	Sheffield Corporation	City Surveyor, Town Hall, Sheffield	Sept. 25
*Baths and Library	do.	do.	do.
Water Mains	Ulverston R.D.C.	W. F. Y. Molineux, Engineer, 3, Benson-street, Ulverston	Sept. 26
*Schools at Pleasley Hill, near Mansfield	Mansfield School Board	Vallance & Westwick, Archts., White Hart Chmbrs., Mansfield	Oct. 1
*School at Croyland-road	Edmonton School Board	See Advertisement	Oct. 2
*Porter's Lodge, &c.	Hertford and Ware Jt. Hosp. Bd.	Clerk, Town Hall, Ware, Herts	Oct. 8
*School at West Hampstead	Aske's Haberdashers' School	See Advertisement	No date
Four Villas and Cottage, Belgrave-rd., Stoke-on-Trent		W. Wood, Architect, Stafford-street, Loughton	do.
Schools, Manston, Leeds		Chorley & Co., Architects, 15, Park-row, Leeds	do.
Three Houses, Nottingham		W. O. Hickson, Architect, 13, Victoria-street, Nottingham	do.
Business Premises, Hills-terrace, Cardiff	Mr. T. Jenkins	R. & S. Williams, Architects, Wharton-street, Cardiff	do.
House, Rubislan Den South, Aberdeen		A. Clyne, Architect, 123, Union-street, Aberdeen	do.
Factory, Tralee, Ireland	Co-operative Wholesale Society	F. E. L. Harris, Architect, 1, Balloon-street, Manchester	do.
Schools, Arkwright Town, near Chesterfield	Staveley Iron and Coal Company	Secretary, Company's Offices, near Chesterfield	do.
Additions to Business Premises, Hyde	Mr. A. Stansfield	F. W. Dixon, Architect, Trevelyan-buildings, Manchester	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Timekeeper, Jr. Clerk, and 2 Temporary Draughtsmen	Wimbledon U.D.C.	35s., 15s., 40s. per week respectively	Sept. 17

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi. viii. x. & xxi. *Public Appointments, pp.* xviii. & xxi.

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PRICES CURRENT (*Continued*).

	£ s. d.	
in. in.		
16 × 8 best blue Portmadoc	6 0 0	per 1000 of 1200 at ry. dep.
20 × 10 best Eureka unfading green.....	11 2 6	,, ,,
16 × 8 ,, ,,	6 15 0	,, ,,
20 × 10 Permanent green and Sedan green	10 0 0	,, ,,
16 × 8 ,, ,,	5 12 6	,, ,,

TILES.

	s. d.		
Best plain red roofing tiles..	41 6	per 1,000	at rly. depôt.
Hip and valley tiles....	3 7	per doz.	,, ,,
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles....	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles.....	4 0	per doz.	,, ,,
Valley tiles.....	3 9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes).	50 9	per 1,000	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles.....	3 8	,,	,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15 10 0	16 10 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0 ,,	,, ,,
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 5 0	4 10 0
Seconds	3 17 6	4 5 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0
JOINERS' WOOD.	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	17 10 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	24 0 0	25 0 0
Do. 3 in. by 9 in.	21 0 0	22 0 0
Battens.....	16 0 0	17 0 0
Second yellow deals, 3 in. by 11 in.....	18 0 0	19 10 0
Do. 3 in. by 9 in.	16 10 0	17 10 0
Battens.....	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	14 10 0	15 10 0
Do. 3 in. by 9 in.	13 10 0	14 10 0
Battens.....	12 0 0	13 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in. ..	13 10 0	14 10 0
Battens.....	11 10 0	12 10 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
,, ,, ,, 3 in. by 9 in.	12 10 0	13 10 0
,, ,, battens	10 10 0	11 10 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	29 0 0	31 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,, ...	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 6	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders ,, ,,	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	12 0 0	- - -

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	10 0 0	10 10 0
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0
Staffordshire "Marked Bars" ..	13 5 0	- - -
Hoop Iron, basis price.....	11 5 0	11 15 0
,, ,, galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.....	11 10 0	- - -
,, ,, to 24 g.....	12 15 0	- - -
,, ,, to 26 g.....	13 15 0	- - -

PRICES CURRENT (*Continued*).

	Per ton, in London. £ s. d.	£ s. d.
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14 15 0	- - -
,, ,, 22 g. and 24 g.	15 5 0	- - -
,, ,, 26 g.....	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.....	18 10 0	- - -
,, ,, 22 g. and 24 g.	19 0 0	- - -
,, ,, 26 g.....	20 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 0 0	14 15 0
,, ,, 20 g. and 24 g.	14 15 0	15 10 0
Cut nails, 3 in. to 6 in.....	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	28 0 0	- - -
Silesian.....	27 10 0	- - -
COPPER—		
Strong..... per lb.	0 1 0	- - -
Thin ..... ,,	0 1 2	- - -
Copper nails ..... ,,	0 1 3	- - -
TIN—English Ingots ..... ,,	0 1 7	- - -
SOLDER—Plumbers' ..... ,,	0 0 8	- - -
Tinmen's ..... ,,	0 0 10	- - -
Blowpipe ..... ,,	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, ,, fourths.....	3d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths.....	5d. ,, ,,
Fluted sheet, 15 oz.	3¼d. ,, ,,
,, ,, 21 ,, ...	4¼d. ,, ,,
½ Hartley's Rolled Plate.....	3d. ,, ,,
⅝ ,, ,, ,, ...	3¼d. ,, ,,
¾ ,, ,, ,, ...	4d. ,, ,,

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes..... per gallon	0 3 1
,, ,, ,, in barrels ..... ,,	0 3 2
Boiled ,, ,, in drums ..... ,,	0 3 4
,, ,, ,, in pipes..... ,,	0 3 4
,, ,, ,, in barrels ..... ,,	0 3 5
,, ,, ,, in drums ..... ,,	0 3 7
Turpentine, in barrels ..... ,,	0 2 6
,, in drums..... ,,	0 2 9
Genuine Ground English White Lead ...per ton	27 10 0
Red Lead, Dry..... ,,	25 0 0
Best Linseed Oil Putty.....per cwt.	0 9 6
Stockholm Tar ..... per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 6
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

U. O. I.—F. F.—"Nemo."—(Consult a builder in the neighbourhood in which you think of building.) T. H. T.—(Amounts should have been stated.)

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BURTON-ON-TRENT.—For boundary wall to school buildings, Horninglow, for the School Board. Mr. Reginald Churchill, architect, St. Paul's-square, Burton-on-Trent:—

W. A. Stevenson	£188 10	H. Edwards, Burton-on-Trent*	£160 0
Lowe & Sons.....	183 0		

CLEETHORPES.—For the erection of electric power station, chimney shaft, car sheds, workshops, &c., in Pelham-road, for the Great Grimsby Tramways Company. Mr. John Glenn, C.E., architect. Mr. J. Fereday Glenn, surveyor, 11, Queen Victoria-street, London, and 346, Cleethorpe-road, Grimsby:—

	Power Station.	Depôt.	Total
Thompson & Sons	£7,987	£6,059	£14,046
Frere & Co.	7,800	5,845	13,645
Hewins & Goodhand ..	7,500	5,440	12,940
H. Marrow	6,522	4,951	11,473
Wilkinson & Houghton, Grimsby*	6,310	5,003	11,313

COSELEY.—For the erection of a temporary iron school at Broad Lanes, for the Sedgley School Board. Mr. S. Henry Eachus, architect, Wolverhampton and Birmingham:—

E. C. & J. Keay, Birmingham* £516

FRIMLEY.—For sewering, &c., Frimley-road, Urban District Council. Mr. W. J. Hodgson, surveyor, High-street, Camberley:—

R. W. Swaker	£233 10	T. Turner.....	£97 0
H. C. Brixey*	5s. 3d. per yard run		

FRIMLEY.—For the execution of sewerage works, for the Urban District Council. Mr. W. J. Hodgson surveyor, High-street, Camberley:—

R. W. Swaker..	£221 0 0	T. Turner	£125 17
H. C. Brixey*	157 0 0		

HENDON.—For private street works and bacteria filter, for the Urban District Council of Hendon. Mr S. Slater Grimley, Engineer and Surveyor:—

Colin Deep-lane Works.

Thos. Adams	£3,833 0	Nowell & Co.....	£3,121 11
Neave & Son	3,443 0	R. Ballard, Ltd., Child's Hill* ..	2,895 0
Mowlem & Co. ..	3,689 0		

Sewage Outfall Works, Bacterial Filter No. 3 (Labour only).

Thos. Adams....	£715 5 6	R. Ballard, Ltd., Child's Hill*	£563 0 0
Neave & Son ..	573 0 0		

[Council find all materials.]

INVERKIP, N.B.—For the construction of a torage reservoir, &c., for the District Committee. Mr. James Murray, C.E., County Buildings, Paisley:—

W. G. Flett	£1,809 12
Peter Bow	1,509 9 11
Hugh Hastie.....	1,166 1 0
Cunningham & Sons, Kilmalcolm*	1,140 17 6
James Keanie‡	915 2 6

‡ Too late.

LICHFIELD.—For additions to workhouse, Trent Valley-road, for the Guardians of the Poor of the Lichfield Union. Mr. W. H. Woodroffe, architect, 214, Great Dover-street, London, S.E.:—

H. Smith & Sons	£6,212 10	Parnell & Son....	£4,781 0
F. N. Stephens ..	5,895 0	Lowe & Sons	4,617 0
T. Smith & Sons	5,098 0	W. Harvey Gibbs, Birmingham* ..	4,350 0
Dorse & Co.	4,905 0		
Willcock & Co. ..	4,850 0		

LONDON.—For alterations to 11, Old Queen-street, Westminster, S.W., for Mr. John Jeffreys. Mr. Cecil A. Sharp, architect, 11, Old Queen-street, Queen Anne's Gate, S.W.:—

Huntley Bros.....	£223 15	F. & H. F. Higgs*	£203 0

LONDON.—For temporary annexes, Church-lane, Tooting, for the Wandsworth and Clapham Guardians. Mr. Cecil A. Sharp, architect, 11, Old Queen-street, Queen Anne's Gate S.W.:—

Contract No. 1.

Foster Bros.....	£10,338 †	Akers & Co	£7,476
Leslie & Co.	9,103	Wall & Co.	7,400
J. B. Potter	8,299	Lascelles & Co. ..	7,250
Martin Wells	7,893	R. A. Jewell, North-street, Wandsworth*	7,134
F. & H. F. Higgs	7,590	Huntley Bros.	6,898 †
E. Wall	7,590		
F. G. Minter	7,573		

Contract No. 2.

Foster Bros.	£8,175 †	Akers & Co.	£5,223
Leslie & Co.	6,366	Wall & Co.	5,189
J. B. Potter	5,899	Lascelels & Co. ..	5,175
Martin Wells	5,676	E. Wall	4,944
F. G. Minter	5,323	Huntley Bros., Tamworth-rd., Croydon*	4,651 †
F. & H. F. Higgs	5,247		

LONDON.—For the erection of shops and residences at the corner of Dawes-road and Hannel-road, Fulham, for Mr. F. Batty. Mr. W. Thomas, surveyor, 12, Waldemar-avenue, Fulham, S.W.:—

S. Knight.....	£1,945 0	Swan & Son.....	£1,675 0
T. Bendon	1,712 0	E. Wall*	1,424 5

OTLEY.—For the erection of store premises, Gay-lane, for the Leeds Industrial Co-operative Society, Limited:—

Joinery.—Patrick & Son, Otley.....	£351 0 0
Plumbing.—Suttle & Son, Otley	102 10 0
Slating.—R. Nelson, Ilkley	47 6 0
Painting. Bennett & Sons, Otley ..	43 18 3
Plastering. W. Laycock, Otley	24 10 0
Excavating, Brick, and Masonry.— W. Maston, Otley	960 0 0

[*See also next page.*

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PAIGNTON (Devon).—For the completion of new road, Paignton, for Mr. W. M. G. Singer. Mr. W. G. Couldrey, architect. Quantities by Mr. V. C. Brown, Paignton:—

E. Westlake	£492 10 0	C. & R. E. Drew*	£485 0 0
Webber & Sons	487 6 0		

POOLE.—For kerbing, &c., Langley-road, Upper Parkstone, for the Town Council. Mr. J. Elford, Borough Surveyor, Poole:—

Grounds & Newton	£346 0 0
G. T. Budden	284 17 6
H. C. Brixey, Newtown, Poole*	260 7 1

POULTON-LE-FYLDE.—For paving, kerbing, &c., the Market-place, for the Urban District Council. Mr. W. Gornall, surveyor, Market-place, Poulton-le-Fylde. Quantities by surveyor:—

W. Ward	£214 4 4	R. Bashall, Preston*	£142 6 6
R. Lewtas	104 18 3		
J. Farrel	167 8 9		

[Surveyor's estimate, £170.]

RETFORD.—For the rebuilding of Ship Inn Cottage and stables for the Home Brewery, Daybrook. Messrs. Eyre & Southall, architects, Retford:—

G. Fenton	£1,577 0	G. Hurst	£1,411 10
T. Hopkinson	1,486 10	F. Fenton*	1,405 0

[All of Retford.]

RETFORD.—For new stables, loose boxes, and carriage houses, for the White Hart Hotel. Messrs. Eyre & Southall, architects, Retford:—

G. Fenton	£1,120	T. Hopkinson	£1,050
C. Jones	1,096	G. Hurst*	1,017

[All of Retford.]

RETFORD.—For building new shop, Carolgate, for Dr. Trevor Pritchard. Messrs. Eyre & Southall, architects, Retford:—

G. Fenton	£1,073	C. Jones	£990
F. Fenton	1,005	T. Hopkinson*	926

[All of Retford.]

ROEHAMPTON.—For erecting a detached house on the Spencer Lodge Estate for Mr. Cyril Bennett. Mr. T. Merrison Garrood, architect and surveyor, 172, Fenchurch-street, E.C.:—

James Dooley, Red Lion-lane, Surbiton*.. £1,000

ROEHAMPTON.—For three detached houses, Rodway-road. Mr. T. Merrison Garrood, architect and surveyor, 172, Fenchurch-street, E.C.:—

J. Dooley, Red Lion-lane, Surbiton* (each) £800

SANDOWN (Isle of Wight).—For the erection of an electric light and power station to supply Sandown and Shanklin, for Messrs. Edmundson's Electricity Corporation, Westminster. Mr. G. A. Bligh Livesay, architect, Wilts and Dorset Bank-chambers, Boscombe, Bournemouth. Quantities by Messrs. Jennings & Goater, Bournemouth:—

Ball & Son, Cowes, I.W. * £3,407 10

SEDGLEY.—For additions and alterations to Hurst Hill Schools, for the Sedgley School Board. Mr. S. Henry Eachus, architect, Wolverhampton and Birmingham. Quantities by Mr. Vale, Wolverhampton:—

Lindsay Jones	£2,698	Hilton & Caswell	£2,596
Wilcock & Co.	2,652	Cave	2,565
Ham	2,627	Skett	2,504
Herbert	2,605	Mark Round, Dudley*	2,350

TONBRIDGE (Kent).—For the supply of 1,300 tons Quenast granite for the Urban District Council. Mr. W. L. Bradley, C.E., Tonbridge Castle:—

C. M. Manuelle, London* ..... 13s. 6d. per ton.

TONBRIDGE (Kent).—For making up, &c., Medway Wharf-road, for the Urban District Council. Mr. W. L. Bradley, C.E., Tonbridge Castle:—

W. H. Wheeler, London* £1,092

TONGE.—For new chancel, organ chamber, vestries, side chapel, and one bay of nave, St. Michael's Church, Tonge. Messrs. Austin & Paley, architects, Lancaster. Quantities by Messrs. Wright & Son, surveyors, Lancaster:—

Grundy, Sons, & Co., Middleton* £4,760 10

WREXHAM.—For the execution of sewerage works, &c., for the Rural District Council. Mr. J. Price Evans, engineer, Argyle-chambers, Wrexham:—

Davis Bros.	£3,011 0 9	Jenkins & Jones, Johnstown*	£3,550 0 0
J. Phœnix	3,824 8 1½		
Harris & Son	3,790 0 0	Geo. Halbert	3,538 0 0

WYE.—For alterations to Oxenturn, Wye, Kent, for Mrs. Haines. Mr. Cecil A. Sharp, architect, 11, Old Queen-street, Queen Anne's Gate S.W.:—

G. F. Davis	£406 0 0	Huntley Bros., Croydon*	£345 0 0
H. Knock	387 5 2		

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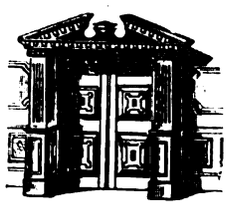

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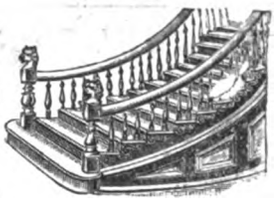

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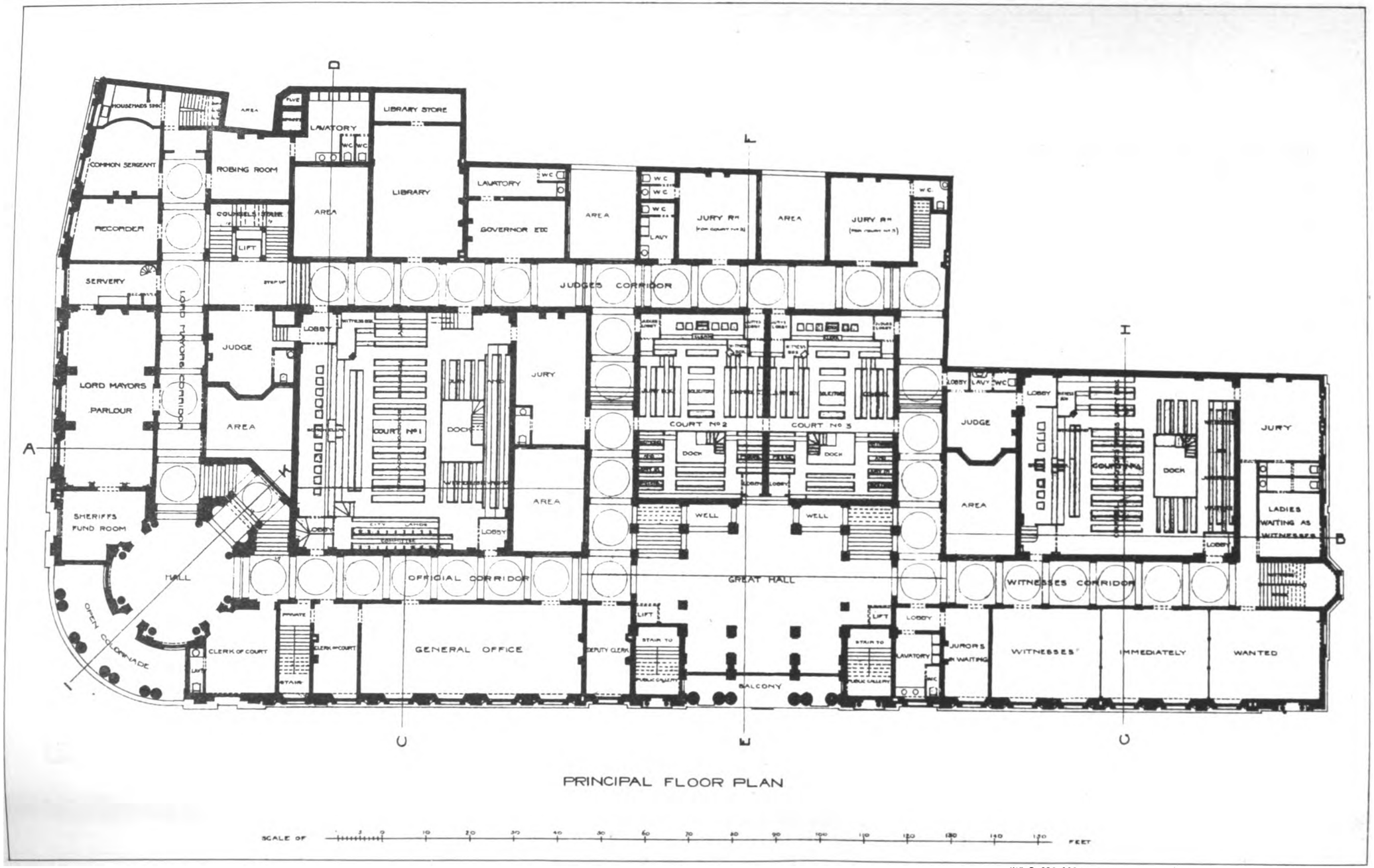

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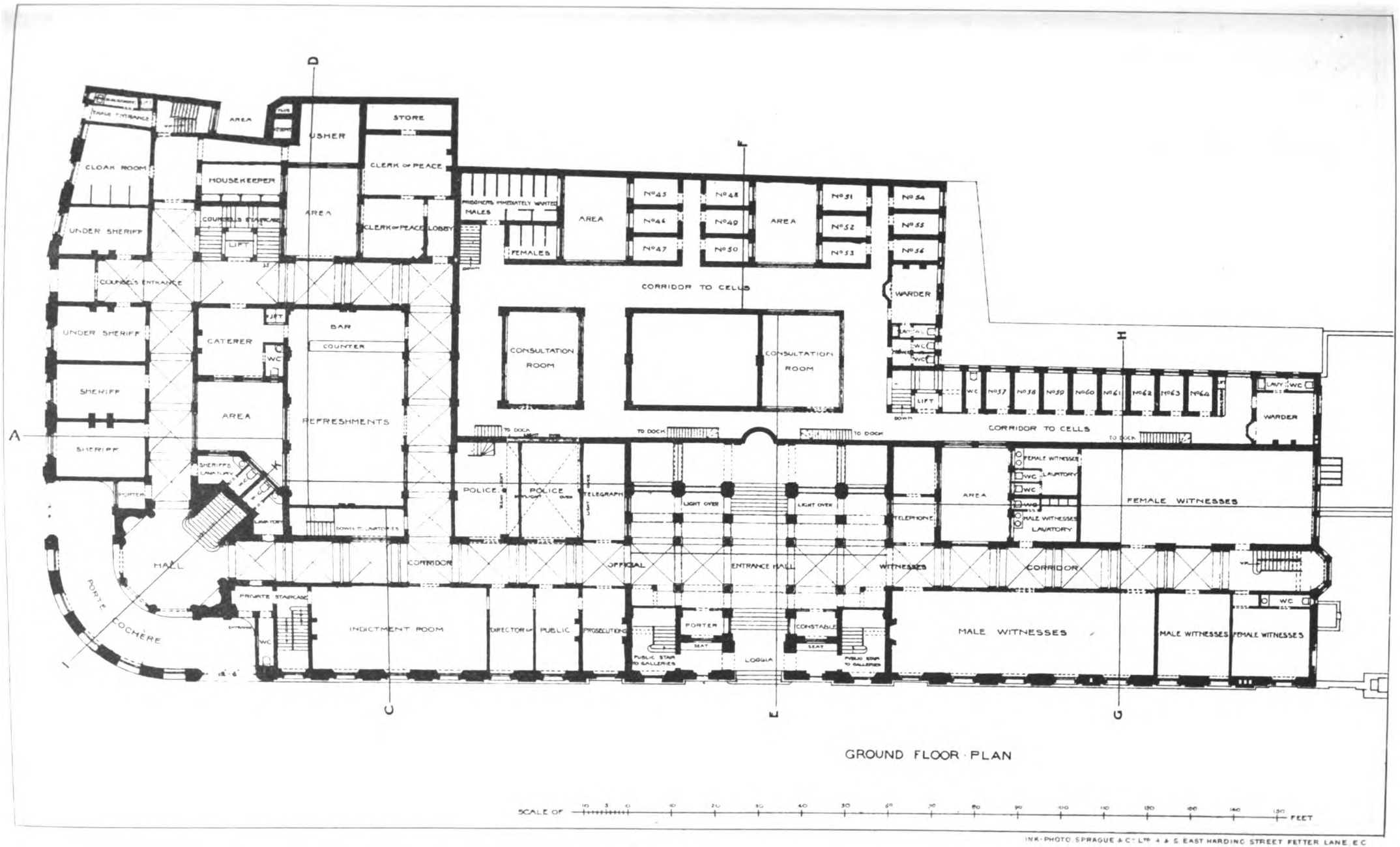

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VOL. LXXIX., No. 3005. SEPTEMBER 8, 1900.

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Notes on the Swedish Timber Trade.

SWEDEN is a land of forests and of lakes. Without the latter and their connecting links, the rivers, the forests would be of little service, for it is the wonderful series of natural waterways which gives such facilities of transport as to make Sweden pre-eminent among the timber-exporting countries of Europe. A generation ago the ports of North Germany or South-Western Russia were almost the only ones known to architects. "All red deal"—so the specifications ran—"must be best Memel or best Riga," and the same words are often used to-day, although Memel red is practically a thing of the past. A brief consideration of the amount of timber now exported from the different countries washed by the Baltic Sea shows the magnitude, both actual and relative, of the Swedish trade.

The exact amounts of the shipments cannot be stated, as we have not the figures for all the ports, and also because the classifications adopted in the different countries vary. But it may be roughly stated that the Swedish exports of red and white deals, battens, and boards, exceed 1,000,000 standards per annum; Finland ships rather less than half this quantity, Norway nearly 300,000 standards, and St. Petersburg and Cronstadt about 150,000, while the total exports from Memel, including sleepers, balks, and oak, are less than 500,000 cubic mètres, equal to rather more than 100,000 Petersburg standards, and of this amount only about one-fifth is in the form of planks, deals, and battens. In other words, the ports of Sweden export nearly as many standards of deals, battens, and boards as all the other Baltic ports combined. Of course, the Russian timber trade is not confined to the Baltic; Archangel and other White Sea ports ship about 150,000 standards. Shipments, however, are not confined to deals, battens, and boards, although these form the staple trade at most of the ports. The details for Sweden for the years 1898 and 1899 are given in the following table:—

Description of Wood.	Quantity in Petersburg Standards.	
	1898.	1899.
Deals and battens	573,090	561,200
Boards	348,583	353,991
Planed or joined boards	97,746	114,163
	1,019,419	1,029,354
"Not worked-up, hewn, or sawn, of Scotch fir or spruce, logs and poles"	35,408	25,257
Square timber and square balks	62,669	79,613
Pit props	171,244	191,087
Cellulose props	2,146	858
Totals	1,296,886	1,327,069

By far the largest purchaser is Great Britain. Every year this country takes more than half the exported deals and battens, between one-third and one-fourth of the rough boards, and over two-thirds of the planed boards, or a total of about 500,000 standards. France is the next best customer, buying about 180,000 standards, while Germany comes third with 100,000 standards. Denmark and Holland take about 75,000 standards each, and Cape Colony and Natal follow with a normal trade of about 40,000 standards, although last year, owing to the Transvaal war, the exports to these colonies dropped one-half. The position of Germany as third on the list of importing countries shows that it is vain to look to German ports for any large *exports* of deals, battens, and boards, although Memel still ships a considerable quantity of beams and square timber.

A noteworthy feature of the Swedish timber industry is the rapid development of the trade in planed boards. In 1893 only 54,000 standards were exported, of which Great Britain received 38,000. In 1899 the exports amounted to 114,000 standards, Great Britain's share being very nearly 89,000, that is to say, 78 per cent. Thus, in six years, the British imports of Swedish planed boards have more than doubled, while during the same period the trade in rough boards has increased rather less than one-half.

Among the most important timber ports, from Hernösand to Stockholm, are Sundsvall, Hudiksvall, Söderhamn, and Gefle. In 1899 Sundsvall came first, with an export of 172,000 standards, Hernösand being second, with 143,000, and Gefle third, with 116,000. In normal years Hernösand and Gefle may be bracketed together as equal, but the removal of the Korsnäs Company's mills, the largest mills probably in Sweden, from Korsnäs to Holmsund (both within the Gefle district) in 1899, seriously reduced the exports from Gefle during that year. Söderhamn is the fourth in order, with a trade of 112,000 standards. The northern port of Umea is a bad fifth, with 61,000, and after this come Hudiksvall (55,000), Skelleftea (51,000), Gothenburg (50,000), Ornskoldsvik (49,000), and Haparanda (47,000). There is a great drop from this to the next in order, namely, Pitea, which has an export of 26,000 standards, and is closely followed by Vestervik and Lulea, with about 25,000 each. Stockholm, it may be said in passing, exports only 6,000 standards of deals, battens, and rough boards, and does no export trade in planed boards. This does not imply that there are no saw-mills and planing-mills in the Stockholm district, but merely that these are little more than sufficient for the local trade. In a similar manner, there are many mills on the banks of the inland lakes and rivers, but many of these simply supply the localities in which they are situated. The great exception to the rule that the exporting mills are on or near the sea-coast was that of the large mills at Korsnäs, about 50 miles inland from Gefle, but these works, as noted above, have now been transferred to Holmsund, at the mouth of the Gefle estuary, and the transfer, it is said, will effect a saving of about 15,000*l.* per annum in railway carriage alone.

The principal timber ports of Sweden are all shown on the accompanying map (fig. 1), but the visitor who expects to see timber-laden quays and fleets of shipping gathered in docks adjoining the buildings of the town will in most cases be disappointed. There are practically no docks, for the sea is

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tideless, and on the quays of the towns themselves timber is the merchandise least in evidence. Hernösand looks asleep as one approaches it from Sundsvall by sea. The

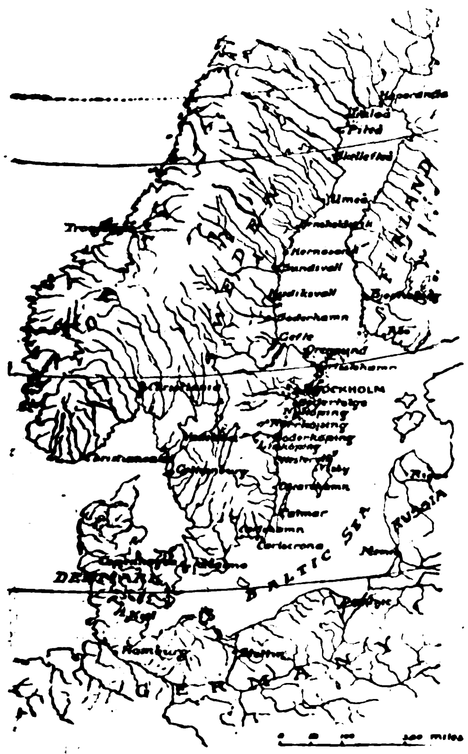

Fig. 1.—The Swedish Timber Ports.

vessels lying at the quays are few in number, and several of these are passenger steamers plying between the Baltic ports. To see the saw-mills and the timber-carrying vessels one must go up the beautiful Angerman estuary and river, and they will be found there scattered along the banks for a distance of twenty miles.

Sundsvall, which, like so many other Swedish towns, has been burnt down more than once, shows little more of its staple industry to the casual visitor. The new town, which is rising from the ashes of the old, has little of the rush and bustle which one would naturally associate with the foremost timber port of Sweden. Its wide quays and vacant building plots give it a somewhat desolate appearance, tempered though this is by the public gardens in the town and by the forest-crowned hills around. Only about half-a-dozen saw-mills are visible from the town; the remainder are scattered about the neighbouring estuaries and channels. In the Sundsvall district there are no fewer than fifty-five minor ports, including thirty-nine steam saw-mills and three wood-pulp mills, and the best way of seeing them is to make trips in the little wood-fired steamers which furnish practically the only means of communication between the different parts of the vast harbour. The map given in fig 2 shows the wide distribution of the ports. To the north of the island of Alnö is shown the mouth of the Indals river, and to the south of Svartvik is the mouth of the Ljungan. It is down these rivers that the logs are floated to supply the saw-mills in the Sundsvall District.

Gnarp is in the Hudiksvall District, though twenty-two miles away as the crow flies. Söderhamn is at the head of a long estuary, studded with islands which are wooded to the water's edge, and all along the estuary, on one or both shores, saw-mills are scattered profusely among the trees, but the timber yards and innumerable lighters stop short of the town itself. Gefle, however, looks like a timber port. The waste lands reclaimed from the head of the estuary are yellow with piles of wood, and among the yellow are blotches of red—the timber sheds

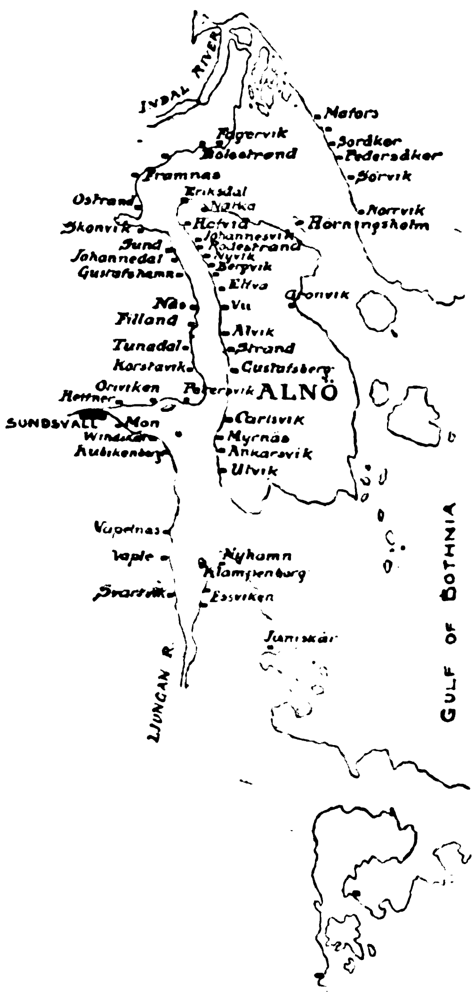

Fig. 2.—The Ports of Sundsvall.

—and the masts of ships and the particoloured funnels of steamers.

Gefle—which, by the way, is pronounced *Yav-lu*, the final *e* being sounded almost like the *u* in *must*—is the great port for red deal. This wood furnishes 80 per cent. or more of its timber exports. Much of it is of excellent quality, and scantlings can be obtained up to 12 in. by 4 in. In the more northerly ports white deal bulks much more largely; thus, from Hudiksvall and Sundsvall the exports of white deal are at least from 60 to 70 per cent. of the whole. The traveller from Trondhjem to Sundsvall by rail—and it is from the districts thus traversed that Sundsvall receives much of its timber—cannot fail to be struck with the disparity in numbers between the "spruce" trees and the "Scotch fir." The latter, which furnish the "red deal" of commerce, seem to be sparingly scattered among interminable forests of spruce. The general opinion seems to be that Gefle red deal is superior to that from any of the ports between it and Hernösand, if not the best in Sweden. A well-known British timber merchant, however, who had just visited nearly every timber port and most of the timber districts, informed us that in his opinion the red deal from the most northerly ports—Umea to Lulea—was even better than that from Gefle, as the forests had not yet been run through. For white deal Söderhamn and Hudiksvall have a good reputation. Generalisations of this sort are, however, of comparatively little value, as wood both good and bad is shipped from every port, and neither the architect nor the builder can blindly accept the name of a port as the sole guarantee of quality. Every consignment of wood brought to a building must be judged on its merits.

As a rule, red deal is sorted at the mills into different qualities, but the classifications adopted by different firms and at different ports, although perhaps the same in name, by no means represent the same quality of wood. Thus, "Fourths" at some of the Sundsvall mills constitute the lowest class of red deal, but at Gefle there are also "Fifths" and "Sixths," and it may be assumed that Sundsvall "Fourths" are no better than Gefle "Fifths" or even "Sixths." At other ports "Fifths" may be the lowest quality, and at Gnarp, in the Hudiksvall District, the red wood is sold unsorted, but here the quantity is small and the quality not of the best. In many places, however, the term "unsorted" is applied to the wood which remains after the "firsts" and "seconds" or "mixed" quality has been sorted out. This variety of classification is, to say the least, confusing, and the confusion is worse confounded by the fact that at the same port different classifications are adopted by different firms. To specify "Thirds Gefle red deals and battens," may seem sufficiently exact, but all Gefle "Thirds" are not by any means of the same quality or price. The classification of wood is an individual rather than a local matter. In passing it may be said that some firms adopt different classifications for the French and the British markets, but we need concern ourselves only with the qualities shipped to this country. At many of the mills white deal is sold unsorted, briefly known as U/S, but this is not always the case. Some firms classify it into four or more qualities, although others in the same district do not sort it at all. At Gefle, where the supply of white wood is comparatively small, it is not sorted, but at more northerly ports classification is often adopted. Consignments of white deal may therefore, if unsorted, contain pieces of widely different quality, and careful inspection is even more necessary than in the case of red deal.

In another article we hope to give some of the most important brands now in use, as only a knowledge of these can enable the architect to know whether a specification as to quality and shipper has been complied with.

NOTES.

The Ruskin Monument Question. In connexion with the correspondence about the proposed monument to Ruskin in Westminster Abbey, referred to in a "Note" in our last issue, we regret to see that Mr. A. Hartshorne, in a letter in the *Times* of the 3rd inst., has revived the absurd proposal for a cloister to be built in connexion with the Abbey, entered through the Chapter-house, for the accommodation of further memorials to eminent men. We call such a scheme absurd, because in the first place such a building will not be "the Abbey," however much people may choose to call it so, and interment there can have none of the associations by which burial in the Abbey is sanctified; and in the second place, such a building must either be frankly designed in a modern style, in which case it will be out of harmony with the Abbey and will spoil it; or it must be a piece of imitation Gothic, or sham-antique,

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which is perhaps even worse. As our ancient Valhalla is filled, the proper course for the nation to adopt is to build a modern Valhalla or Campo Santo, wherein to place the remains of such illustrious men as we may still hope to have. But to propose to spoil Westminster Abbey by tacking on to it a new building, under the pretext that this will still be "the Abbey," is ridiculous both from the logical and the architectural point of view.

The Right of Prospect.

IN England it has long ago been settled that the owner of a house or land has no right against any one who obstructs his view, or "prospect," as it is legally termed. In America this state of the law does not seem quite so well defined, as in the State of Wisconsin an attempt has recently been made to assert this right, but without avail. When, however, the point comes to be considered, it is surely as reasonable that such a right should exist as a right to light. In many country districts the value of a house may be fully as much depreciated by the obstruction of a view as in towns the value may be lessened by a diminution of the supply of light. In old days the latter, in what may be called a natural state, was regarded as a necessity; the right of prospect as a luxury. Now, however, since the introduction of artificial light and reflectors has altered the practical state of things, the difference between prospect and light becomes a little unreasonable. Of course, what is required, as we have more than once pointed out, is a diminution of the present excessive rights of the owner of the dominant tenement.

New Scotland-yard and Cannon-row.

THE substructure is being built, by Messrs. E. Lawrence & Sons, for an extension of the chief offices of the Metropolitan Police, and a new police station to replace the King-street station recently demolished. The architect is Mr. J. Dixon Butler. The new premises cover the site of the building, entered from Cannon-row, which had been latterly occupied by the Civil Service Commissioners, and stood on the site of Dorset-court, near Manchester-stairs. That house, distinguished by its Ionic portico entered from a flight of steps, and spacious round hall, was originally built for the old Ordnance and Transport Department, but, having proved too small for their purposes, it was assigned to the Board of Commissioners for the Affairs of India. It was built in 1816, from the designs and plans of William Pilkington, not, as is often stated, of William Atkinson, who was architect of the old office of the Master-General and Board of Ordnance, now the War Office, in Pall Mall. Close by, but nearer to the former water-side, was the first domicile of the Architectural Museum (1851), of which an illustration will be found in our columns of January 3, 1857.

Church of St. Mary, Moorfields.

THE Charity Commissioners have framed a scheme dealing with this charitable trust and the proceeds, 202,000*l.*, of the recent sale of the church, presbytery, and schools, covering an area of about 18,400 ft. superficial, in Moorfields. The scheme provides for the erection of a new church, with presbytery, schools, and other buildings upon a site which the trustees have purchased in Eldon-street and Sash-court, Finsbury, and for the allocation of the endowment to the following purposes—50,000*l.* towards the completion of the fabric of the new Roman Catholic Cathedral at Westminster, and 20,000*l.* towards paying off any mortgage of the cathedral's site: then the yearly income is to be applied, as to 400*l.* per annum, to the maintenance of the new church and schools, and, as to the residue, to the support of the cathedral. The property belonging to the charity consists of sixteen acres of land at Wembley, Nos. 4 and 5, Eldon-street, and four houses in Sash-court, Finsbury, and a capital sum of 172,000*l.* being the as yet unpaid balance of the purchase moneys for the former site in Moorfields, part of which will be expended upon the purchase of the new site in Finsbury. The former church was built in 1817-20, at a cost of 26,000*l.*, from the plans and designs of John Newman, and is illustrated in Britton & Pugin's "Public Buildings of London." In our number of November 25 last we published a representation, after Mr. A. C. Conrade's water-colour drawing, of the high altar, and the picture painted on the rounded wall of the apse by Aglio, and repainted by him in 1837.

The Franzens Bridge, Vienna.

APROPOS of the Alexandre III. bridge in Paris, we may remark that the new three-hinged bridge over the Danube Canal, in Vienna, is of almost identical design, although some details are different. Early in 1896 competitive designs were invited, and the prize was awarded to Mr. Frank Pfeuffer, Chief Engineer of the State Railway Company, and a member of the Austrian Society of Engineers and Architects. The centre span is 174 ft. long, and there are two approach spans of 27 ft. each. Nine three-hinged arches, with braced spandrels, are comprised in the main span. The approach spans are of masonry, constructed so as to oppose the thrust of the steel arches, with the view of keeping the resultant line of pressure within the middle third of the abutment pier. The bridge has a total width of about 79 ft., including a roadway, 52 ft. 6 in. wide, and two footpaths, each 13 ft. 3 in. wide. The new structure takes the place of a chain suspension bridge, with span of 296 ft., and which it was found necessary to supercede in consequence of the great increase of heavy traffic. If the French and the Austrian designs are both original we find in them a remarkable instance of what we may term simultaneous illumination.

The Leeds Experiments in Sewage Disposal.

AN interim Report on the progress of the Leeds experiments in sewage disposal has recently been printed by the Corporation of that city. The investigations have now been carried on exactly three years, and we need scarcely say that much valuable knowledge has been gained during this period, although much yet remains to be done before definite conclusions on all points can be reached. For about fifteen months Mr. W. J. Dibdin, of Barking and Sutton fame, had charge of the experiments, but in October, 1898, the Corporation established a laboratory at the sewage works under the control of Mr. W. H. Harrison. The tests have all been made with a view to ascertaining the best methods of bacterial purification, as the Committee had in 1897 come to the conclusion that in bacterial purification a solution of the difficult problem would be found. We cannot, in a note, describe in detail the different steps in the investigations, but the general results obtained up to the present time may be briefly summarised. The filtration of crude sewage, without any preliminary treatment except screening, was found to be impracticable on account of the rapid clogging of the first of the two filters through which the sewage was passed in turn. The same result occurred even with sewage which had been first passed through a settling tank. Good effluents were obtained, but the gradual reduction of the capacity of the filters was so serious a feature that it became necessary to attempt other methods. The reduction of capacity was partly due to the disintegration and settlement of the coke and clinker of which the filters were formed, and partly to the accumulation of sediment in the interstices of the filtering materials, much of this sediment being irreducible, and, therefore, unaffected by the periods of rest which were given to the filters. Septic tanks were then tried as a preliminary to filtration, and it was found, as at Manchester, that open tanks gave as good results as closed, with, of course, a smaller initial cost. The advantages in the use of septic tanks were (1) the production of a practically uniform effluent from sewage of varying composition; (2) the digestion of part of the solids in suspension; and, (3) a degree of anaerobic putrefaction which facilitated subsequent filtration. In addition to the ordinary intermittent filtration, continuous filtration through special filters was tried, both with crude sewage and with septic-tank effluent. The Whittaker bed was treated continuously with septic tank effluent, but proved somewhat unsatisfactory in working, and the final filtrate was turbid; it was found, however, that the turbidity was due to suspended solids, which are "absolutely non-putrescent, and about half of them being ferric oxide and silica are not further reducible by bacterial action, and if they do not come out must choke the bed." This unexpected result seemed to point the way to another method of treatment, namely, the adoption of a coarser filtering material (so that the irreducible solids will not be retained) and the passing of the filtrate through a final settling tank in which these solids will be deposited. Experiments in this direction will be commenced without delay. The Ducat filter was treated continuously with crude sewage, but the "construction is prohibitively costly;" the filter soon became choked and the filtrate was not satisfactory, but as the experiment is being continued, a final conclusion has not yet been reached. The Corporation of Leeds deserves the thanks of the community for its labours, and we trust that the investigations will eventually, as the authors of the Report predict, "settle with certainty the best method of treatment for the local conditions."

Mines and Quarries.

THE first part of the "General Report" on mines and quarries for the year 1899 has recently been issued by the Home Office. The three remaining parts may be expected some time this year or next. Part I. is entitled "District Statistics," and contains statistics as to the number of persons employed in mines and quarries, the number of accidents, and the output of minerals. In mines under

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the Coal Mines Act 729,009 persons were employed in 1899, an increase of about 3 per cent. over 1898; these persons were almost exclusively engaged in the production of coal. Under the Metalliferous Mines Act 35,157 persons were employed, an increase of about 2½ per cent. In quarries more than 20 ft. deep 97,995 persons are said to have been at work, as against 134,478 persons in 1898. This apparent decrease is entirely due to the transfer of works for making bricks, tiles, Portland cement, &c., situated outside the quarries, from the Mines Branch of the Home Office to the Factory Branch. On the whole, the output of minerals of use in the building trades shows a reasonable increase. Sandstone and slate are the only exceptions. Clay and shale showed an increase on the previous year of about 2 per cent. (the smallest increase for four years); limestone 3 per cent., and igneous rocks 5 per cent. Clays and shale represent the greatest weight of minerals raised from metalliferous mines and quarries — over 14 million tons; limestone (other than chalk and gypsum) gives a total of over 12 millions, sandstone rather more than 5 millions, igneous rocks about four millions and three-quarters, and slate a little over half a million tons. Of course, these figures include the quantities raised for road metal and other purposes in addition to the requirements of the building trade. The Report contains a large amount of statistical information, but unfortunately this is presented in such a manner as to be robbed of much of its value. One curious error may be mentioned; in tables 3, 8, and 9 the output of "igneous rocks" is said to be 4,709,925 tons, but in table 28 this quantity is given as the output of "igneous rocks *other than granite*." As separate statistics for granite are not given we presume that the description in table 28 is erroneous.

Housing of the Working Classes.

THE Medical Officer of Health for St. Marylebone, Dr. Wynter Blyth, has taken the first steps towards the reconstruction of an area under the Housing of the Working Classes Act. The area is in the Christ Church sub-district, and comprises 102 houses and a population of 971. The number of families to be displaced is 259. The area is practically covered with houses, many of which are back to back, allowing of no through ventilation. The great majority of the houses are worn out and unfit for healthy habitation. The density of the population is about 450 to the acre. The rates of mortality for five years from 1894 to 1899 inclusive is 27·8. Should the London County Council adopt the scheme, it is probable that the improvement scheme would provide for the widening of Burne-street, a street at present of considerable traffic and one in which many street accidents have occurred.

The Architectural Association Prize List.

FROM the Architectural Association Prize List for Session 1899-1900, which has just been issued, we see that the Architectural Association Travelling Studentship, value 25*l.*, and Silver Medal, have been awarded to Mr. C. H. F. Comyn. The Architectural Association Medal, competed for by six students, has been won by Mr. S. Towse, while an Hon. Mention has been awarded to Mr. J. E. Forbes. The Architectural Association Essay Prize goes to Mr. J. Maclaren Ross, and the Architectural Union Company's Prize, value 10*l.*, to Mr. P. J. Turner. The Banister-Fletcher Bursary and Medal, as we have already announced, is given to Mr. Arthur Stratton. This year the Andrew Oliver Prize has been awarded to Mr. F. C. R. Palmer, and the Arthur Cates Scholarship to Mr. L. W. Ensor.

THE PARIS EXHIBITION:

NOTES ON MATERIALS OF CONSTRUCTION.

INDIA seems very proud of its stones for building and decoration; wherever, in recent years, it has shown in large exhibitions the country has always been well represented so far as its newly-discovered natural products are concerned, and building stones have received special attention. On the first floor of the India building in the Trocadéro gardens will be found the exhibit of the Geological Survey Department of India, including specimens in large blocks of building, &c., stones. No catalogue was available at the time of our visit, and the following notes may prove useful.

The most universally-used building material in India is kunkur. All over the plains there is no other source of lime or for road-metal, for both of which purposes it answers admirably; it occurs almost everywhere in the superficial clay, and being easily dug out, broken, and burned it is mostly preferred even where "rock-limestone" abounds. From its usual admixture with the clay in which it is formed it often yields excellent hydraulic lime.

1. Porebunder stone. This is a marine limestone of recent formation found at moderate levels over a considerable part of Kathiawar. It is largely composed of the foraminifer *Miliolites*, is grey, and fine-grained. It works like the finest oolite, and is extensively used in Bombay.

2. Coorla buff trap or basalt. This is a trachytic rock; the specimen in the Exhibition came from Pawai, near Coorla, Salsette Island. It is of a light brown tint and fine grained. This stone is much used in Bombay for coping, bases, columns, arches, &c.

3. From the same district as No. 2, but light brown in tint, and having dark veins.

4. Basalt, Waghoor quarry, near Rhusawal, Khandesh District; rough grained and of a dark tint.

5. Coorla blue trap; quarried two miles north of Coorla, Salsette Island. This rock is a dolerite, of medium grain, of bluish grey black tint, with lighter coloured spots. It is used in Bombay for large steps, for staircases, &c.

6. Sewree blue trap. This is a dolerite quarried at Sewree, on the east side of Bombay Island. It is of medium grain, bluish-grey black with lighter coloured spots. This rock is regarded by the geological survey of India as the best class of building stone used in Bombay.

7. Dolerite, from a quarry near Chinchwad Station, largely employed by engineers on the Great Indian Peninsular Railway. It has a rough medium grain, and is of dark bluish grey tint.

8. Basalt, from Hyderabad Province. This is very fine grained, black, and breaks with a hackly fracture.

9. Watekolli stone, from Coorg. This is a coarse-grained augite norite, with pink Labrador felspar. Its general colour is a brownish dark blue, with lighter spottings. This rock should prove of more than Indian interest; it is very similar to the so-called Labrador granite from Sweden (Laurvigite), so extensively used in a polished state in London, except that the Indian stone is darker in tint, and the Labradorite crystals are smaller.

10. Sholinghur stone, from North Arcot District, Madras. This is a light grey stone, spotted with black biotite mica. Its gneissose structure was not well marked in the specimen in the Exhibition.

11. Charnockite stone, Madras. This is of a dark tint, and the specimen is polished on one side; it is fine grained.

12. White Makrana marble, from Jodhpur, Rajputana. This is a crystalline, rather coarse stone, with occasional broad veins of bluish white. It takes a beautiful polish, and is not unlike some varieties of Norwegian white marble. The stone is celebrated for having been so extensively employed in the great Moghul monuments of Delhi and Agra.

13. Black Makrana marble, from the same district as No. 12. There is a tendency to mottling, and grey-whitish veins occur here and there.

14. Yellow Makrana marble. Similar but differs in tint.

15. Green serpentine marble, from Ajmere, Rajputana. This is from the Arvali metamorphic series, is of a light yellowish green tint, with occasional dark green and fewer white streaks. This stone is practically identical with the well-known Connemara marble, Ireland.

16. Jesalmer limestone. A brownish yellow, fine-grained material.

17. Kaimur Sandstone (Chunar stone), from the Mirzapore District, North-West Provinces. This is fine grained and of grey tint. It is one of several varieties of Vindhyan sandstone, and, together with the Mirzapore sandstones, is the chief stone used in Calcutta. (It may be remarked, however, that terra-cotta mouldings are the usual substitute for stone in architectural ornamentation in Calcutta.) Several varieties of the stone are exhibited.

18. Mirzapur stone, from the locality of the same name. It is of a light brownish-red tint (see observations under No. 17).

19. Dhrangadra stone, Kathiawar. This is a coarse-grained purplish-red sandstone, having a tendency to false bedding. It comes from the Umia (Jurassic) group of the Gondwana series, and is much used by the Great Indian Peninsular Railway Company on their system.

20. Dhandiwara stone, sometimes known as Mahadeva sandstone, quarried near Seoni. It is cream-coloured and of fine grain.

21. Barákar sandstone, Bardwan District. This is a light brownish-red stone of fine grain, found in the coal-measures of the Raniganj basin, Bengal, and is employed to some extent in Calcutta. Varieties of this rock yield excellent grindstones.

22. Mottled sandstone, Nellore District, Madras. Two specimens of this remarkable stone are exhibited. They are mottled on a large scale, the colours being yellow, light pink, and cherry brown. Sections at right angles to the bedding show irregular lamination.

23. Kaimur flagstones from Chunar, North-West Provinces. They are light purplish-red in tint and fine grained.

24. Felspar porphyry, quarried near Seringapatam, Mysore. This rock has a light red ground-mass, in which dark pink phenocrysts of orthoclase felspar abound, and is a beautiful ornamental stone.

25. Red marble, Jaipur, Rajputana. This is a dark pinkish red stone, veined irregularly, with occasional streaks of deeper tint.

26. White marble, from the same district as No. 25. This is a bluish white stone, with indistinct coalescing bandings, and some scarcely perceptible broad pink streaks.

27. Serpentinous limestone (ophicalcite), from Tadpatri, Anantapur District. This is a light emerald green stone, mottled white, and is an excellent variety of this class of ornamental material.

28. Lameta limestone, from Puranapani quarry, Jabalpur. This is a greyish, medium-grained stone.

29. Several varieties of roofing slate, together with slate slabs, cubes, &c., principally from the quarries of Messrs. Ambler & Co. in the Kharappur hills in the Monghyr District, are also exhibited. The Kangra Valley Slate Company show a very fine slate slab, of greyish blue tint, measuring about 5 ft. by 2 ft. 3 in. by ¼ in., a good example of the manner in which these excellent Indian slates cleave, the surface being practically smooth.

We give the above list of stones for the same reason that we mentioned the British specimens in our former article (p. 140, *ante*). The Indian Government authorities evidently regard the specimens exhibited as representing the principal varieties of stone used in building and decoration, and to some extent for engineering purposes, in Indian cities, and on railways. This exhibit, however, is on a much more extensive scale than that of the Home Office, for nearly all the specimens are large blocks (not hand specimens merely) so that one can form a better idea of the appearance of the material when used as materials of construction.

In the same exhibit we note several examples of carving in some of the above-mentioned stones, particularly from Gwalior and Agra. An ornate bracket, carved in fine-grained, yellowish-grey sandstone, comes from the State workshops at Gwalior, whilst several

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delicately-carved screens in pink and white stones are sent from Agra. There is also a block of carved red sandstone (similar to our Triassic sandstones from Chester and the neighbourhood) showing the utility of Makrana stone in the production of finely-cut work. Near by are pillars and slabs of gneiss, showing the effect of fire on this material at Bangalore. No greater proof of the unsuitability of this class of stone for building purposes could be furnished, the columns are split and the slabs are exfoliated along planes determined by folia of black biotite mica. Several other examples of stone raised in India are on the ground floor of the building. They are chiefly built in as panels in a large show-case, but whilst they are of considerable merit, chiefly for ornamental purposes, there are no particulars forthcoming as to their origin or use.

India shows some good examples of mica and talc; so does Ceylon, but the last-mentioned island has not paid sufficient attention to its mineral products so far as they are displayed in the Exhibition. The plumbago exhibits, which comprise some of the best graphite to be found in the world, are largely left to take care of themselves, and the small court in which they are found was, at the time of our visit, in a very filthy condition.

Canada exhibits many varieties of building and ornamental stones. Amongst them we noticed a granite from Spoon Island, Queen's County, New Brunswick, which is similar in appearance to our Newry granite, having a blue-grey background, in which small, irregularly-shaped crystals of orthoclase felspar abound. Another granite, like our Scotch grey Dalbeattie stone, comes from Jarvis Inlet, Nelson Island, British Columbia. A third is like red Peterhead granite, minus smoky quartz. A fourth, of Laurentian age, from Gonansque, resembles the well-known deep red, medium-grained granite from Sweden. There are several kinds of light green and grey sandstones from different parts of the Dominion, and a deep red sandstone, recalling the stone from Corsehill, Dumfries. A good assortment of marbles also forms part of this collection, which has been made under Government auspices. The cities of Montreal, Quebec, and Ottawa are chiefly constructed of limestones from the Trenton formation. The grey fine-grained granites of Quebec are raised in the eastern part of the Province; but many others equally good yet remain to be exploited from the Laurentian formation. The same horizon furnishes excellent crystalline limestones, pure, or mixed with serpentine, forming beautiful white and greenish marbles. In the eastern part of Quebec, at New Rockland, for example, there are large slate quarries, and the material compares very favourably with the best Welsh slate. Most of these stones are represented in the Canada building.

Amongst the miscellaneous exhibits of stone in the Exhibition we may notice the columns, decorative objects, vases, and slabs for lining walls, executed in verde antico marble, shown by the Verde Antico Marble Company, of London. The stone is a coarse, green, serpentinous breccia, spotted with large white marble fragments. This exhibit will be found in the section of decoration and furniture. Messrs. Arthur Lee & Brothers, of Bristol, show a pavement executed in *opus alexandrinum* in the staircase hall of the Royal Pavilion.

French marbles are, naturally, well represented in the Exhibition, but the exhibitors have not been very enterprising in the matter of displaying them. For instance, almost the entire wall of that part of the Champ de Mars building devoted to mining and metallurgy, facing the grounds, is covered with slabs of marble, chiefly, if not entirely, of French origin. It is one of the best exhibits of its kind in the Exhibition; yet no information is forthcoming unless inquiries are made at the offices of the firm in Paris, outside the Exhibition. Algerian onyx, from the neighbourhood of Oran, is shown at several places. As will be noticed later on, this material is finding favour with manufacturers in the making of washstands and the like.

With reference to machinery and appliances for quarrying Messrs. Holman Brothers, of Camborne, Cornwall, exhibit their Cornish rock drills, which are also extensively used in mining operations. To show speed of the drill and rate of penetration demonstrations are made at intervals, the material experimented with being a large block of hard granite. Messrs. Bickford, Smith, & Co., of Tuckingmill, Cornwall, show models of safety fuses for blasting, models of volley-firers with instantaneous fues for simultaneously firing charges without electricity, &c. There is a large block of granite in which several holes have been drilled, and a fuse being placed in each hole the ends of the fuses are connected together, thus explaining the method of firing. The Nobel's Explosive Company, of Glasgow, show models of explosives: dynamite, blasting gelatine, gelatine-dynamite, gelignite, &c.

Clay goods, including sanitary ware, are well represented in the Exhibition, but here, again, only the better class goods are exhibited by a few British manufacturers, and these latter chiefly have branch offices in Paris or in other parts of France. There are a few notable exceptions to this last however. Sanitary ware and stoneware are found for the most part in those sections devoted to hygiene and pottery and porcelain.

Messrs. Doulton exhibit canopy baths and a fitted-up bath-room, plunge baths, enamelled earthenware and skeleton spray baths, lavatories in pottery and marble, and many other sanitary goods and appliances. We may note a range of isolated trough closets with automatic action, specially adapted for use in schools, factories, barracks, &c. This isolated system has been specially designed to meet the demand for separate closets, which shall at the same time have the advantages of the ordinary continuous trough closet. Each basin is isolated, there is a large surface area and some depth of water in each pan, a flushing rim by means of which the whole surface is cleansed at each discharge, and a tank arrangement which allows for a large aftercharge supply. Messrs. Doulton also have a good show of ornamental washstands in which marbles of different kinds are used, fireplaces in green faience, black paving bricks, sections of drain-pipes, and the like. Mr. G. Jennings exhibits a number of sanitary and drainage appliances, water closets with siphonic discharge and noiseless action, bath fittings, lavatories, sinks, &c., altogether a characteristic display of the firm's well-known sanitary and other clay goods. Both Mr. Jennings and Messrs. Doulton exhibit in the Royal Pavilion, and the last-mentioned firm also in other sections.

Messrs. T. C. Brown-Westhead, Moore, & Co., of Stoke-on-Trent, have a large exhibit of Cauldon sanitary earthenware and pottery for sanitary purposes, as well as several ornamental washstands fitted with marble, and pink, yellow, and green onyx. Special exhibits are closets fitted with a suction water flush.

The Lambton Collieries, of Newcastle-on-Tyne, have the largest British exhibit of sanitary pipes. They are of dark brown glazed stoneware, and are specially burnt to withstand high pressure. The clay of which these and other goods, including the firebricks manufactured by the firm, are made is extracted from a bed underneath the coal seams in the Fence Houses district.

The Farnley Iron Company, of Leeds, show firebricks of various shapes and sizes, glazed bricks, glazed sanitary goods, sinks, &c. To show the effect of some of these materials when built up a wall, flanked by two square pillars, has been erected on the stand. The bricks employed are chiefly cream, brown, and greenish slate grey glazed; and there is also a stand with bricks glazed on one face.

In the same pottery and porcelain section Pilkington's Tile and Pottery Co., of Clifton Junction, near Manchester, have a large and ornate exhibit of tiles unglazed for floors; glazed for wall decoration, fire-places, furniture; encaustic tiles for floors, mosaic work, &c. Several of the glazed tiles are displayed as panels on a specially erected wall, and there is a low-wall of white tiles panelled with neat designs, also in glazed work. This is one of the best displays of glazed tiles in the Exhibition.

Messrs. H. J. & C. Major, of Bridgwater, Somersetshire, have erected a temporary shed roofed and backed by their patent interlocking weather-proof roofing tiles, and angularly-corrugated pattern tiles. Ridge tiles for use with these are also shown.

The Newellite Glass Tile Company, of London, have a stand displaying their opal glass tiles in various colours. These have a backing of an elastic nature, which materially assists their durability, preventing them from cracking, and they are practically unaffected by rapid changes in temperature. This exhibit is situated in the annexe to the British portion of the section of decoration and furniture along the Esplanade des Invalides.

Messrs. Pease & Partners, of Darlington, amongst other things already mentioned (p. 151 *ante*), exhibit firebricks, silica (Ganister) bricks, coke oven bricks (which are of a yellow tint, speckled with deep brown spots), and white pressed building bricks in several forms, all deeply recessed. Many kinds of Dinas silica firebricks and blocks are shown by Messrs. Allen & Co., of Hirwain and Neath (Glam). These are specially adapted for steel furnaces, also for roofs of other types of furnaces, for glassware, for copper and chemical works, &c. The Glenboig Union Fire Clay Company, of Glasgow, also show firebricks and blocks for the construction of high-class furnaces in the department of mining and metallurgy.

As might naturally be supposed the French are the largest exhibitors of clay goods, as well as of machinery for making them, retorts, &c. These exhibits are situated principally in the buildings in the Esplanade des Invalides. Many of them are not, however, displayed to advantage, being confined in a very cramped position, and much of the machinery is not in motion. The American Clay Working Machinery Company, of Bucyrus, Ohio, have the largest and possibly the most complete plant for brickmaking in the Exhibition.

No previous Exhibition held in Paris has ever displayed such a collection of timber. A large building has been erected on the left quay of the Seine near the Pont d'Iéna to contain the group relating to forests, sport, &c., but it is filled to overflowing, and many exhibitors have had to be content with space outside. Some of the British possessions are large exhibitors of timber, and their specimens may chiefly be found in the Colonial buildings. Canada sends a fine collection of woods contributed by the Government authorities of the Provinces of British Columbia, Manitoba, and Quebec, as well as by many private firms and individuals. The following are some of the principal kinds of timber found in Canada: The white or Weymouth pine (*Pinus strobus*), which was formerly the principal wood of commerce, has now become much diminished in quantity except on the grounds near the sources of the rivers. The yellow pine differs from the white principally on account of its growing in a more robust manner; it is often confounded with the latter. The red pine (*Pinus resinosa*) is less exploited than the preceding. Of the Canadian fir-trees there is the white variety (*Picea alba*), not so large as the pines, but it makes excellent joists, battens, and laths; the black (*Picea nigra*); and the red (*Karix americana*), the latter being much employed in the construction of ships. Another kind (*Abies canadensis*) has the merit of lasting some considerable time underground, and has furnished large quantities of railway sleepers to Great Britain and the United States. Other varieties of the same class of trees are also cut, but are not of much use as materials of construction. The white cedar (*Thuja occidentalis*) is a widely spread tree in Canada, and attains to a large size; it is remarkable for its durability, and is employed as piles, wood for fences, telegraph poles, and the like. The plane tree, and two kinds of oak are also much used. Black and white ash trees are common and grow to a height of nearly 50 ft.; they are principally exploited for the manufacture of furniture, balusters, and where curved woods are required for constructional purposes. Canadian walnut trees furnish a hard and compact material much employed in the arts; the white elm (*Ulmus americana*) is a large tree, and provides quantities of wood for the carpenter. Other Canadian trees are also utilised, but to a lesser extent. Samples of these woods, both polished and unpolished, will be found in the building devoted to forestry and sport, already alluded to.

The Forest Department of the Government of India exhibits a collection of specially-prepared wood panels, about 100 in number, polished so as to show the capabilities of the chief Indian woods for purposes of decoration. Also a collection of special woods from the forests of the Andaman Islands, the principal of which is the "padouk," and the marble-wood, and zebra-wood (*Diospyros kurzii*), a species of ebony. A collection of paving blocks is exhibited in order to draw attention to the many valuable hard timbers to be found in the Indian forests which are suitable for street paving; chief amongst these, and, in the opinion of the Indian Forestry Department likely to be the best, is the "pyinkado" (*Xylia dolabriformis*). There is an interesting collection illustrating

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the extraction and conversion of sandal-wood (*Santalum album*), chiefly from the forests of Mysore. Sissu-wood and black-wood employed for carvings and furniture are neatly displayed. As would naturally be expected, teak, being the principal timber of the Indian forests, is largely represented. The majority of these specimens of woods are on the first floor of the India building, but examples of carved screens, furniture, and worked wood generally, are scattered throughout the edifice. The large entrance staircase was carved in Mandalay. The Inspector-General of Forests is of opinion that a species of *Pterocarpus*, found in considerable quantities and of large dimensions in the Andaman Islands, has, of all Indian timbers except teak, probably the most promising immediate future. It yields the best wood for ordnance purposes, and is sure to rival mahogany. The timber is stronger than teak in every direction, is said to be more durable, does not warp in seasoning, and only weighs 15 lbs. to 20 lbs. more per cubic ft. It may be noted that the Indian Forest Department has the charge and management of nearly 120,000 square miles of forest.

Western Australia exhibits the uses of karri, jarrah, and other well-known woods indegenous to the colony, in the building next to that occupied by Canada in the Trocadéro gardens, and the display is worthy of these excellent materials. Ceylon, likewise, has a collection of specimens of timber and some products of forest industries exhibited by the Conservator of Forests, Colombo.

Great Britain is not, of course, much of an exhibitor of timber, except in its converted forms in the shape of furniture, and the like—with which we have nothing to do in the present article. We may, however, notice the stand of the British Non-flammable Wood Company in the Army and Navy section. As an example of what can be done with the wood after having been treated by the company's process, a ship's cabin and fittings have been erected in reddish brown wood, and the result is certainly very satisfactory. The company also exhibits examples of risers, treads, and balusters for staircases, window frames, &c.—all of non-flammable wood. If the British exhibits of forest trees are not remarkable, the same cannot be said of machinery for converting the wood, which is represented by two excellent stands, furnished by Messrs. A. Ransome & Co., of King's-road, Chelsea, and Messrs. Thomas Robinson & Son, of Rochdale, respectively. These are situated in the civil engineering section, in the Champ de Mars, and will be described in an article dealing more especially with that class of subject.

WILSON—SCULPTOR AND ARCHITECT.

FROM A CORRESPONDENT.

WHEN the gossiping antiquary, Elias Ashmole, penned a note in his diary, under the date of March 11, 1682, that he had attended his lodge of Freemasons, Sir William Wilson, knight, being its master, he evidently considered that the patronage of the friend and pupil of the great Wren lent some lustre to the occasion. Yet such is the irony of fate that only a few scattered traces of the very existence of a man, evidently of no small repute in his own day, have been made out, and many of the structures of which he was author have been as completely obliterated as the records of the Masonic body over which he presided, which were consumed by fire more than a hundred years ago.

William Wilson was born at Leicester in 1640, and twenty years later is first heard of as a sculptor and draughtsman under the tuition and employment of Sir Christopher Wren. It would be a busy period in the great restorer's office, when the havoc of civil war, and subsequently the Great Fire of London, made the renewal of public edifices a daily task, but Wilson is only casually mentioned as working under the direction of Wren until 1677, when he obtained an independent commission which led to an important change in his fortunes.

Jane, widow of Henry Pudsey, of Langley Hall, Sutton Coldfield, was desirious of testifying her wifely grief, and perpetuating her husband's memory, by a monument of more elaborate kind than the usual tablet in a country church. Two busts of herself and her late lord appear in a sort of alcove or recess, disclosed to the sight by the drawing back of a pair of curtains, cut in white marble, with a golden fringe at their extremities. It may be mentioned that this somewhat upholstery arrangement found favour in the eyes of a critic in the *London Chronicle*, 1762, who says: "These, though overlooked by the incurious, are remarkable, being so well designed in their folds, and executed with such an easy flowing of the drapery, as would not have disgraced a Roubilliac." There may be several plausible conjectures as to the mode in which the young sculptor obtained an introduction to the wealthy widow. Wilson had been employed upon the castle at Nottingham, and certainly was the sculptor of the equestrian statue, of which the mutilated remains long surmounted the entrance, representing the first Duke of Newcastle, whose death took place in 1676, and the steward of his heir, John Holles, Earl of Clare, was a native of Sutton Coldfield, and might possibly recommend Wilson. This statue shared the ill-luck which seems to have attended Wilson's productions. When the mob in 1831 attacked the modern castle, a building of the school of Inigo Jones, and probably, to judge from the style of the eastern façade, Wilson's composition, they carried off the figure as a glorious trophy of the destructive work on which they had been engaged. It had been supposed to have been sculptured from an entire block of stone, but the late Duke of Newcastle met with a fragment of it in a shop in London which turned out to be of *wood*, as one of the horse's legs was said to have done when thrown upon a bonfire at Nottingham. Another of Wilson's sculptured figures might also have brought him into notice in the neighbourhood of Lichfield, as he had lately executed for Bishop Hacket, then engaged in repairing Lichfield Cathedral, a full-length statue of Charles the Second, with ribands at his knees and roses in his shoes, which was intended to occupy the topmost place in the west gable, from which the image of the Virgin Mary had been hurled by the stormers. This statue, too, has ceased to exist, for on its being taken down, when renovations were recently made, it was found in so weather-worn a condition, being made of the soft stone of the district, as to place beyond question the propriety of destroying it.

However the introduction to the Lady Pudsey may have been effected, there can be no doubt that Wilson's performance was not only satisfactory to the public at large as a work of art, but appealed so forcibly to the fair patron of our sculptor that she, shortly after its completion, took him for her second husband—much to the indignation of her relatives, one of her daughters being cruel enough to taunt her with the disgrace that a lady who had lived in a moated house should marry a stonemason. "As far as the moated house goes, madam," Wilson is reputed to have said, "I can easily build her another"; and in front of the dwelling which he erected in the main street of Sutton Coldfield he excavated a dry ditch or basement, over which the visitor crossed by a bridge to the front door, less than half a century ago. Another member of the family is supposed to have menaced him with a refusal to admit his coffin into the family vault. "Bury me outside," replied the bridegroom, "and as I am a stonemason I will work my way in." His wife, who had some family interest among courtiers, obtained for him the honour of knighthood, and by Sir Christopher Wren's influence he was entrusted with the rebuilding of the Church of St. Mary's, Warwick, in 1694, and to him must be attributed the censure and the praise which the fine proportions but incongruous detail of this singular building have so often called forth. Indeed, the beauty of the proportion of the tower is so conspicuous that Horace Walpole would not admit that it could have been designed by any lesser genius than Wren himself. It seems, however, fairly proved to be the work of Wilson.

He built many houses in Warwickshire and Staffordshire, most of which have been altered or destroyed. They have all an air of being somewhat older than their actual date, reminiscences of Inigo Jones, and not uncommonly an even earlier treatment of details being noticeable. One house on which he spent much trouble, after being twice altered, has recently been entirely swept away. It is the only one of Wilson's undoubted work of which we have an engraving. It was built for Lord Ffolliott of Ballyshannon, and was finished about 1680. The engraving is in the second edition of Dugdale's Warwickshire. The house, known as Four Oaks Park, was sold by the representatives of Lady Ffolliott, widow of its builder, to Simon Luttrell, of Luttrellstown, Ireland, in 1749. He modernised it with stucco and sham pilasters, stuck four ugly turrets upon its roof, and transformed it into a mere box. Internally, however, some costly and tasteful adornment was introduced under what Mrs. Luttrell, in a contemporary letter, terms her "oversea reship." She was a woman of private fortune, her father having been Governor of Jamaica, so that marble chimney pieces, elegant brass locks, mahogany doors, and iron stair rails of the best design rendered the interior suitable for a family, one of whose daughters eventually became a Royal Duchess. There is no need to record the reasons which led to its being destroyed, but Wilson's solid brickwork remained unimpaired to the last.

The architect himself lived tranquil and esteemed at his "moated house" until 1710, when he was buried on the outside of the Pudsey vault under a long Latin inscription setting forth his virtues and his exploits. His prescience has been vindicated by the circumstance that this tomb, once outside the church, has by recent additions to it come under its roof. At Leicester his name is still held in veneration, mainly on account of some charitable bequests to his fellow-townsmen. His was a record honourable if meagre.

W. K. R. B.

MAGAZINES AND REVIEWS.

THE *Art Journal* continues the description of art in the nursery by Mr. R. Davis Benn, with illustrations from the work of Mr. Cecil Aldin and Mr. John Hassall, the collaborateurs in the decoration of the nursery under review. The article on "Arts and Crafts at Wilton, Wilts," by Mr. Gideon Fidler, professes to be brief, and is hardly even a catalogue of the many treasures that are stored in that mansion. "Etrétat and its Environs," by M. A. Toucey Gibert, is attractive and topical.

Part V. of the Paris Exhibition Special Extra Numbers of the *Art Journal* deals with furniture and woodwork, with illustrations from various countries; "The Colonial Sections situated near the Trocadero"; "Le Grand Hall Elliptique of the Grand Palais des Beaux Arts"; the great "Surtout de Table," by Fremiet; the "Rörstrand Porcelain Manufactory of Stockholm"; Orfévrerie, by V. Mayer's Söhne of Vienna; Porcelain, by Bing & Grondahl, of Copenhagen; Electric Lamps, by Mottheau et fils, Paris; Orfévrerie, by E. Sanner, Paris; Della Robbia Pottery, by Mr. Harold Rathbone; and Messrs. Heaton, Butler, & Bayne's stained-glass windows.

The *Studio* also deals with the Paris Exhibition in the article entitled "Round the Exhibition." I. The House of the "Art Nouveau Bing," by M. Gabriel Mourey, which is interesting not only on account of the ability and character of the work represented, but as showing the readiness with which French artists have seized upon that particular phase of art which has had its origin in our own country. There is also an article on "The Decorations of the Peninsular and Oriental Pavilion at the Paris Exhibition," with illustrations of the architecture of Mr. Collcutt, and the decorative design of Mr. G. E. Moira and Mr. F. L. Jenkins. The other leading articles are appreciations of the work of James Aumonier and Emil Orlik.

The *Magazine of Art* is void of architecture this month except for a small photograph of the Findlay Memorial in the Scottish National Portrait Gallery, by Dr. Rowand Anderson, but a well-illustrated account of the inlaid furniture at Buckingham Palace, chiefly eighteenth-century French work, is of interest. The medals of Michel Cazin and Henri Dubois, as described and illustrated, are of more than ordinary superiority to what we have to put up with in England.

The *Artist* has, like other contemporaries, gone to the Paris Exhibition for an article and illustrations of interiors and furniture, whilst the capabilities of Rye as a sketching ground are shown by Mr. G. Forrester Scott. Clever sketches are the studies of "Some Young Birds and an Adjutant," by Mr. C. H. C. Baldwyn, which may even be useful as decorative suggestions.

The *Architectural Record* (New York) commences a series of articles on the architectural schools in the United States, with an account of that at Columbia University, but the leading theme is entitled "How the Rich are Buried," an extensive series of photographic illustrations of sepulchral monuments. More cheerful is

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No. 1 of the series, "Where our Architects Work," Mr. George B. Post's workshop, and the illustrations of Cleeve Prior Manor, whilst the account of the Natural History Museum at Paris is a good example of modern French work.

The Architect and Builder's Magazine (New York) has an interesting article on "Prismatic Lighting for the Illumination of Dark Interiors," by Dr. W. H. Greene, which is concise and clear, and should be read by those who have to determine between rival manufacturers of various forms of prismatic lights. The article on "Summer Homes," by Mr. Frank T. Lent, is continued with plans and illustrations of some of the American types of summer residences.

The *Berliner Architekturwelt* shows us what German school architecture is to-day in the account and illustrations of the Gemeinde doppel-schule in the Wilmstrasse, Berlin, by Ludwig Hoffmann, as well as other examples of current German work.

The *Antiquary* has a description and sketches of some frescoes discovered last year in the Church of All Saints, Little Kimble, Buckinghamshire, with the unique picture (as so far found in England) of St. Francis preaching to the birds.

The *Pall Mall Magazine* contains a popularly-written article on Inverary, by the Rev. A. H. Malan, illustrated by photographs that do not contain a great deal of architectural interest.

The *English Illustrated Magazine* has an interesting account of "Signs that Survive," by Mr. Wilfred Mark Webb, chiefly taken from examples in London, and well illustrated. "The Highest Houses in the Kingdom," by Mr. G. A. Way, refers chiefly to those that are high in position, though Queen Anne's Mansions and Hyde Park Court are illustrated as examples of the other literal interpretation of the title.

The *Gentleman's Magazine* has an article on "Arctic Co-operation," in which the Russian manner of building log-houses within the Arctic Circle is incidentally described.

Scribner has "A Study in Japanese Perspective," in which the general statement that the Japanese do not know perspective drawing is controverted, and their method cleverly and with a considerable basis of truth upheld, the text being illustrated by examples from Hokusai's "One Hundred Views of Fugi."

"Troglodyte Dwellings in Cappadocia," in the *Century*, is a description of an archæologically curious phase of embryo architecture by Professor Sterrett, with drawings by Harry Fenn. Sketches of the Detroit Bicentennial Memorial of 1901 show us the immense Doric column, "the highest in the world," which is to be the banal centre of the memorial.

The *Genealogical Magazine* has an article on the difficult and indeterminable question of "The Armorial Bearings of a Lady," which should, at least, preserve from pitfalls some of our friends who regard heraldry merely from its decorative aspect.

The *Quarry's* most important article is the continuation of "The Mineral Industry of the United Kingdom," dealing with the counties of Huntingdon and Cambridge.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

AT the meeting of the Building Act Committee of the London County Council, on August 30, the proceedings were governed by the clause in the order of reference which empowers the Committee at certain seasons to act on behalf of the Council in relation to matters included in the order of reference. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

Lines of Frontage.

Chelsea.—One-story shop additions to No. 400, King's-road, Chelsea, to abut upon Langton-street (Messrs. J. T. Wimperis & Arber for Mrs. Hoye).—Consent.

Clapham.—Four houses with bay windows in Ravenslea-road, Battersea, and two houses with porches and bay windows on the south side of Mayford-road, to abut upon Ravenslea-road (Mr. A. Boon).—Consent.

Islington, North.—One-story shops on the forecourts of Nos. 14, 16, 18, and 20, Sussex-road, and Nos. 130 and 131, Devonshire-road, Seven Sisters-road, Islington (Mr. R. Midworth for Messrs. Crisp & Co., Limited).—Consent.

Lewisham.—That the application of Messrs. Eastman Brothers, for an extension of the period within which the erection of a house on the west side of Perry-rise, Lewisham, to abut upon Queenswood-road, was required to be completed, be granted.—Agreed.

Lewisham.—A two-story brewery building on the south side of Loampit-vale, Lewisham, at the corner of Algernon-road (Messrs. Douglas Young & Co. for Messrs. Thorne Brothers).—Consent.

Lewisham.—A one-story shop on the forecourt of No. 124, Rushey-green, Catford (Mr. H. Amer).—Consent.

Lewisham.—Six houses with shops on the site of Nos. 118, 120, 122, 124, and 126, High-street, Lewisham (Mr. A. Roberts for Mr. T. A. Belcham and Mr. A. Belcham).—Consent.

Paddington, South.—A one-story shop on part of the forecourt of No. 78, Bishop's-road, Paddington (Mr. J. W. Chapman for Messrs. Piper & Son).—Consent.

St. Pancras, West.—A one-story addition to the Regent's Park Riding School, on the north-east side of Park-village East, Regent's Park, next the York and Albany Hotel (Mr. W. Woodward for Mr. B. Perry).—Consent.

Woolwich.—One-story shop on part of the forecourt of No. 31A, Plumstead-road, Plumstead (Mr. F. Bill for Mr. A. Beard).—Consent.

Woolwich.—Temporary wooden steps to form an approach to a temporary wood and iron church on the north side of Viewland-road, Riverdale-road, Plumstead Common (Messrs. J. Rolfe & Co. for the Committee of the Plumstead Congregational Church).—Consent.

Hammersmith.—Four houses on the north-west side of Dalling-road, and five houses on the north side of Wellesley-avenue, Hammersmith (Mr. E. C. York for Mr. W. Humphrey).—Refused.

Lewisham.—A one-story shop on the forecourt of a house known as The Acacias, High-street, Lewisham (Mr. W. Howell).—Refused.

Lewisham.—Houses with bay windows on the east side of Laleham-road, Lewisham, with two of such houses to abut upon Elmer-road (Mr. H. Woodham).—Refused.

Norwood.—Six houses on the east side of Knight's Hill-road, West Norwood, at the corner of Rothschild-street (Mr. H. Bushell for Mr. P. St ck).—Refused.

Paddington, South.—A board-room and offices on the south side of Harrow-road, Paddington, at the corner of Woodfield-road (Mr. F. G. Smith for the Board of Guardians of Paddington).—Refused.

St. George, Hanover-square.—An addition to a porch and bay window at No. 27, St. George's-road, Belgravia, at the corner of Warwick-street (Messrs. Waller & Co. for Mr. P. R. Waller).—Refused.

Projections.

Battersea.—An iron and glass shelter in front of the New Grand Palace of Varieties, St. John's Hill, Battersea (Mr. E. A. E. Woodrow for the New Grand (Clapham Junction), Limited).—Consent.

Marylebone, East.—A three-story bay window at the western angle of No. 26, Upper Wimpole-street, at the corner of Weymouth-street, St. Marylebone (Mr. F. M. Elgood for Mr. V. J. Robinson).—Consent.

Marylebone, East.—A stone and iron balcony at the first floor level in front of No. 41, Welbeck-street, St. Marylebone (Messrs. Romaine-Walker & Besant for Dr. E. A. Snape).—Consent.

Paddington, North.—A projecting wooden shop-front at No. 1, Mozart-street, Paddington (Mr. E. Vigers for Messrs. Seaman & Guest.—Consent.

Paddington, South.—Bay-windows on the first, second and third floor levels in front of Nos. 111 to 121a (odd numbers only), Queen's-road, Bayswater (Mr. W. J. Gibbon for Mr. H. Gibbon).—Consent.

Strand.—A turret at the first, second, third, fourth and attic floor levels at the western angle of a building to be erected on the site of Nos. 111a and 112, Jermyn-street, St. James's, at the corner of Wells-street (Mr. R. Morphew for Mr. E. S. Morphew).—Consent.

Westminster.—Oriel windows at the first and second floor levels of a proposed block of residential flats on the east side of Great Smith-street, Westminster, at the corner of Wood-street (Messrs. F. & E. Cooper).—Refused.

Greenwich.—A projecting lamp in front of the Three Tuns public-house, No. 18, London-street, Greenwich (Mr. J. R. Johnston for Messrs. Taylor, Walker, & Co.).—Refused.

Lewisham.—That Mr. A. L. Guy be informed that the Council is not prepared to accede to his request for consent to the retention of a projecting lamp over the entrance to the Salisbury public-house, High-street, Lewisham (for Mr. C. Hutchinson); but that he be informed that an application in accordance with the Council's regulations for consent to the erection of a lamp not exceeding 5 ft. in height and 3 ft. in width would be considered.—Agreed.

Marylebone, East.—A block of buildings with projecting bay-windows, porches, and balconies on the site of Harley House, Marylebone-road, Marylebone, at the corner of Brunswick-place (Messrs. Boehmer & Gibbs for Mr. C. J. Hinsley).—Refused.

Paddington, South.—A brick, stone and iron porch over the public way in front of No. 7, Hyde Park-gardens, Paddington (Messrs. Banister Fletcher for Mr. G. N. Stevens).—Refused.

Strand.—A projecting iron and copper sign in front of No. 107, Regent-street, St. James's (Mr. R. H. Kerr for the British Mutoscope and Biograph Company, Limited).—Refused.

Width of Way.

Greenwich.—That the request of Mr. B. E. Phelps for Phelp's Metal, Limited, for permission to retain a boundary fence in front of a building at less than the prescribed distance from the centre of Riverside, Charlton, be acceded to.—Agreed.

Bow and Bromley.—A building at No. 150, Chrisp-street, Bromley (Messrs. J. & S. F. Clarkson for Mr. C. G. Randall).—Consent.

St. Pancras, East.—A coach-house and stable at the rear of No. 254, Camden-road, St. Pancras, at less than the prescribed distance from the centre of Camden-mews (Mr. G. W. Hatcher for Mr. H. Chetham).—Consent.

Whitechapel.—The retention of portions of Nos. 4, 5, and 6, St. Mary-street, Whitechapel, at less than the prescribed distance from the centre of that street (Mr. R. W. Hobden).—Consent.

Finsbury East.—An addition to the King's Arms tavern, No. 18, Moreland-street, City-road, St. Luke's, at less than the prescribed distance from the centre of Cross-street (Messrs. Eedle & Meyers for Mr. W. E. Eaton).—Refused.

Rotherhithe.—A warehouse building on the south side of St. Thomas-street, Rotherhithe, at less than the prescribed distance from the centres of Great Maze-pond and Maze-pond-terrace (Messrs. Tebbitt Brothers).—Refused.

Space at Rear.

Hampstead.—A modification of the provisions of Section 41 (1) (vi.) of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of a dwelling-house on the west side of Honeybourne-road, West End-lane, Hampstead, with an irregular space at the rear (Mr. E. Sibson for Mr. A. Davis).—Consent.

Lewisham.—A modification of the provisions of Section 41 (1) (vi.) with regard to open spaces about buildings, so far as relates to the proposed erection of dwelling-houses with shops on the site of Nos. 118, 120, 122, 124, and 126, High-street, Lewisham, with irregular spaces at the rear (Mr. A. Roberts for Mr. T. A. and Mr. A. Belcham).—Consent.

Whitechapel.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of additions at the rear of the Working Lads' Institute, No. 279, Whitechapel-road, Whitechapel, abutting at the rear on the Whitechapel and Bow Railway (Messrs. G. Baines & Son for the Rev. T. Jackson).—Consent.

Lines of Frontage and Width of Way.

Marylebone, East.—An addition over the porch in front of No. 10, Sussex-place, Regent's Park, St. Marylebone (Mr. E. H. Selby for Mr. G. Corderoy).—Consent.

Bermondsey.—An addition to the porch and the erection of a forecourt fence at the Charterhouse Mission, Crosby-row, Bermondsey (Mr. B. Ingelow for the Rev. H. V. Le Bas).—Consent.

Hackney, Central.—That the application of Messrs. Ford, Son, & Burrows for Messrs. Stapley & Smith, for an extension of the period within which the land, next Pigwell-path, was required to be dedicated to the use of the public, be granted.—Agreed.

Woolwich.—Rebuilding of the Red Lion public-house on the north side of Shooter's-hill, Plumstead (Mr. J. O. Cook for Mr. C. Beasley).—Consent.

Woolwich.—A temporary wooden bar-room next the site of the Avenue Arms beer-house, on the west side of Sandy-hill-road, at the corner of The Avenue, Woolwich (Messrs. Church, Quick & Whincop for Mr. C. Beasley).—Consent.

Brixton.—A one-story addition at the rear of the Swan public-house, No. 215, Clapham-road, in advance of the general line of buildings in Stockwell-road, and at less than the prescribed distance from the centre of Swan-mews (Mr. J. C. Jackson for Mr. R. Weller).—Refused.

St. George, Hanover-square.—An iron staircase in front of No. 208, Eaton-mews South, Eccleston-street, Eaton-square (Messrs. St. Aubyn & Wadling for Mrs. Rycroft).—Refused.

Width of Way and Construction of Building.

Whitechapel.—A wood and iron shed at the entrance to the railway arch, No. 50, Chambers-street, Goodmans-fields, Whitechapel, at less than the prescribed distance from the centre of the roadway (Messrs. Humphreys, Limited for Messrs. Chantard & Christensen).—Refused.

Width of Way and Projections.

Holborn.—Oriel windows at the first, second, and third floor levels of an addition at the rear of No. 28, John-street, Bedford-row, Holborn, to abut upon Little James-street (Mr. T. J. Anderson for Mr. T. H. Pankhurst).—Consent.

Width of Way and Height of Buildings.

Bow and Bromley.—A building, to be used as a bakery, on the east side of Fawe-street, Morris-road, Bromley-by-Bow, to exceed in height the

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width of the street (Mr. Max Clarke for Spratt's Patent, Limited).—Consent.

Strand.—Three blocks of dwelling-houses, to be inhabited by persons of the working class, on the south side of Drury-lane, St. Martin-in-the-Fields, with the eastern flanks of the blocks at less than the prescribed distance from the centre of, and to exceed in height the width of, Martlett-court, and with the forecourt boundary or fence next Crown-court at less than the prescribed distance from the centre of that street (Mr. J. Briggs for the Housing of the Working Classes Committee of the Council).—Consent.

Staircase in Public Building.

Finsbury, Central.—That the Council do make no order with respect to the application of Mr. C. R. Baker King for Mr. J. Oldrid Scott for the rector and churchwardens of St. John's, Clerkenwell, for approval of the construction of a staircase to the crypt at the north-west angle of St. John's Church, St. John's-square, Clerkenwell.—Agreed.

Formation of Streets.

Woolwich.—That an order be issued to Mr. A. H. Kersey, sanctioning the formation or laying out of a new street, for foot traffic only, to lead from Blithdale-road to Bracondale-road, Plumstead (for Mr. W. West).—Agreed.

Clapham.—That an order be issued to Messrs. D. Young & Co. sanctioning the formation or laying out of a new street for carriage traffic in continuation of Rodenhurst-road, Clapham, to lead into Park-hill (for the United Realisation Company, Limited). That the name Rodenhurst-road (in continuation) be approved for the new street.—Agreed.

Hampstead.—That the Council do approve of a variation from the plan and sections sanctioned by the Council for the formation of Cecilia-road, to lead from Ferncroft-road to Kidderpore-avenue, Hampstead, so far as relates to an alteration in the levels of that street (Mr. J Reynolds).—Agreed.

Woolwich.—That an order be issued to Mr. A. E. Habershon sanctioning the formation or laying-out of new streets for carriage traffic on the south side of Timbercroft-road, Plumstead (for Messrs. McAllister). That the names Alabama-street (in continuation), Ancaster-street, Flaxton-street, Barden-street, Cardiff-street, and Lucknow-street be approved for the new streets.—Agreed.

Woolwich.—That an order be issued to Mr. J. O. Cook, sanctioning the formation or laying-out of a new street for carriage traffic to lead from Clay-lane to Ennis-road, Plumstead Common-road (for Mr. H. W. Grant). That the name Tuam-road be approved for the new street.—Agreed.

Woolwich.—That an order be issued to Mr. J. O. Cook, sanctioning the erection of five cottages next the Red Lion public-house, and the adaptation and widening of a portion of an existing footway, in front of such cottages, between Red Lion-lane and Shooter's Hill (for Mr. C. Beasley).—Agreed.

Woolwich.—That an order be issued to Mr. J. O. Cook, sanctioning the formation or laying out of a new street, for foot traffic only, out of the north side of Shooter's Hill, Plumstead, and also sanctioning the widening of the existing roadway in front of Nos. 1, 2, and 3, Red Lion-place (for Mr. C. Beasley and Mr. H. E. Boxshall). That the name of Red Lion-place be approved for the new street.—Agreed.

Dulwich.—That an order be issued to Mr. A. S. Gover refusing to sanction the formation or laying out of new streets for carriage traffic on the Cintra Park estate, on the east side of Church-road, Upper Norwood (for the House Property and Investment Company, Limited).—Agreed.

Hackney, South.—That an order be issued to Messrs. A. H. & A. E. Simpson, refusing to sanction the formation or laying-out of new streets for carriage-traffic on the Glyn estate, on the east side of Daubeney-road, Homerton.—Agreed.

Wandsworth.—That an order be issued to Mr. W. C. Poole, refusing to sanction the formation or laying out of new streets for carriage traffic on the Magdalen College estate on the east side of Garratt-lane, Wandsworth (for Messrs. Holloway Brothers).—Agreed.

Wandsworth.—That an order be issued to Mr. E. B. l'Anson, refusing to sanction the formation or laying out of new streets for carriage traffic on the Drew estate, on the north side of Tooting-bec-road, Streatham (for the Drew Trustees).—Agreed.

Artisans' Dwellings and Open Space about Buildings.

Holborn.—That the Council do make an order as follows:—Whereas Mr. J. Briggs . . . under the provisions of sections 41 and 42 of the London Building Act, 1894, delivered on behalf of the Housing of the Working Classes Committee of the Council, at the County Hall, plans of six blocks of intended dwelling-houses, to be inhabited by persons of the working class, and proposed to be erected, not abutting upon a street, on the site of Reid's Brewery, Clerkenwell-road, Holborn, such plans also showing one block of intended dwelling-houses, to be inhabited by persons of the working class, proposed to be erected on the north side of Portpool-lane, Holborn, with an irregular space at the rear. . . . Now the Council does by this order disapprove of, and refuse to sanction, the said plans.—Agreed.

Width of Way, Artisans' Dwellings, and Open Space about Buildings.

Lambeth, North.—That the Council do make an order as follows—Whereas Mr. E. Andrews, of the Engineer's Office, Waterloo Station, London, on August 21, 1900, under the provisions of sections 13, 41, and 42 of the London Building Act, 1894, delivered on behalf of the London and South Western Railway Company, at the County Hall, plans of four blocks of intended dwelling-houses, to be inhabited by persons of the working class and proposed to be erected, not abutting upon a street, on a site between Boniface-street and Lambeth Upper Marsh, Lambeth, and of a block of intended dwelling-houses, to be inhabited by persons of the working class, proposed to be erected on the north side of Lambeth Upper Marsh, with an irregular open space at the rear, and the boundary fences of the site within the prescribed distance from the centres of Lambeth Upper Marsh and Boniface-street. . . . Now the Council does by this order sanction the said plans so far as sections 13, 41, and 42 of the said Act are concerned.—Agreed.

Means of Escape from top of High Buildings.

Kensington, South.—That Messrs. Rolfe & Matthews be informed that the Council has considered the plans and drawings submitted by them on behalf of Messrs. Jones Brothers, showing the means of escape in case of fire, proposed to be provided in pursuance of Section 63 of the London Building Act, 1894, on the topmost story of a block of residential flats to be erected on the north side of Oakwood-court, Addison-road, Kensington (the upper surface of the floor of which story will be above 60 ft. from the street level), for the persons dwelling or employed therein, and . . . the Council will issue a certificate under the said section.—Agreed.

Strand.—That Mr. W. Woodward be informed that the Council has considered the plans, dated August 10, 1900, submitted by him on behalf of the Gordon Hotels, Limited, showing the means of escape in case of fire, proposed to be provided in pursuance of Section 63 of the London Building Act, 1894, on the third, fourth, fifth, and sixth stories of an addition at the rear of the Grand Hotel, Northumberland-avenue, Strand, to abut on Northumberland-street (the upper surface of the floors of which stories are above 60 ft. from the street level) for the persons dwelling or employed therein, and . . . the Council will issue a certificate under the said section.—Agreed.

Buildings for the Supply of Electricity.

Hampstead.—Variations from the plans approved by the Council for the construction of an extension to the electricity generating station and works, Lithos-road, Hampstead, abutting on a footpath between West End-lane and Finchley-road (Mr. J. Hudson for the Vestry of Hampstead).—Consent.

Bermondsey.—A generating station and works on the west side of Neckinger, Spa-road, Bermondsey (Messrs. Kincaid, Waller, & Manville for the Vestry of Bermondsey).—Consent.

Holborn.—An electric sub-station, transformer-room, and storage-battery room on the south-west side of Tower-street, Little Earl-street, Holborn (Mr. E. C. Owen for the Metropolitan Electric Supply Company, Limited).—Consent.

Wandsworth.—A sub-station on the north side of Yukon-road, Balham High-road, at the corner of Lynn-street (Mr. C. S. Peach for the County of London and Brush Provincial Electric Light Company, Limited).—Consent.

Dwelling Houses on Low-lying Land.

Woolwich.—That the solicitor do prepare a licence, under Section 122 of the Act, to Mr. W. West, for the erection of 215 dwelling-houses on low-lying land, situate on the Church Manorway Estate, Plumstead, being fifteen houses in Church Manorway, eighty-eight houses in Bracondale-road, seventy-five houses in Birkdale-road, seventeen houses in Blithdale-road, and twenty houses in Woodhurst-road (for Mr. A. H. Kersey).—Consent.

COMPETITIONS.

POLICE-STATION, BYKER, NEWCASTLE.—A special meeting of the Watch Committee of Newcastle Corporation was held on the 29th ult., to receive the report of Mr. F. H. Oldham, of Manchester, appointed at the request of the committee by the President of the Institute of British Architects, relative to the plans sent in for the erection of a new police-station at Headlam-street, Byker. There were twelve competitors. The assessor recommended that the plan marked "Ad Reu" be accepted, that the second in place of merit was "Practical," and the third, "N. E. B." On opening the sealed letters bearing the mottoes, it was found that Messrs. Cackett and Dick, of Newcastle, were the successful competitors; Messrs. Riddle & Brown, of Newcastle, had secured the second premium, of the value of 50*l.*; and the third, Mr. B. F. Simpson, receives 25*l.*

ARCHÆOLOGICAL SOCIETIES.

NEWCASTLE SOCIETY OF ANTIQUARIES.—The monthly meeting of the Newcastle Society of Antiquaries was held on the 29th ult. in the Castle. Mr. J. C. Hodgson, F.S.A., read a paper on "Proofs of Age of Heirs to Estates in Northumberland in the Reigns of Henry IV., Henry V., and Henry VI." Mr. R. O. Heslop read a paper, contributed by Mr. Fred T. Elsworthy, F.S.A., on the "Sculptured Panel on a House-front in All Hallows Bank, Newcastle." The paper was prefaced by some observations by Mr. Heslop himself. He spoke of the interest of strangers in the contrasts in Newcastle between the ancient and the modern. This contrast was especially marked on the Sandhill, and in the thoroughfares converging upon it. The east side of the Sandhill had now become entirely modernised. The north side, fortunately, preserved to them several of its half-timber structures, in more or less complete condition, and from these it was yet possible to realise the aspect which, a generation ago, characterised the place. At once market-place and place of assembly, this great open place had, in the past history of Newcastle, played many parts. The ancient buildings served the purpose of trading on the ground floor, but rose in many tiers, lighted from end to end with window casements, the dwelling of many a good merchant. With the air of repose belonging to an earlier century, these old buildings looked down upon the struggling throng in the Sandhill, and afforded just that contrast which gave picturesqueness to Newcastle in the eyes of the stranger, and brought the past and the present face to face in a manner especially interesting. Radiating from this centre there were streets of a similar character, and of these the old Quayside used to form an example. Fire and time, however, had changed its appearance. Until quite a recent date, the Side and the Head of the Side retained many of the old half-timber buildings; but here, again, fire and the destroyer had been busy. In the lower side some examples were spared to them; of others, all that remained were the delineations in the pages illustrated by skilful draughtsmen, and their colleague, Mr. W. H. Knowles. The handrail at the upper part of the Sandhill indicated the width of the roadway previous to the explosion of 1854. A reference to Corbridge's plan of Newcastle in 1725 showed the condition of the lines of communication before the formation of Dean-street in 1787. Up to that date all the traffic from Gateshead passed over the Tyne Bridge and reached the higher part of the town either by the steep, narrow thoroughfare before them, or by the much steeper and narrower street by way of the Head of the Side. Brand told them that Pilgrim-street, growing narrower as it approached All Saints' Church, wound down the hill towards the foot of the Side, taking the name of the Butcher Bank, as being chiefly inhabited by persons of that trade; but that it had been formerly called All Hallows Bank. It was in a house in All Hallows Bank, on November 9, 1721, that Mark Akenside, physician and poet, was born. The mansion had long since been replaced by a building of dingy brick; but Local Authorities had named the thoroughfare Akenside Hill. From all these names, he preferred to select the most ancient, All Hallows Bank. Next door below the site of the Akenside shop and dwelling was a house, No. 33, which was one of the original half-timber framed houses. Each of its two stories overhung the story below it, being carried on oak beams, so that the building leaned over the roadway, like all the other similar contemporary structures. It was really a strong frame-work of oak, the brick and plaster being merely filling, which might be taken away without the building being destroyed. The basement was occupied by a shop, now modernised, and by a passage-way which gave an independent entrance to the dwelling overhead. Immediately over the entrance to the passage-way of the house was a plaster panel, artistically and skilfully carved and designed. It was lozenge shaped, and measured nearly 4 ft., and contained double fishes, like mermaids, and *fleur-de-lis*. The meaning of the panel has been a mystery till now. He had, however, communicated with Mr. Fred T. Elsworthy, the author of the "Evil Eye," in which there was a chapter dealing with such things; and, thanks to Mr. Elsworthy's explanation, the meaning of the panel was now clear. As the

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panel was over the door, its intention was manifestly to attract the observation of all who entered; and there could be no hesitation whatever in saying, added Mr. Elsworthy, that its object was that of an amulet, to protect the house and its inmates from the dreaded power of the evil eye and the machinations of witchcraft.—*Newcastle Chronicle.*

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—The Hon. Charles A. Parsons, of the Turbinia Works, Wallsend, being President of the Institution this year, it was arranged to hold the summer meeting at Tyneside. The meeting took place from August 13 to 17, and among those present, in addition to the President, were the Chairman, Mr. Basil Joy, Mr. W. J. Tennant, Mr. A. W. Marshall, Mr. L. H. Rugg, Mr. V. H. Chabot, Mr. R. A. Miles, Mr. E. Trevenen, and the Secretary, Mr. Walter T. Dunn. The programme opened on Monday morning with an inspection of Messrs. C. S. Swan & Hunter's ship and floating-dock building yards at Wallsend, under the guidance of Mr. C. S. Swan. The original shipyard was laid out in 1872. In 1883 it was found necessary to extend its area, and the ground known as the East Yard was acquired and equipped with shipbuilding machinery of the best type, and it is in this yard that workshops, sheds, and machines have been gradually introduced and kept up to date in order to cope with the building of the very largest class of merchant vessels. It is to undertake successfully the building of this class of vessel that the large ship sheds seen in the yard have been erected. They are each 500 ft. long, one being 68 ft. and the other 71 ft. 6 in. clear in width, the inside height being 83 ft. clear at the far end, and 80 ft. at the other. Each shed is provided with two electric travelling cranes, with revolving jibs working below the cranes, capable of lifting a weight of 3 tons, of travelling at a speed of 300 ft. per minute, and of making a complete revolution in a half-minute. There is also a travelling cantilever crane and an electric crane to span the third berth. The work in progress at the time of the members' visit included a floating dock for Bermuda to the order of the British Admiralty, 545 ft. long, 126 ft. wide, lifting 16,500 tons; two screw colliers; and various steamers. After partaking of the company's hospitality the party proceeded by train to Newcastle. They were there received in the Council Chamber of the Town Hall by Councillor Onbridge, Deputy Mayor. The members were shown round the building and then repaired to St. Nicholas Cathedral, over which they were conducted by the Vicar of Newcastle, Dr. E. J. Gough. Opportunity was afforded for ascending the tower. The works of the Newcastle-upon-Tyne Electric Supply Company were then visited, the engineer, Mr. J. S. Watson, explaining the mode of working the system—single phase alternating of 100 periods per second, and 100 volts pressure, transformed from 2,100 volts. Robey horizontal compound engines are employed, driving, by cotton ropes, brush alternators. Important extensions are now taking place for obtaining a continuous current supply, the plant being by Messrs. Belliss and Messrs. J. H. Holmes. The company intend to lay down a station on the riverside, and thereby overcome some of the condensing difficulties which have necessarily to be met at their existing station situated in the heart of the city. On Tuesday morning the works of the Newcastle and District Electric Lighting Company at Forth Banks were inspected, under the guidance of the engineer, Mr. W. D. Hunter. They adjoin the boiler shops of Messrs. Hawthorn, Leslie, & Co., and the plant consists of Parson's turbs electric generators. It is noteworthy that, although the total area of the engine-room is only 400 square yards, there are at present fixed generators representing nearly 1,720 kilowatts, with a provision for a total of 3,200. Sir Benjamin Browne, hearing that the Junior Engineers were at works adjoining those with which he is associated, invited them to see the Belleville and other boilers in course of construction at Messrs. Hawthorn, Leslie's. He showed the visitors round. In the afternoon the Elswick Works of Sir W. G. Armstrong, Whitworth, & Co. were visited, including the heavy gun-shops, cast-iron foundry, shops for hydraulic and electric fittings, ammunition and q.f. gun shops, torpedo tube factory, gun-carriage and heavy gun-mountings departments, finished gun stores, cartridge-case factory, and steel works. A visit in the evening to the Engineering Department of the Durham College of Science, under arrangements made by Professor R. L. Weighton, concluded the day's engagements. The 100-ton testing machine, experimental steam-engines and boilers, electric light plant, &c., were seen, and their special features indicated. Wednesday was devoted to an inspection of the works of the Tyne Improvement Commissioners, their steamer the *J. C. Stevenson* having been placed at the service of the Institution for the purpose. Mr. Little, superintendent of the dredging department, and Mr. Richmond, manager of the Howdon repairing yard, acted as guides. Embarking at Tynemouth Pier, the members first saw the operations in progress for the restoration of the north pier. The Albert Edward Dock, coal-shipping staithes, Northumberland Dock, Howdon engineering yard, Newcastle swing bridge, and other undertakings came into view. Summarising the effect of the improvements carried out, it may be stated that the shipbuilding and engineering industries have greatly increased; the height of land floods has been reduced, the tidal waters being now easily discharged. Previously all the fields on the riverside between Wylam and Blaydon, and the wharves or quays from Blaydon to the east end of Newcastle harbour were inundated. With regard to the tidal wave, its velocity has been greatly increased. Before the year 1860, high water at Newcastle bridge occurred sixty minutes later than at the entrance to the Shields harbour, a distance of 9¼ miles; it now occurs only twelve minutes later. On Thursday an excursion was made to Sunderland, the Institution having there an honorary member, Mr. Henry H. Wake, Engineer to the River Wear Commission. Leaving Tynemouth Pier by the steamer *Larmont*, provided by the River Wear Commissioners, the sea lock of the South Dock at Sunderland was entered, and here the party were welcomed by Mr. Wake. The pumping installation of No. 1 graving dock was seen, consisting of centrifugal pumps direct driven by 98 max B. h.-p. gas-engines; 10,500 tons of water can be discharged in two hours. The chain and action testing works were visited, the processes of proving being shown in operation. The hydraulic accumulator pressure is 2,000 lb. per square inch. The party were then conducted to the New South Harbour Protecting Pier in course of construction, and the block-setting radial crane driven by gas-engines was shown at work. They then proceeded to the Roker Pier, where some models were exhibited. On the invitation of the engineer luncheon was partaken of, and subsequently, in brakes provided by Mr. M. W. Parrington, viewer of the Wearmouth Coal Company, the members were conveyed to the Hylton Colliery belonging to that company, and situated about two miles above Sunderland. Sinking was commenced in July, 1897, the pits being three in number. Two with a finished diameter of 20 ft. each are coal-drawing shafts; the third, 15 ft. diameter, is intended for use entirely as a ventilating shaft. The load of coal per wind will be 4½ tons. There will be two horizontal winding engines (one of which is already at work), cylinders 34 in. diameter and 6-ft. stroke, the drum being 20 ft. diameter of the plain cylindrical type. The members descended and walked on to the working face, the details of sinking and other operations being pointed out by Mr. Parrington and other gentlemen. After being entertained by him the party returned to Newcastle by rail. The Allhusen Works of the United Alkali Company at Gateshead were visited on Friday morning, Mr. Alfred Allhusen showing the members over. The works cover an area of 94 acres. The members crossed the river by steam launch provided by Messrs. Hawthorn, Leslie, & Co., and went on board the torpedo-boat destroyer H.M.S. *Cobra* lying off Messrs. Parsons & Co.'s Wallsend works, and fitted with their steam turbines. In the evening the summer dinner of the Institution was held at the County Hotel. The President having been called away to Portsmouth Mr. Basil Joy, the Chairman, presided in his absence. After observance of the usual loyal toast, that of "The City of Newcastle-on-Tyne" was proposed by the Chairman, and was acknowledged by Councillor Onbridge, the Deputy Mayor. "The Port of Sunderland" was submitted by Mr. A. W. Marshall, and responded to by Mr. Henry H. Wake. Mr. W. J. Tennant gave "The Proprietors of the Works, &c., open to the Visit of the Institution," to which Mr. F. T. Marshall and Mr. C. S. Swan replied. At this stage a presentation, consisting of a silver tea service, was made to the Secretary, Mr. Dunn, in recognition of his efforts in organising and carrying through the arrangements of the meeting. The toast of "The Institution of Junior Engineers" was proposed by Sir Benjamin Browne, and the Chairman responded to it; that of "The President and the Chairman" having been given by Mr. B. T. King, and acknowledged by Mr. Joy, the proceedings shortly afterwards terminated.

Illustrations.

SESSIONS HOUSE, OLD BAILEY.

WE publish this week the ground-floor plan, the court-floor plan, and the exterior perspective view of Mr. H. L. Florence's design submitted in this competition.

Mr. Florence writes that in the preparation of the design he considered that as the courts were on the first floor it was inadvisable to give any great height to the ground floor; a mezzanine floor was also to be avoided, also, that each court should have windows on at least two sides, and not trust entirely to lighting and ventilating through double skylights.

In Mr. Florence's report he calls attention to some of the chief features of his design.

"The various departments, so far as it has been possible to group them, have been kept distinct. Thus the courts and the public attending them are concentrated at the centre of the site, the offices upon the Newgate-street front, and the Lord Mayor's and judges' apartments next to the courtyard.

The tower in the position shown is rather suggestive than absolute, as this could without loss of purpose or dignity be placed immediately over the principal entrance in the Old Bailey. A glance at the elevation will at once illustrate this; but as the perspective view shows, the grouping of the parts would be better were it in the position assigned to it.

The corridors on the Old Bailey front serve the double purpose of providing direct and easy communication between the various departments on each floor, and of screening the courts from all noise proceeding from the adjacent streets.

The principal entrance is placed in the centre of the Old Bailey façade. In this position it is away from the more congested traffic of Newgate-street, and has the full advantage of the greater space caused by the thoroughfare being considerably wider at this point.

Reference to the ground floor plan will immediately reveal the principle upon which the building has been planned. The public are concentrated in the centre of the building, entering by the principal entrance in the centre of the Old Bailey façade. Once within the doors they are restricted to the places set apart for them, and have no reason for going beyond these limits unless specially conducted or directed. The indictment and other offices are contiguous, and in easy communication with the waiting-rooms and public entrance hall.

The two public staircases open directly from the entrance hall. They are centrally placed, are commodious, and lead directly with equal convenience to all the courts on the floor above. Passenger lifts could be provided in the well holes if desirable, but the rise being only to the court floor they are, it is thought, unnecessary. The offices assigned to this floor are grouped together, and are entered from their own particular corridor. They are so designed and arranged that the whole can be used independently of the remainder of the building. Between the Sessions, the courts, and all parts of the building working in connexion therewith, can be closed and locked up without in the slightest degree interfering with the working or completeness of the offices.

The entrance to the official department from the street immediately faces a spacious staircase with passenger lift, which is in convenient communication with the offices and the courts above and the record rooms below. Persons having business with this department do not come in contact with the public attending the

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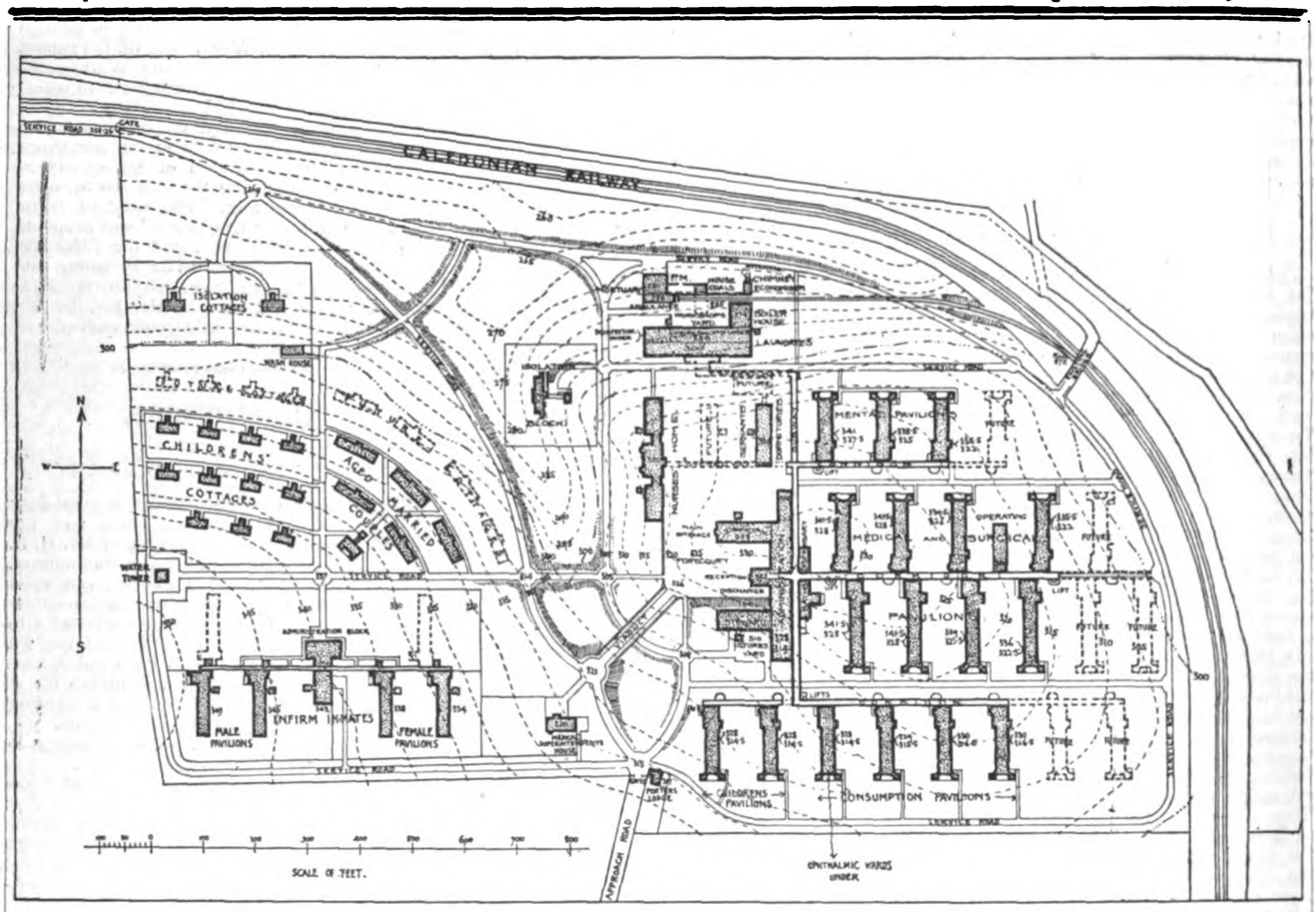

General Hospital, Stobhill, Glasgow. Block Plan.

courts. The barristers' entrance is placed to the south of the principal entrance, and immediately communicates with the staircase to the bar, robing, and other rooms upon the second floor and the courts on the first floor. If thought desirable it would be convenient for the juries to enter here also, away from the general public, in which case they would immediately proceed to the room set apart for them at the end of the corridor.

The Lord Mayor and judges' entrance opens from the courtyard in the Old Bailey, and has no communication upon the ground floor with the remainder of the building. A spacious and dignified entrance hall and staircase gives direct access to the suite of apartments upon the court floor above. The courtyard itself is large, being 64 ft. by 50 ft., giving ample room for the State coach to enter and leave without difficulty.

The same principle of planning has been followed on the court floor as upon that below. The general public are still confined to the centre of the site in the upper hall, from which the courts are approached. This is a spacious and dignified feature of the plan, it being 26 ft. wide, and extends from the front to the rear of the site. Around this hall are grouped the four courts, each having its entrance for the public opening therefrom, while those for the barristers and solicitors open from adjacent corridors. It will be seen upon reference to this plan that the latter can in all cases be approached without the necessity of passing through the public hall. The corridor on the Old Bailey front would be of the greatest convenience to barristers and solicitors and their clerks, and would answer the purpose of the lobby in the existing old buildings. The courts themselves have received special study in order to, as far as possible, make them acoustically perfect. In each case the width is some multiple of the length, and all the ceilings are coved and sufficiently broken to prevent echo or reverberation. The walls are panelled with oak giving the advantage of its resonant qualities. Each court has a handsome ceiling light which of itself is sufficient to thoroughly light it, but there are large side windows provided in addition."

Mr. Florence proposed that the building should be carried out in Portland stone from the brown bed as being the most suitable material for the London atmosphere.

GENERAL HOSPITAL, STOBHILL, GLASGOW.

FIRST PREMIATED DESIGN.

IN the recent competition for the General Hospital at Stobhill, near Glasgow, the problem set to competitors by the Glasgow Parish Council was to provide accommodation for 1,200 patients subdivided as follows :—

1. In "hospital proper" for 800 patients of both sexes in equal numbers.
2. Accommodation in "separate or ordinary wards or detached cottages" for 100 healthy children under five years of age.
3. Wards for 240 ordinary infirm cases of both sexes.
4. "Separate cottages or other buildings" for thirty aged married couples.

The conditions further stated that in the "hospital proper" provision was to be made for mental and epileptic cases and phthisical patients, the average numbers of each class being given. It was also made a condition that all the wards were to be so designed as to allow of their being easily converted from one class to another, and the hospital was to be capable of easy extension. A detached home for 100 nurses was required and a residence for the medical superintendent.

It was stated in the conditions that the Council desired a "general hospital on the best modern lines, containing accommodation and all relative buildings and arrangements in the most complete and perfect form." The site comprises about 53 acres. As will be seen from the contour lines on the block-plan, there are great diversities of level, and the difficulty was to place the buildings upon the site in such a way as to avoid great expense in navvy work and at the same time preserve the proper relationship between the different sections. For this reason, as well as for its general suitability in other respects, the eastern portion of the site is appropriated in this design to the hospital proper and its adjuncts. The infirm wards are placed on the western portion near the south boundary, and the cottages for aged married couples and children are disposed in groups to the north, all with due regard to the levels and the contour of the ground.

The main entrance gates are placed at the end of the approach road from the south, and from this point roads lead to all parts of the site. The road to the hospital, after passing the medical superintendent's house, crosses the valley by means of a viaduct, and then enters the main forecourt in front of the general administrative block. This block is arranged as an ∃-shaped building. The northern wing is the official block, and contains the usual offices, laboratory, museum, clinical room, and boardroom. On the upper floor of this wing there are rooms for the medical staff with a self-contained suite for the matron having access by a separate staircase. The nurses' mess-room and accommodation for matron's stores and patients' clothes occupy a one-story building forming the northern half of the stem of the ∃, while the southern half contains the kitchens, sculleries, and maidservants' mess and sitting rooms. The south wing contains part of the kitchen stores, with a suite of rooms for the steward and a mess room for the men at the west end. The sleeping accommodation for the latter is on the upper floor of this wing. The stewards' stores occupy a lower ground-floor under the south wing and maidservants' mess and sitting rooms, and communicate by lifts and staircase with the main floor. The stores are also in direct communication, through the subways, with all the wards and the laundry. From the stores' yard there are service roads to all parts of the site, while a short road gives direct access from the main entrance gates.

The central projection of the ∃ is devoted to the accommodation for the reception of patients, and their discharge-rooms are situated contiguous thereto. A short lobby gives access at right angles to the main north and south corridor, which runs behind the administrative block and is level throughout its course. This lobby is continued on beyond as the central corridor, on which the medical and surgical wards and operating-rooms are grouped. Two bed-lifts are provided in the wells of the stairs, and a lift, capable of receiving a small trolley, is placed for the use of each pair of wards. These and all other lifts go down to the subways as well as up to the first floor. At the junction of the main and central corridors are arranged the assistant matron's and night superintendent's office, the dispensary, kitchen servery, and linen store delivery, while close by there is a suite of baths. In arranging the

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south corridor advantage was taken of the rapid fall of the ground to approach the south corridor wards at the level of their upper floors. By this means greater protection from the north and north-east is obtained for the consumption blocks, while a larger amount of sunlight is admitted to the ends of the central wards. At the junction of the main and south corridors a lift hall is placed fitted with bed and trolley lifts. The north corridor gives access to the mental and epileptic wards, and is furnished with one bed-lift in the well of west staircase and a trolley-lift to each block. This corridor continues westwards as a covered way to the maidservants' dormitory block and nurses' home. A staircase at its junction with the main corridor gives access to the subway, which, continued on, rapidly runs out of the ground and becomes a covered way to the laundry.

The general character of the wards is sufficiently explained by the illustrations. The consumption wards were arranged for fewer patients, and an extra large dayroom was provided at the end of the ward, and also additional balcony space. Ophthalmic wards were arranged on the lower floor in one of the south corridor blocks. No fireplaces are provided anywhere in the hospital, the intention being to warm and ventilate the building on the Plenum system. All the ward blocks, with the exception of one, have their ground-floors raised sufficiently high above the ground to procure a through draught. A blow-through is also arranged wherever possible across the corridors, both below the ground floor and the first floor.

The laundry block consists of officers' and patients' laundries, kept distinct throughout, and so arranged that all the workrooms can be seen from the laundress's central office. There is also a foul washhouse in connexion with the patients' laundry. The drying-rooms are arranged in pairs, so that, while clothes are being dried by hot air in one, the other is supplied with cool air, and may be undergoing the process of recharging or discharging. Below the laundry on the north side the engine-room and workshops are arranged, with a disinfector under the foul washhouse. The boiler-house is close by, the coal bunkers being so arranged that they could be used either for hand or automatic feeding. An economiser was proposed, and, contiguous to the chimney-shaft, a destructor. A railway siding is brought into the workshops' yard.

Close by is the mortuary block containing mortuary, mortuary chapel, friends' waiting-room and conveniences, and a post-mortem room.

A small isolation pavilion within a 50-ft. ring fence is provided for doubtful cases. In the event of patients needing removal to a fever hospital it was intended that they should be taken out by the gate at the north-west corner of the site, thus avoiding the regular traffic. The same gate would also be available for funerals.

Provision is made for the children in ten cottages, with a spare one always lying idle in case of epidemics. Each contains a day-room, kitchen, dormitory, and foster-mother's sitting and bed room, with bath, water-closet, &c. Two pavilions are provided similar to the others for isolating cases, and there is a small washhouse for napkins.

In planning the infirm wards it was deemed advisable to separate their domestic administration from that of the hospital proper. A separate block was accordingly provided, containing a small kitchen and accommodation for a housekeeper, and the necessary staff of attendants and servants. The wards are on two floors, and each consists of a dayroom with balcony, dormitory for thirty beds, kitchen and larder, with lavatory, bath, and water-closet accommodation. These last are arranged so as to be convenient both to dayroom and dormitory. It was intended to heat this section by hot-water radiators, with open fires in dayroom.

The aged married couples are accommodated in five cottages. Each couple has a room arranged as a bed-sitting-room, and there is a common scullery and two sets of water-closets in each cottage. A common-room and central coal store is grouped with the cottages.

The buildings have been treated very simply, it being stipulated in the conditions that the materials were to be brick, with stone cills and lintels, and all expensive ornament was to be avoided. The roofs were to be covered with slate and the flats with asphalt. Internally terrazzo floors were proposed, with Keen's cement wall finishings, and high tile dados in the annexes.

The authors of this design are Messrs. Robert Weir Schultz and Edward Page Howard, of Gray's Inn-square, W.C.

HOUSE, CHRISTCHURCH, NEW ZEALAND.

THIS is a view of a house recently built at Christchurch, New Zealand, the architect being Mr. S. Hurst Seager, an Associate of the Institute of British Architects.

It is not very often that we have illustrations of architectural work from New Zealand. This example seems to show that some fashions in English house architecture are in course of being reproduced at the Antipodes.

127-131, CHARING CROSS-ROAD, W.C.

THESE new premises have recently been erected in Charing Cross-road for Messrs. Goslett, builders' merchants. The site has a frontage of about 53 ft. and a depth of about 40 ft. The materials used are Portland stone and red brick facings, and the roofs are covered with green Westmoreland slates. As to the exterior, the ground and first floors have been grouped together, and an attempt has been made to make this portion as bold as possible; they serve to indicate the show-rooms. On the upper floors are the offices and store rooms. The general contractors were Messrs. E. Lawrance & Sons. Mr. Gilbert Seale is responsible for the carving to the main cornice. Messrs. Waygood supplied the hydraulic lift, and the N.A.P. Window Company supplied the steel casements. Mr. Banister F. Fletcher is the architect.

Correspondence.

To the Editor of THE BUILDER.

"THE ART AND CRAFT OF GARDEN MAKING."

SIR,—Whilst thanking you most sincerely for your kind and generous words about my work in connexion with this book in your recent criticism of it, will you allow me space in your next issue to say that the circular garden seat referred to on page 146 was designed by Mr. Mawson himself, and does not occur in Mr. John P. White's latest catalogue of garden seats from the Pyghtle Works, Bedford, as you infer? C. E. MALLOWS.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

9. ALTERNATING CURRENT MOTORS—ROTATING MAGNETIC FIELDS — INDUCTION MOTORS.

ONE of the great drawbacks to adopting alternating currents as the system of supply ten years ago was that it could not be used for supplying motive power, as no commercial motor had then been invented. It was known that one alternator could drive another as a motor, but then this second alternator had to be run up to full speed by some other agency before it could be switched on to the mains. It was also known that an ordinary direct current series motor would work on an alternating current circuit, and when the field magnets were laminated in order to prevent eddy currents being generated in them by the alternating magnetic flux, a self-starting motor was obtained which seemed theoretically to be very promising. The torque on the armature of such a motor is always the same way round for the field magnetism, and the current in the armature change sign together, and, therefore, the torque, which is proportional to the product of these two quantities, is always of the same sign. In practice, however, it was found that there was excessive sparking at the brushes and that the power factor was very low.

A direct current shunt motor will work with alternating currents, provided that the difference of phase between the currents in the shunt coil and armature is not too large. It starts with a good torque, but then, when it gets up speed, the currents in the armature and shunt coil get so far out of phase that the torque gets very feeble. Other forms of commutator motors have been tried, but none are commercially successful.

If we have two alternators running at exactly equal speeds, and we join their terminals, then Dr. Hopkinson showed that the phases of their E.M.F.s would so adjust themselves that they would be always opposing one another, so that the current round the circuit would be a minimum. It follows that the current would be flowing in the same direction as the E.M.F. in one of the armatures, and in the opposite direction in the other. Hence one of the alternators will act as a generator and drive the other as a motor. Both the generator and the motor run at exactly the same speed, and a considerable load can be put on the armature pulley of the motor without altering the equality of their speeds. This load alters the phase difference between the two machine E.M.F.s, and when it reaches a certain amount the regulating action of the electrical forces breaks down and the motor slows down the large currents then set up blowing the fuses.

An alternator used in this manner is called a synchronous motor and is very suitable for use in long-distance transmission power schemes. Its efficiency is high, and if the excitation of its field magnets is properly adjusted, its power factor is also high. Various devices have been invented to start this motor, but it always needs to be started on a loose pulley, which handicaps it when compared with some of the other motors described below. It also needs direct current to excite its field magnets. Its property of running exactly in step with the alternating current makes it of great use for various electrical devices for commuting the alternating current into direct current or for studying the light from an alternating current arc, getting the shape of the wave of the applied E.M.F., &c. In the Ferranti rectifier, for example, which is extensively used in this country for arc lighting, the commutator is driven by a small 1-h.p. synchronous motor. This motor, being of necessity exactly in step with the alternating current, connects one of the external mains to one pole of the alternator for half a period by means of the commutator, and for the next half-period this main is connected to the other pole. In the same way the connexion between the other external main and the poles of the alternator is periodically altered, so that the current in the external circuit is always in one direction, and so direct current arc lamps can be used.

In practical work the main point to be attended to in a synchronous motor is the excitation of the field magnets. If the excitation be not strong enough it will take a large current. As we increase the excitation the current gets smaller up to a certain point, where it begins to increase again. Hence we vary the excitation by putting in or cutting out resistances in the exciting circuit until we make the current the motor is taking a minimum. In this case the current is exactly opposite in phase to the motor E.M.F. If we now gradually increase the excitation of the generator, the current diminishes up to a certain point and then begins to increase again. If we adjust the excitations alternately until we get the minimum current in each case, we can reduce the current very considerably and obtain a high-power factor.

It is owing to this action and reaction of two alternators that it is possible to run them in parallel. We have seen that two alternators running in series produce E.M.F.s which oppose one another—that is, they make the poles connected together of like polarity. Hence at one instant one connecting main is positive and the other negative, and at the next instant their polarities are reversed. If we connect these mains with lamps it is obvious that both these machines will now help to supply the lamps with alternating current. It is easy to show that if one of the alternators tends to quicken then the electrical pressures are altered so that a greater load is thrown on this machine, and at the same time the load on the other machine is lightened, or even in extreme cases it may be driven as a motor. Hence equality in speed is soon re-established. The stable position of the E.M.F.s is when each machine is taking part of the load.

In order to understand the action of induction motors, which form about 80 per cent. of the alternating current motors of the present day, it is necessary to consider the action of rotating magnetic fields. In a rotating magnetic field

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the direction of the magnetic force is continually revolving. If we move a permanent magnet round a small compass needle, keeping the same end of the magnet always pointing to the needle, then we produce a rotating magnetic field at the centre of the small compass. The needle at any instant points out the direction of the magnetic field, and its angular velocity measures the velocity of rotation of the field.

Now if we place two bars of iron at right angles to one another whose axes point in the directions B' O B and A' O A (fig. 1), then if

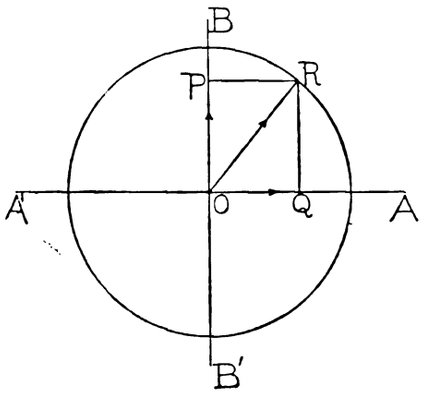

Fig. 1.

we magnetise them periodically, first in one direction and then in the other, we get in certain cases a rotating magnetic field at O. Suppose initially that O P represents the force due to the first magnet, and O Q that due to the second. Then, as in statics, the resultant force is O R, which is the diagonal of the parallelogram constructed on O P and O Q as adjacent sides. The needle of a compass placed at O would point in the direction O R. Now if the magnetism of the first magnet be diminished, and of the second increased, then O P will diminish and O Q increase, and hence O R will be brought nearer to O A. When the first bar is demagnetised O P will be zero and O R will coincide with O A. If the first bar be now magnetised in the reverse direction O R will come below O A, and when O Q is zero then O R will point along O B'. If the magnetism of the second bar be now reversed so that Q comes between O and A' then O R will be between O B' and O A'. Hence we see that by periodically varying the magnetism in the two bars we can make O R rotate continually round O.

If the strength of the resultant field (O R) always remains constant then we get a circular rotating field. In this case it is easy to see that the magnetism in the two bars differs in phase by a quarter of a period—that is, when one has its maximum strength the other is demagnetised and *vice versa*. If the phase difference be not a quarter of a period then in general R lies on an ellipse, which in the particular cases when the phase difference between the magnetism of the two bars is zero, or half a period, becomes a straight line, and the magnetic field is now merely an oscillatory one.

If we take a bundle of iron wires and wrap a few turns of insulated copper wire round them, and then pass an alternating current through this wire, we get an alternating current electro-magnet. The polarity of the ends of this magnet changes many times a second. Hence at its ends there is a powerful oscillating magnetic field, which will attract a piece of iron towards it just like a direct current magnet. If a solid iron bar were used as the core then it would heat excessively, owing to the large eddy currents that would be induced in it by the alternating magnetic flux. For this reason the iron cores of alternating current magnets are always either laminated or made up of a bundle of iron wires insulated from one another so as to reduce the eddy currents to a minimum. The energy required to magnetise the iron circuit is now much less, and so also is the current it takes at a given voltage.

In fig. 2 the apparatus required for producing a powerful rotating magnetic field is shown. A, B, C, and D are the terminals of four electro-magnets, which are joined in pairs as in the figure. Now if A D forms part of an alternating current circuit a powerful vertical oscillating magnetic field will be set up between the two magnets. Similarly, if C B forms part of another alternating current circuit, a powerful horizontal oscillating magnetic field will be set up in the same space. At any instant the direction of the magnetic field is got by compounding the strengths of the fields due to each pair of magnets respectively by the parallelogram law. Suppose

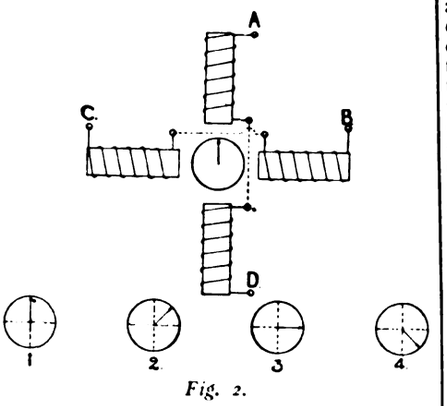

Fig. 2.

that the phase difference between the two alternating currents exciting the magnets is a quarter of a period. Then, when the current in the coil A D is a maximum, the current in B C will be zero. At this instant let the direction field be as in 1. An eighth of a period later the current in A D will have diminished and that in B C will have increased, and the direction of the field is shown in 2. A quarter of a period later there will be no current in A D, and the current in B C will be a maximum. The direction of the field is shown in 3, and similarly three-eighths of a period from the start the direction of the field will be as shown in 4.

In practice the alternating current goes through all its cycle of values from fifty to a hundred times per second, and the magnetic field rotates at this rate. If we place a pivoted magnetic needle in a rotating field it will rotate with the same angular velocity, and hence it is practically invisible. Pivoted iron discs or cylinders will rotate in a similar manner. They need not necessarily be of iron, as when they are made of copper or brass they also rotate owing to the repulsion set up between the magnetic field and the eddy currents it induces in the solid metal. A brass ball resting on a plate will rotate very nearly as rapidly as the magnetic field in which it is placed.

If we place in the rotating field an armature formed of iron discs mounted on a spindle, and if the iron discs be perforated with holes near their circumference in which copper rods are inserted, the ends of the rods on each side being joined together, then we get the ordinary armature of an induction motor. It forms as it were a squirrel cage of copper rods filled up with iron discs. The rotation is due partly to the magnetic friction giving rise to a tendency on the part of the iron to remain magnetised in the same direction, and partly to the action of the field on the large currents induced in the copper rods. This latter action, however, is much the more powerful. Motors which depend merely on the former action are unsuitable for doing heavy work. They are generally called hysteresis motors. If we put in copper conductors in their armatures so as to get large induced currents, then the power we can get from them is largely increased.

In polyphase systems such as are common abroad it is very easy to get rotating magnetic fields, and hence the polyphase motor can be made very simply and is consequently cheap. With ordinary alternating currents, however, it is much more difficult. As a rule the motors must be started on a loose pulley, and many ingenious starting devices are employed. A usual device is that of Messrs. Brown, Boveri, & Co., who use two circuits at the start, and make the difference in phase between the currents in them as near to quarter a period as possible in order to get a strong rotating field. This is managed by putting an electrolytic condenser, which consists simply of iron plates placed in a solution of soda contained in an enamelled iron vessel, in series with the starting coil. Once the motor gets up speed the current in the starting coil is switched off, and the load can be put on the pulley.

One drawback to the use of alternating current motors from the Central Station engineer's point of view is that most of them take an abnormal current in starting, and hence produce a blink in the light supplied by glow lamps connected to the same mains. For this reason very stringent rules are laid down insisting on the use of starting resistances to diminish this momentary demand for a large current. In Bradford there are between three and four hundred motors in use, and the demand for power is about 20 per cent. of the demand for light. On the Continent there are towns where the demand is even larger. In the City of Frankfort for the year 1898 the proportion of power units sold to the total sale of units was 58 per cent. In this case the bulk of the power is supplied for working electric tramways. The alternating current motors are coupled direct on to continuous current dynamos, which feed the trolley wire at a pressure of 500 volts.

Dr. Silvanus Thompson calls the rotating part of an alternating current motor the rotor, and the stationary part the stator. In some motors the current is supplied to the rotor by means of two slip rings, and in others it is applied to the stator. A simple squirrel-cage rotor is only used for small motors up to about 5 h.-p. owing to the large starting current that this motor takes. For larger sizes slip rings are fastened on the rotor, and the rotor currents are prevented from becoming excessive at the start by introducing resistance between these slip rings. This resistance is cut out when the motor gets up speed.

The following numerical example illustrates the economy that can sometimes be achieved by the use of this kind of motor. At Worcester a 30 h.-p. motor is employed at the Corporation waterworks to drive a three-throw horizontal pump by means of a belt. As it is only a day load the electric-lighting station supplies it with current at 1½d. per unit. The result of a test showed that it pumped 95,000 gallons of water 300 ft. high in nine hours and thirty minutes. It consumed 168 units in this time. The average power required by the motor is therefore $\frac{168}{9 \cdot 5}$ kilowatts, *i.e.*, twenty-four horse-power. The brake horse-power is $\frac{95{,}000 \times 10 \times 300}{33{,}000 \times 570}$ *i.e.*, 15. The percentage combined efficiency of the motor and pump is $100 \cdot \frac{15}{24}$ *i.e.*, 62. This result is very satisfactory, as the frequency of the alternating current at Worcester is 100, which is very high for motor working. With larger motors working on circuits where the frequency is lower much higher efficiencies have been obtained.

OBITUARY.

MR. E. WYNDHAM TARN.—We regret to record the death of Mr. E. Wyndham Tarn, the well-known author of the following works:—"Mathematical Sciences in their Relation to Architecture" (prize essay); "Stability of Domes;" "Admeasurement of Sky in Cases of Light;" "Science of Building;" "Practical Geometry for the Architect, Engineer, and Surveyor;" "Elementary Principles of Carpentry," from the work of Thomas Tredgold, with additions and corrections and a treatise on Joinery; "Construction of Roofs;" "Light;" "The Dome of St. Sophia at Constantinople;" "The Mechanics of Architecture;" &c. Mr. Tarn had given special attention to applied mathematics in relation to architectural construction, and his publications formed the principal treatises, in a convenient and economical form, on this department of architectural study, at a time when architectural literature of this kind was less available for the student than it is at present.

GENERAL BUILDING NEWS.

FREE CHURCH, CULLEN, BANFFSHIRE.—The new Free church at Cullen was opened on the 29th ult. The new building, which stands in front of the old church, now transformed into a hall, faces Seafield-street, and is constructed of freestone from Elgin. In front, a tower rises to a height of 90 ft., and in the centre of the front gable is the doorway, approached by a flight of granite steps. Over the doorway the gable is pierced by a traceried window. The church is lighted on each side by four double-light windows, while in each wall at the further end to right and left of the pulpit is a small gable with traceried windows. The internal finishings are of pitch-pine, stained and varnished. The roof is of wood, supported on five arched ribs, and finished with a cornice and mouldings. Opposite the pulpit and over the vestibule a gallery has been erected, the front of which is carved and panelled. The church, which has been built from designs by Messrs. D. & J. R. M'Millan, architects, Aberdeen, will accommodate 435 persons, and has cost about 2,300*l.*

WESLEYAN METHODIST CHAPEL, BRADFORD.—Kirkgate Wesleyan Methodist chapel, Bradford,

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was reopened on the 2nd inst. after various alterations had been carried out. The work was executed under the supervision of the architect, Mr. Edgar H. Parkinson.

CONGREGATIONAL CHURCH, SEAFORTH, LANCASHIRE.—The new Congregational church at Seaforth adjoins the school-chapel, and has frontages to Elm and Gladstone-roads. The nave is 38 ft. 3 in. wide, with arched arcades on either side, ambulatory aisles, and trancepts, also an end gallery over the vestibule. The church will seat close upon 600 people including the choir, which is arranged in stalls on a raised dais in front of the rostrum. The organ chamber is in an arched recess at the back of the rostrum. The entrance to the church is by two porches in Elm-road front, with wide vestibules under the gallery. The total length is 70 ft. 6 in. The church may be entered from the present school-chapel or from Gladstone-road by a side door. In this part there is a deacons' vestry, a minister's vestry and lavatory, also a wide passage, which will be used as an assembly-room for the choir. Over the deacons' vestry is the church parlour, which is approached by way of the gallery of the school-chapel. The exterior treatment is in common brick, with Whiston stone dressings, and the roof is covered with American unfading green slates. The gallery window is of five lights, with traceried and cusped fillings to the arch. The clearstory and transept windows have also traceried heads. The interior has the surface of the walls finished in plaster, and the joiners' work in pews, rostrum, choir stalls, &c., is of American canary white wood, stained green and varnished. The roof is pitch-pine unvarnished, with shaped and trussed principals, and is open to the ridge, and sheathed on the under-side of the spars with boarding. The flooring is in pitchpine boards, laid solid on sleepers embedded in a concrete floor, and the outer porches are tiled. The ventilation is combined with the heating arrangements, with air inlets connected with hot-water radiators. The church will be illuminated by the electric light. The architect is Mr. J. H. Cook, Liverpool. Mr. James Holme, Seaforth, was the general contractor, with the following sub-contractors: — Joiner's work, Messrs. Haugh & Pilling, Liverpool; slating and plastering, Messrs. Henry Johnson & Sons, Liverpool; masonry, Mr. John Green, Everton; plumbing, Messrs. Joseph Fowles & Sons, Liverpool; heating, Messrs. Dargue & Griffiths, Liverpool; electric lighing, the Liverpool and District Electric Lighting Company. The communion table and chair were supplied by Messrs. Jones & Willis, Liverpool.

WESLEYAN METHODIST CHAPEL, USHAW MOOR, NEAR DURHAM.—A Wesleyan Methodist chapel was opened at Ushaw Moor on the 1st inst. Mr. J. W. Taylor, of Newcastle, was the architect.

BOARD SCHOOL, BLANTYRE, LANARKSHIRE.—On the 30th ult. a new Board school in Auchinraith-road, Blantyre, was opened. The building is one story in height, and will accommodate 650 scholars. There are ten classrooms. Mr. A. Cullen, of Motherwell, was the architect.

ELECTRIC-LIGHTING STATION, VICTORIA EMBANKMENT.—An electrical-lighting station is in course of being built on Victoria Embankment, on the north side of the Charing-cross Station of the Metropolitan District Railway, for the London County Council's Engineering Department, by Messrs. Holloway Bros., contractors. The new building is of stone, and the hipped roof of green slate carries a cupola, octagonal on plan.

DISPENSARY, EXMOUTH.—A new dispensary building is to be at once erected at Exmouth, Devon, from designs prepared by Mr. Ernest E. Ellis, architect, of the Strand, Exmouth.

COTTAGE HOSPITAL, MORECAMBE.—The foundation stone was laid on the 30th ult. of the Morecambe Queen Victoria Cottage Hospital. The building will cost about 2,500*l.* Mr. S. Wright is the hon. architect, and the contracts have all been let to local firms.

CONSTITUTIONAL CLUB BUILDING, ALEXANDRIA, DUMBARTONSHIRE.—A new building is about to be erected in Bank-street, Alexandria, for the Vale of Leven Constitutional Club. The cost will be about 2,300*l.* Messrs. Boston, Menzies, & Morton, Alexandria and Greenock, are the architects, and the following are the contractors:—Mason, Mr. Robert Bisland; joiner, Mr. James Shearer; slater and plasterer, Mr. James O'Conner; and plumber, Mr. Thomas Taig—all of Alexandria.

BUSINESS PREMISES, GLASGOW.—A company has been formed to acquire a block of buildings in Argyle-street, Glasgow. The buildings are to be remodelled and converted into premises for the Glasgow Central Stores, Limited. The site is bounded by Argyle-street on the north, Dunlop-street on the east, Turner's Court, &c., on the west, and the new street opposite St. Enoch Station on the south. The plans have been prepared by Messrs. Ernest Runtz & Co.

YOUNG MEN'S INSTITUTE, MOTHERWELL, LANARKSHIRE.—A Young Men's Institute was opened at Motherwell on the 31st ult. by the Right Hon. Lord Kinnaird. The building consists of reception-room and social parlour, secretary's office, a large apartment to be used as a dining-room, classroom, or boardroom, photographic dark-room, baths and spray rooms, gymnasium, a hall to accommodate nearly 300, recreation-rooms reading-rooms, cycle store; and in the building it is intended to locate a telephone public call office. The whole building is lighted by electricity. The corridors, gymnasium, and hall are heated by hot-water pipes distributed by means of radiators situated in various parts. The architect is Mr. Alexander Cullen, F.S.A. (Scot.), Motherwell, whose design was placed first in competition, Mr. R. A. Bryden, being the assessor. The building is situated on rising ground at the top of Brandon-street. The estimated cost, including painting, furnishing, electric lighting, and cost of site, is 5,500*l.*

BATHS, KELTY, N.B.—Public baths are being erected at Kelty, near to the public library and public schools. Mr. John Houston, of Dunfermline, is the architect. The contractors for the work are:—Masonry, Mr. Benjamin Simon, Kinross; joinery, Mr. T. Rutherford, Maryborough; plumbing, Messrs. A. Rolland & Co., Dunfermline; plastering and tile work, Mr. R. Macintosh, Markinch; and slating, Messrs. T. Steel & Son, Glasgow.

UNDERGROUND CONVENIENCES, LEICESTER-SQUARE.—The Board of Works for the Strand District have recently erected some conveniences under the footway and part of the carriage-way on the north side of Leicester-square. The demand for this accommodation was considered to be large, and a space of internal dimensions 74 ft. long by 20 ft. wide and 9 ft. 6 in. in height for men and the same width and height for women, but 31 ft. in length (giving about 13,000 cubic feet in the one case and 6,000 cubic feet in the other), has been provided at a cost of about 4,000*l.*, with the following accommodation:— Men: water-closets, 13; lavatory basins, 10; urinals, 29. Women: water-closets, 7; lavatory basins, 5; urinettes, 3. Toilet-tables and lavatory basins are provided in private dressing-rooms, one for men and one for women. The work of construction has been carried out by Messrs. Finch & Co., of Belvedere-road, on the plans and specification of the surveyor. The details are as follows:—The walls to dado height, of polished marble, surmounted with an ornamental coloured and moulded glazed brick dado rail, and with white glazed brickwork to the freize course, which is of similar moulded glazed brick, the freize being finished in Parian cement prepared for painting, covering the water-pipes and electric wires which are, as much as possible, concealed; the steel girders carrying the pavement lights are encased in "Jhil-mil," finished alike in Parian cement. The ceiling under carriage-way consists of teak framing, moulded in panels, filled in with opalite filling; the roof about this ceiling is of steel troughing, 12 in. in depth, resting on stone templates built in retaining wall on the one side, and on the other on a 15½ in. steel girder supported on stanchions running under the line of street kerb, the whole being that known as Dorman & Long's heavy section, the footway being almost entirely laid in Hayward's prismatic pavement lights. The divisions between water-closets are of polished marble, fitted to teak framing with 2-in. teak doors. The floors, of black and white vitreous tiles, are lined with a black and red border, a smaller pattern being used in each water-closet. The ventilation in the men's conveniences is provided by three of Blackman's copper ventilating fans, driven by electric motors, and two similar fans, similarly driven, in the women's conveniences. The fans are fixed in the opalite ceiling, the motors, being situated above the fan in the hollow of the steel troughing, are out of sight, the air is conducted to the centre of the roadway, discharging under two large ornamental lamp columns, one ventilating the men's and the other the women's conveniences. The water-closets are Finch's siphonic, with ornamental pottery cisterns fixed on marble cantilevers; 2-in. polished teak seats are provided to the water-closets. Lavatories of the tip-up and lift-out kind are supplied with hot and cold water laid on, marble tops with marble towel-shelf and plated fittings. The entrances—two to the men's and one to the women's—are each 5 ft. in width, York stone solid stairs, provided with Mason's heavy section non-slipping steel treads and landings, 2-in. copper handrail with brass brackets being provided on either side. The ornamental railings of the pattern employed by Baron Grant when laying out the Square gardens are being supplied by Messrs. W. & A. Baker, of Newport, Mon. The urinals, of the radial basin type, 2 ft. 3 in. centres, are of white glazed porcelain with polished marble divisons, brass footplates with brass treads over open glazed-ware channels, provided with marble flushing-cisterns with copper fittings and glass fronts, discharging automatically. The urinettes for women are provided for use without payment. These are similar to those recently exhibited at the Paris Exhibition, and consist of a pedestal shaped like a "bidet." Each has a drain connexion and flushing rim, the water supply being given by a separate cistern to each urinette. There are marble divisions, but not doors, and their use is free. Electric incandescent lighting is adopted throughout, the wires being for the most part concealed in wood casing or metal piping let into the plaster. Water supply is taken from the road mains, but large storage cisterns are provided over the attendants' offices for use when the main supply is shut off. Hot water from a circulating cylinder gas-boiler is laid on to the basins, and a warm cupboard is provided for towels. In the women's lavatory is provided a polished copper instantaneous water-heater. The drains, properly trapped, are all laid direct to inspection chambers with white glaze channels and bell-mouth junctions and air-tight covers, fresh air inlets being taken from the gardens, and outlets to surface ventilators in the roadway; the "pitch" or height from the floor to the girders carrying the pavement lights is 9 ft. 6 in. Mr. A. Ventris is the Surveyor and Engineer to the Board.

SEASIDE HOME FOR GIRLS, BARE, LANCASHIRE.—A "G.F.S. Home of Rest" has just been erected at Bare. The architect is Mr. Maidman, Edinburgh, whose plans were accepted in competition. On the ground floor is a large dining-room looking out on the promenade, as well as a cloakroom, with special entrance for the girls. The first floor is arranged so as to include sitting-room, matron's sitting-room, and dormitories extending to the rear, whilst the third floor is almost exclusively occupied by dormitories. The cost of the building, including land, &c., is 3,100*l.*

FOREIGN.

FRANCE.—A monument to Vauban, the great military engineer under Louis XIV., has been erected at Bazoches-du-Morran. It consists of a granite column carrying a bust of Vauban, copied from the statue at the War Office.——The monumental group by Elias Robert, representing "France Crowning Art and Industry," which formerly surmounted the entrance of the Palais de l'Industrie, has been set up, by the direction of the Minister of Fine Arts, in the park of St. Cloud, at the end of the long avenue starting from the Place d'Armes and running parallel to the Seine. The monument stands out in front of a semicircle of trees, and is flanked at each side by two other groups, also taken from the Palais de l'Industrie.——The great stained-glass window over the north porch of Sens Cathedral has been restored by M. Félix Gaudin, artist in stained glass, under the direction of M. Bérard, the diocesan architect——An infirmary on a large scale has been commenced at Issy-les-Moulineaux.——A new bridge is to be erected over the Garonne, at Mauvera.——A large barracks building is to be erected at Oran, at a cost of 600,000 fr.——M. de Sarzac, the French archæologist, who has been engaged for fourteen years in explorations in the valley of the Euphrates, has recently brought to Bagdad numerous specimens of Chaldæan and Assyrian art, among them a cuneiform inscription engraved on a plaque of gold. The collection is ultimately to be placed in the Louvre.——The exhibition of "Femmes Peintres et Sculpteurs" has been opened in the orangery at the Tuileries. Mme. Demont-Breton, the president, exhibits a fine painting representing a young girl of the Gaul period. Among the best of the other exhibits are the landscapes of Mme. N. Adam, and various works by Mmes. Huillard, Turner, Duran-Marx, Marie Coignet, &c.; also a powerful landscape by the late Marie Bashkirtseff.——We have to record the death of a great still-life painter, Antoine Vollon, whose name and works will be familiar to all frequenters of the Salon exhibitions. Among his most remarkable works may be named "Casque de Henri II.," which attracted much admiration in the Salon of 1878; "Un Coin de Cuisine," "Oiseaux de Midi," "Pot au feu," "Vue du Tréport," "Une Cour—Effet de Soleil," "Le Bassin de Neptune," &c. Vollon had received medals in the Salons of 1865, 1868, and 1879, and a medal of the first class at the Universal Exhibition of 1878, when he was also created "Officier" in the Legion of Honour. He was elected a member of the Académie des Beaux-Arts in 1898. He was sixty-seven years old at the time of his death.

AUSTRIA.—At the present time considerable building and engineering works are being carried out in Vienna. The control of the smaller rivers or canals entering the Danube has not proved an easy matter; extensive storage reservoirs are being constructed, and some of them are nearly completed. Judging from the magnitude of the works a very large sum of money is being expended.——The Vienna Cathedral (Stefansdom) is being restored in parts, and at the present time is closed to the public; the two towers at the west end are being practically rebuilt, but the west façade, erected about A.D. 1200, and which is in fairly good preservation, is not being interfered with. The greater part of the edifice has, however, been restored at intervals since 1852, at first by the architect, L. Ernst, who died in 1862, then by Fr. von Schmidt, deceased in 1891, and latterly by Herr Herrmann. The Miocene limestone and calcareous sandstone of which the cathedral is built are not of good quality, and much of the old as well as the new work is in an unsatisfactory condition.——The large additions to the Hofburg, facing the Burgthor, in Vienna, are not yet complete, and appear to be proceeding at a snail's pace, judging from the condition of the masons' and other sheds in connexion therewith and the scaffolding, which must have been up for some years. When finished, however, this Royal residence will be worthy of the Austro-Hungarian Empire, and it is situated in a unique position in the city. Within a very short distance, and with only gardens and wide streets intervening, there are the Natural History and Art Museums, Duke Frederick's palace, the Royal Library build-

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ing, and the Law Courts; whilst a little farther along the beautiful Franzensring we find the Town Hall, Royal Theatre, and University buildings—all of them erected during the past few years.——Many of the principal streets of Vienna are now up, as an extensive system of tramways is being adopted.——Trieste, also, is furnishing plenty of work for the engineer. The electric-lighting system is now completed, but the electric tramways, although they will be opened in a few days, are as yet not quite ready. We were permitted to join in an experimental run, and found the track very smooth. The cars are more sumptuously fitted and larger than any we have seen elsewhere on the Continent.——That great engineering feat, the construction of the Semmering Railway (the oldest of the great Continental mountain railways), the main line from Vienna to Trieste, is undergoing much alteration between Gloggnitz and Mürzzuschlag. Several tunnels are being reconstructed, and various other improvements effected.

SANITARY AND ENGINEERING NEWS.

MILLWALL DOCK COMPANY.—The board of directors have resolved to meet the growing demands upon their traffic by spending about 80,000*l.* upon the building of a new granary with a capacity of about 90,000 quarters of grain, and equipping it with machinery for unloading vessels and barges at the dock's edge, delivering the grain on to the granary floors, and again loading it for inland conveyance. A further estimated sum of 40,000*l.* will be devoted to the establishment of a timber-yard upon some waste land belonging to the company, and fitting it with the latest improved machinery for unloading barges and stacking the timber. The necessary funds will be raised by founding an equipment company with a capital of 100,000*l.*, and with power to issue debentures, to whom the dock company will lease the land for a term of ninety-nine years, the auxiliary company providing the machinery and re-leasing the property back to the dock company at a rental sufficient to pay 6 per cent. on the capital.

SEWAGE DISPOSAL, CHERRYHINTON.—The Chesterton Rural District Council have appointed Mr. H. Bertram Nichols, C.E., of the firm of Messrs. Beesley, Son, & Nichols, Westminster, to act as Consulting Engineer with Mr. Waters, C.E., of Cambridge, in connexion with the sewerage and sewage disposal of the district of Cherryhinton.

SEWERAGE SCHEME, KINGSWOOD, BRISTOL.—At the meeting of the Kingswood Urban District Council recently, the surveyor, Mr. Alfred J. Saise, A.M.Inst.C.E., submitted the plans and estimates for the sewerage of the district and they were discussed in committee. The scheme is divided into two sections, called respectively the Warmley and Conham sections. Each section drains by gravitation to the outfall works, where the sewage will be precipitated and filtered, the resultant effluent being in the one case discharged into a tributary of the river Avon at Oldland Bottom, and in the other into the river itself at Conham. In the surveyor's report he states that the tanks have been designed to hold three times the dry weather flow, with an intermediate space for providing for six times the dry weather flow for a period of two hours before discharge takes place of the storm water, over a weir provided for the purpose. The filters will be on the continuous flow system, and are expected to give the very best results, and the necessary reserve of land has been provided, as far as the Warmley section is concerned, for the final disposal of the effluent in accordance with the requirements of the Local Government Board. At Conham no treatment beyond precipitation and filtration is contemplated. After considering the scheme it was resolved to apply to the Local Government Board for sanction to borrow a sum not exceeding 27,000*l.* for carrying out the works. The total estimated cost was 27,171*l.*, namely, Warmley section, 16,645*l.*; Conham section, 10,526*l.*

DRAINAGE SCHEME, LEWES, SUSSEX.—Mr. W. O. E. Meade-King recently held a Local Government Board inquiry at the Town Hall, Lewes, into an application by the Town Council for sanction to borrow 7,000*l.* for the execution of a drainage scheme for the Cliffe. The scheme was described by Mr. David Roberts, the Borough Surveyor.

SEWERAGE SCHEME, WALTON-ON-THE-NAZE.—The Urban District Council has received the formal sanction of the Local Government Board for a loan of 8,200*l.* to carry out the sewerage scheme, and the engineers, Messrs. Beesley, Son, & Nichols, of Westminster, have received instructions to prepare the specifications, &c., so that tenders may be received for the construction of the works.

CORPORATION STABLES, HARROGATE.—A Local Government Board inquiry, conducted by Mr. W. A. Ducat, was held at the Municipal Offices, Harrogate, on the 30th ult., with respect to the borrowing of 3,300*l.* for the erection of stables and the purchase of horses, &c., in connexion with the collection of dust in the Borough. The inquiry was attended by Mr. Bagshawe, the Borough Engineer.

MISCELLANEOUS.

TRADE NOTES.—The Farnley Iron Company, Leeds, in addition to the award mentioned by us last week, have received a gold medal at the Paris Exhibition for their best Yorkshire iron, exhibited in Class 64.——The Royton Scattered Homes, for the Guardians of the Oldham Union, are being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland & Brother, of Manchester.——St. Mary's Schools, Edgehill, Liverpool, have been fitted with "small tube" hot-water heating apparatus by John King, Limited, engineers, Liverpool.

THE WIDENING OF THE STRAND.—The London County Council have already given notice, in pursuance of their Improvements Act of last year, that they propose to take parts of the churchyards of St. Mary-le-Strand and St. Clement Danes, and to remove all human remains found therein to the Necropolis Company's cemetery at Woking. The work will be begun on October 23 next. Thus will be thrown into the roadway the site of the Strand Cross, mentioned by Stow as a place where "the justices itinerant sat without London," and the famed maypole set up by John Clarges to celebrate his daughter's accession to a title as Duchess of Albemarle. Clarges's forge stood where is now No. 317, Strand, at the corner of Drury-court. The maypole, and previously the cross, stood just within the gates of the present churchyard, opposite a point midway between the ends of Windsor and Drury courts. The "new church" of St. Mary was completed in 1717. Sir Isaac Newton, a few months afterwards, acquired the maypole (renewed in 1713) for Dr. Pound, rector of Wanstead, who used it to raise the big telescope in Wanstead Park that was subsequently given by Houblon to the Royal Society. At Wanstead Park James Bradley perfected his two great discoveries of the aberration of light and the nutation of the earth's axis. In "The Citie's Loyalty Displayed," 1661, the maypole is described as a "stately cedar . . . 134 ft. high . . . made below bridge and brought in two parts up to Scotland-yard, and from thence on April 14 [1661], to the Strand to be erected," amidst great rejoicings. The pole lost about 40 ft. of its upper portion in a storm, 1672, and was not repaired. Beneath the "Spotted Dog" tavern, Nos. 297-8, in the now demolished block, on the Strand's *north* side, between the two churches was an old well from which some maintain that Holywell-street took its name. The narrow passage close by, opposite Surrey-street, led to Lyon's Inn (on the north side of Holywell-street) where, in 1845, the Architectural Association held their first meetings. The Inn's site was taken for the Globe and Opera Comique theatres—the former, opened on November 28, 1868, was designed by S. Simpson, the latter, as altered five years ago, by Messrs. Fowler & Hall. In the wide space at the west of the maypole, was established in 1634 the first stand for hackney coaches in London.

CHURCH OF ST. MARY, CHARING CROSS-ROAD.—An order in Council has been issued in terms of the Burial Act, 1857, requiring the churchwardens to remove and to re-inter in some consecrated ground wherein burials may legally be made, all the human remains found beneath the floor of the church; the churchwardens are further required to relay the floor of the aisle upon a layer of concrete at least eight inches in thickness and to carry out the work under the supervision of the district medical officer of health and to his satisfaction.

PUBLIC IMPROVEMENTS, LOWESTOFT.—A Local Government Board inquiry was held in the Town Hall, Lowestoft, recently, into an application by the Corporation for sanction to borrow 960*l.* for the improvement of the North Parade Slopes. The inquiry was conducted by Mr. M. K. North, A.M.Inst.C.E. It is proposed to purchase some land forming the slopes next the Denes. The area is about 1½ acres. The surveyor, Mr. G. Hamby, explained that a footpath would be formed from the North Parade-road, near Lyndhurst-road, to the Denes, about 320 ft. in length.

STANFIELD MEMORIAL TABLET, SUNDERLAND.—A marble tablet which has been placed in the entrance hall of the Sunderland Free Library in memory of Clarkson Stanfield, R.A., was unveiled on the 30th ult. The tablet was executed by Messrs. McMillan, of Sunderland.

CITY OF LONDON COLLEGE.—The results of the May Examination in Building Construction by the Science and Art Department show that 50 per cent. of the candidates in honours from the City of London College succeeded in passing, as against 55½ per cent. last year.

STRAND IMPROVEMENT SCHEME.—That portion of the Strand between the churches of St. Mary-le-Strand and St. Clement Danes, which forms part of the Strand Improvement Scheme, has been thrown open for traffic. The houses on the south side of Holywell-street will be demolished as soon as the leases expire.

THE SANITARY INSTITUTE.—The syllabus of the thirtieth course of lectures and demonstrations for sanitary officers in September, October, and November has been issued. The course will comprise the following lectures:—Part I.—Five lectures on Elementary Physics and Chemistry in relation to Water, Soil, Air, and Ventilation, and Meteorology. Twenty lectures on Public Health Statutes; Orders, Memoranda, and Model By-laws of the Local Government Board, and the By-laws in force in the Administrative County of London. The Practical Duties of a Sanitary Inspector, *e.g.*, Drawing up Notices as to Sanitary Defects, Drain-testing, Disinfection, Methods of Inspection, Note-taking, Reporting, and Elementary Statistics. Municipal Hygiene or Hygiene of Communities, including Prevention and Abatement of Nuisances, Sanitary Defects in and about Buildings and their Remedies, Water Supplies, Sanitary Appliances, Drainage, Refuse Removal and Disposal, Offensive Trades, Disinfection. Building Construction in its Sanitary Relations, Local Physical Conditions. Measurement and Drawing Plans to Scale. Inspections and Demonstrations will be arranged in connexion with the Lectures, and will include visits to disinfecting stations, dairy premises, municipal depots, artisans' dwellings, offensive trades, waterworks, common lodging-houses, sanitary works in progress, refuse and sewage disposal works, and other public and private works illustrative of sanitary practice and administration. In some of the visits the students are shown the routine of an inspector's office work and duties. Part II.—Seven lectures on Meat and Food Inspection, including taking of samples of Water, Food, and Drugs for Analysis.

MEMORIAL WINDOW, FREE SOUTH CHURCH, ABERDEEN.—The east window behind the pulpit of this church has been filled with stained glass. The work was designed by Mr. R. Douglas Strachan, of Aberdeen.

CAPITAL AND LABOUR.

CORK BUILDERS' LABOURERS' DISPUTE.—It is stated that at the conference between representatives of the Cork Builders' Labourers' Society, the city builders, and the United Trades Council, held on the 30th ult., a satisfactory settlement of the dispute between the builders' labourers and the employers was arrived at.

STONEMASONS' STRIKE, BARROW-IN-FURNESS.—A section of the stonemasons in Barrow-in-Furness have struck work against the bricksetters employed in building the new science and art schools, because of the work of putting in the terra-cotta facings being done by them instead of by masons.

BLACKPOOL PAINTERS' STRIKE.—There are about 100 men at present in receipt of support from the Operative Painters' Union, through the strike of painters at Blackpool for an increase of wages from 8½d. to 9d. per hour, which has entered upon its twenty-second week. At first the advance of one halfpenny per hour was granted on condition that the working rules were altered so that all future notices should expire at any time of the year, and that society men should work with non-society men without interference. These terms were rejected, and the intervention of the Board of Trade, at the men's request, has been unsuccessful.

WAGES IN THE NEWCASTLE BUILDING TRADES.—At a meeting of the Newcastle and Gateshead Master Builders' Association at Newcastle on the 4th inst., a letter was read from the Operative Bricklayers' Society refusing the employers' offer of two years' guarantee at the present rate of wages—namely, 10d. per hour, or, as an alternative, arbitration to settle the dispute, in which the men ask for 1d. advance. The meeting agreed to lay the matter before the Northern Counties' Federation of Building Trades employers to decide what action should now be taken.

LEGAL.

DISPUTE AS TO LIGHT.—CASE IN THE VACATION COURT.

THE case of Chester *v.* Bowker & Sons came before Mr. Justice Farwell in the Vacation Court on the 5th inst., on the application of the plaintiff to restrain the defendants till the trial from erecting any building or buildings so as in any way to prevent the access of light to the plaintiff's premises.

Counsel for the defendants asked for an adjournment in order to be enabled to answer the plaintiff's affidavits.

Counsel for the plaintiff said that if his learned friend gave an undertaking not to obstruct the plaintiff's light, he would agree to an adjournment.

His lordship said that that was equivalent to asking for an interim injunction.

In answer to the learned Judge, counsel for the plaintiff said that he could not say how high the defendants' building was, but he quite expected they had put the roof on.

Counsel for the defendants said that his instructions were that the building was up before the notice of motion was served.

His lordship said he could not think of granting a mandatory injunction then. If he found out that the defendants had run up the building between then and next Wednesday, he should probably compel them to pull down. His lordship then allowed the case to stand over for a week.

LODGING-HOUSE LAW.

AT Bow-street Police-court, on the 3rd inst., Mr. A. Ebbs appeared before Sir Franklin Lushington to a summons issued at the instance of the St.

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Giles's Board of Works charging him, as the owner of a tenement lodging-house in Betterton-street, with failing to comply with the local regulations for maintaining the house in a proper state of cleanliness and sanitation. Mr. H. C. Jones supported the summons on behalf of the Board. Mr. Symonds defended. Mr. Jones, after explaining the regulations under which the proceedings were taken, said he understood that Mr. Symonds was going to contend that the house was not a lodging-house but a building of flats, and that it ought not to be registered as a lodging-house. Mr. Symonds said that was practically what he contended, but he wished it to be understood at once that the repairs, &c., required by the Board of Works were being carried out. Mr. Jones said that under the Acts which empowered Local Authorities to make certain regulations every house or part of a house let to more than one family was a lodging-house, and must be registered as such. Inspector Robinson, of the St. Giles's Board of Works, said that the house in question had four floors, on each of which were three rooms. There were separate entrances to each floor except the top one. Each floor was let to a separate family. In answer to the magistrate the Inspector said there was not more than one family on each floor. Sir F. Lushington said he did not think that the term "lodging-house" could be applied to a house in which separate floors were let to different families. Mr. Jones: I contend that if a house or part of a house is occupied by more than one family it is a lodging-house. Otherwise we should have no power to touch any tenement lodging-house. Mr. Symonds: If my friend's interpretation of the Act is to be permitted, all the flats of the West-end would become tenement lodging-houses. Mr. Jones said he was taken at a disadvantage, as no intimation had been given to him of the defence to be raised. He asked the magistrate to adjourn the case, as his Board attached considerable importance to it. Sir F. Lushington said he saw no reason for that, and dismissed the case. Mr. Symonds said his client was anxious to have his house taken from the register of lodging-houses, and he would ask the magistrate to assist him by stating on what grounds he dismissed the summons. Sir F. Lushington: I dismiss the summons because it does not appear to me that the portions of the house into which it is divided are let to members of more than one family. —*Morning Post.*

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

9,384.—APPARATUS FOR CIRCULAR SAWS: *A. E. Knox and R. Knox.*—For adjusting the fence and raising the bench of a circular saw the bench is armed to bars that slide vertically in guides upon the frame, and have, on their inner sides, spur teeth fitting into spiral grooves on two wheels mounted upon a common axis, one of the wheels gears with a pinion to be turned with a hand-wheel, and by turning the hand-wheel the bench may be lowered or lifted. The fence is attached to an adjustable socket that can be clamped at any point desired. For the vertical sliding bars one similar bar may be substituted.

9,401.—A SELF-CLOSING COCK: *W. H. Carrington and J. Meiklejohn.*—An extension, fitted with a pin, is made on the side of the plug, and a corresponding pin, which is screwed into the tap's casing, retains a circular stop. A spring joins the two pins, and when the tap is opened the spring becomes extended that it may again shut the tap when it is freed. The stop can be set reversely, or a fixed stop may be adopted.

9,474.—A WATER-HEATING APPLIANCE: *W. Humiberstone.*—The boiler, after the kind fitted in kitchen-ranges for heating water for baths, &c., is fashioned with two corrugations in its front, of which the openings are covered with plates that are fastened with a cross-bar and are perforated for circulation of the water; in another form the corrugations are placed beneath the boiler, and a short vertical tube for aiding the circulation is attached to one of the perforations of each of the plates.

9,543.—A MACHINE FOR MOULDING ARTIFICIAL STONE: *F. C. Reincke.*—In this machine, which is more especially intended for making lithographical slabs of artificial stone, the mould-table is fastened to a piston-rod, which is moved to and fro with compressed air or steam. The material to be moulded is laid between reticulated plates, upon the upper plate is placed the compressor-plate, the table's reciprocating movements and its downward impact against a rubber ring induce a series of shocks so as to press the material and to bring to the surface the water and air which it contains, and the water and air are then drawn away by suction set up by the piston's motion downwards; the warping or accidental breakage of thin slabs is obviated by embedding iron rods, or their equivalents, in the plastic material.

9,652.—AN ANTI-FOULING PAINT: *J. A. Just.*—The paint is composed of talc or steatite, red or white lead, or zinc white, mixed with linseed oil and linseed oil varnish, and also, if required, pigments and driers.

9,676.—TRAPS FOR DRAINS, SINKS, &c.: *O. Pallat and E. Harsangi.*—In order to prevent the traps from becoming unsealed they are made so that their inlet and outlet pipes shall be placed in free atmospherical connexion before the seal can be drawn out: that is effected by putting a chamber between the siphon's longer and shorter legs, and making communications between the chamber and the outlet at its top and the inlet at its base. When the water level descends to the inlet, air flows from one side to the other, and the siphonical action is thereupon interrupted. The invention is adapted for use with siphon traps and with gully traps alike; in the latter instance the chamber is made with double walls. For the chamber the upper one of two outlet channels may be substituted for the one outlet.

9,689.—A DRYING OIL: *W. L. S. van Loo.*—Resin melted in petroleum, with the addition of lime and water, is prepared as a drying-oil for use in compounding varnishes, paints, and so on. Instead of lime can be used a salt, say, zinc sulphate, the precipitated calcium sulphate being removed.

9,691.—A WATER-WASTE PREVENTER: *T. W. Craker & H. W. Dunmore.*—The discharge of water through the supply-cock is directed into an upper compartment, and the overflowing water passes thence through a pipe into another compartment below. When the cock has become closed the water continues to flow into the lower compartment through a weeping-hole, and thereby the closing pressure around the valve exceeds that of the water in the service-pipe, whilst an increase of the water pressure is at the same time prevented. A rubber-covered ball valve controls the water inlet, or the valve's seating may be covered with indiarubber for that purpose.

9,714.—A CIRCULAR-SAW GUARD: *A. Lees & Co. and L. Dunkerley.*—A radial arm clamped upon a vertical pillar carries the guard, and its rotation is regulated by a feather upon the pillar, but when raised above the feather the guard can be swung back and the saw can be reached. The back of the saw is protected by a riving-knife, which is pivotted on to a bracket at the radial arm's end, and can be clamped at any angle with a bolt which passes through a slot cut in the bracket. For protection of the front of the saw a curved plate is either pivotted upon an arm of the bracket, or caused to rise between guide-rollers as the wood passes under its roller.

9,748.—A GUARD FOR USE WITH IRONING AND SIMILAR MACHINES: *D. S. Arklay and E. W. Collier.*—In the feeding of ironing and similar machines the workman's hands are protected with a guard made of sheet metal, which is retained closely above the iron with springs. If the iron is above the roller the guard is hung from a support, no springs being necessary. The invention extends to a guard to be used in covering the entrance between two rollers.

9,771.—A FACING FOR EARTHENWARE BRICKS, BUILDING BLOCKS, AND SLABS: *H Rosenbaum and M. J. Murphy.*—Glass plates are fastened to the faces of the bricks, &c., with projections thereon and cements; the glass is prevented from cracking by means of a layer of some elastic or shock-deadening material which is laid beneath it, and is secured to the brick with glue that contains a few grains of corrosive sublimate and strychnine. Holes are formed in the bricks in order that melted sulphur mixed with some grains of arsenic may be filled in around the projections.

9,779.—SHEET PILES FOR COFFER DAMS, CAISSONS, &c.: *W. D'H. Washington.*—Tongued and grooved edges are formed upon the sheet piles, which have hollow serrated and perforated shoes through which water is forced in order to make the piles sink; the water is supplied to the shoes with pumps and pipes, and the expelled earth is carried off in the trenches. For wooden piles are used boards or planks in pairs joined together with cross-bolts, the edge of one pile is taken by a groove formed with strips affixed to the edges of the pile next adjacent, and rails or cross-bars join the upper ends of the piles. Sheet-metal piles may be fastened at a right angle to one another with a braced angle-plate or pile, and a cylinder-shaped caisson is made with sections or piles clamped together with hoops. The caisson may be sunk in its entirety down to a certain depth, and after the bands have been loosened the sections can be sunk separately on to the bed rock.

9,812.—A VENTILATOR: *M. Gaul.*—A solenoid which is controlled by a thermometer is used for automatically closing and shutting a ventilator. A curved solenoid turns a disc which has four sector-shaped apertures, and the solenoid when under the influence of a current attracts the core which is attached to the disc; a thermometer closes the circuit as soon as the mercury has risen to a height sufficient for making contact with the upper wire, the other wire being fused into the thermometer's bulb.

9,816.—BUILDING BLOCKS OF ARTIFICIAL STONE: *C. W. Stevens.*—An artificial stone compounded of ground natural stone mixed with cement is moulded by either the "wet process" or the "dry process" in ordinary moulding sand, or by preference in ground stone or glass sand. For making a hollow block a layer of moulding material impressed with the design of an ornamental facing is laid at the bottom of the moulding-box, and a layer of the composite stone is poured in from above; then are inserted division-boards and metallic facing-plates, a central web being formed to serve as a layer of composite stone between portions of moulding material. After the boards have been drawn out, and the stone compound has been filled into the spaces, the facing-plates are removed; the mould-box is then filled with the stone compound for completion of the block. Additional strengthening stays are produced in the block by the use of metal tubes for removing the cores of the moulding material, and the spaces thus formed are filled in with the stone.

9,832.—RATCHET SPANNERS: *A. K. W. Farie.*—Blocks seated in rectangular notches cut in the handle's annular end constitute the pawls which are pressed outwards with wire springs that they may engage with ratchet notches on the sleeve's collar whose angular opening fits the rut. Annular side-plates retain the collar in position; for nuts of different sizes a sleeve having a collar and differently sized openings is slid into the first-named sleeve.

9,836.—A COMBINED LOCK AND LATCH: *T. Benton and J. W. Benton (trading as T. Benton & Son).*—The latch-plates, whose lugs engage with a follower, have studs that project through holes cut in a web of the latch's bolt-head into holes which are perforated in a plate that the casing's cap keeps in position; around a shank upon the plate is turned a spring which presses against a lug through which the shank will pass. That lug may either constitute a fixture in the casing against which the spring around the shank and another spring joined to the lever will press from opposite sides, or be in itself a projection rising from an arm of a tumbler or lever of the lock's bolt.

MEETINGS.

SATURDAY, SEPTEMBER 8.

British Institute of Certified Carpenters.—Visit to Apsley House, Hyde Park Corner. 3.30 p.m.

Northern Architectural Association.—Excursion meeting at Sunderland: St. Columba's Church will be visited, and subsequently the painter of the fresco (Mr. J. Eadie Reid) will deliver a lecture on "Some Principles of Christian Art Historically Considered"; whilst at the church an adjoining new parochial house will be visited.

WEDNESDAY, SEPTEMBER 12.

Institute of Sanitary Engineers (Incorporated).—Examination and Literary Committee at 2.30 p.m.; General Purposes and Finance Committee at 3.30 p.m.; Election Committee at 5 p.m.; Members' Sessional Meeting at 7 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 22.—By T. THORNE (at Dunstable).

Kensworth, Herts.—Green End Farm, 142 a. 0 r. 33 p., f. and c.	£1,900
Bleak House and 3 r. 20 p., c.	440

August 24.—By W. & W. JAMES (at Llandovery).

Llanddeusant, Carmarthen.—Nantyrodyn Farm, 65 a. 2 r. 16 p., f.	1,150
Allt-y-Carw Farm, 70 a. 3 r. 3 p., f.	795
Gwydre and Pwll-y-Gerwn Farms, 279 a. 2 r., f.	2,800
Pwlldu Farm, 44 a. 0 r. 9 p., f.	790
Blaenllechach Farm, 44 a. 1 r. 10 p., f.	600
Nantgoch Farm, 79 a. 0 r. 34 p., f.	865
Penygraig-goch Farm, 61 a. 3 r. 23 p., f.	900
Accommodation land, Dole Partis, 21 a. 1 r. 3 p., f.	440

August 28.—By J. BOTT & SONS.

Clapham —19, Santley-st., u.t. 65 yrs., g.r. 8*l.* 8s., r. 40*l.*	510

By CHURTON, ELPHICK, & Co. (at Menai Bridge).

Llandisilio, Anglesey.—Water-st., The Liverpool Arms p.-h.; also Glandwr, f.	1,725
2, 4, and 5, St. George's-rd., f.	825
Beech-rd., The Old Foundry, f.	1,150
17 to 53 (odd), High-st.; also stabling and warehouse premises, f.	4,990
1 to 11, Lower Well-st., and piece of land, f.	1,340
3, 6, 7, and 9, Hill-st., f.	1,165
2 to 5, Well-st., f.	400
1, Hill-st.; also Menai Cottage, f.	465
1, 2, and 3, North Hill-st. and three cottages, f.	895
12 to 20 (even), Mount-st., f.	1,140
Llandegfan, Anglesey.—Nant and Cadnant Cottages, f.	1,670
Penmynydd, Anglesey.—March Ynys, 70 a. 2 r. 27 p., f.	2,300
Sarn Fadian Farm, 22 a. 3 r. 15 p., f.	1,410
Llangaffo, Anglesey.—Hen Shop b.-h. and 39 a. 1 r. 19 p., f.	2,100
Plas Llangaffe Farm, 23 a. 3 r. 34 p., f.	1,000
Llanfechell, Anglesey.—Brynavon and Bwchanan Farms, 39 a. 1 r. 23 p., f.	1,680
Llanbadrig, Anglesey.—Ty Bach and Talcen Eiddan Farms, 16 a. 2 r. 8 p., f.	755
Llaniestyn, Anglesey.—Ty Phillip Farm, 8 a. 3 r. 26 p., f.	605

August 29.—By M. H. PEART.

Paddington.—17, Desborough-st., f.	500
Tottenham.—280, 282, 286, and 288, High-rd., f., e.r. 104*l.*	1,300
9, Eagle av., u.t. 84 yrs., g.r. 6*l.*, e.r. 32*l.*	335
Dalston.—165, Haggerston-rd., f., e.r. 30*l.*	405

By WOOD, SON, & GARDNER.

Cranleigh, Surrey.—Main-rd., Elm Bridge cottages, f.	400

August 31.—By A. J. SHEPPIELD.

Custom House.—118 to 138 (even), Leyes'-rd., u.t. 37 yrs., g.r. 44*l.*	1,320
Poplar.—57, Upper North-st., u.t. 48 yrs., g.r. 2*l.* 8s., e.r. 4*l.*	370
St. George's East.—15, Upper East Smithfield, f.	590

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent yd. for yard.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Cabmen's Shelter	Southport Corporation	20*l.*	Sept. 27
Two Schools	Ashford (Middlesex) School Bd.	Not stated	do.
Store Buildings, Rose Hill	Willington Quay, &c., Indus. Soc	10*l.*	do.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Sewerage Works	Luddenden Foot U.D.C.	J. Waugh, Civil Engineer, Sunbridge Chambers, Bradford	Sept. 11
Public Convenience, &c , Silverhill, St. Leonards	Hastings Corporation	P. H. Palmer, Civil Engineer, Town Hall	do.
Service Reservoir, &c.	Chesham (Bucks) U.D.C.	J. Taylor & Co., Engineers, 27, Great George-street, S.W.	do.
Brickwork of Destructor Buildings	Lancaster Corporation	Borough Surveyor, Town Hall	do.
Assembly Hall	Baxenden Conservative Club	H. Ross, 15, Cannon-street, Accrington	do.
Harbour Protection Works, Kilkeel, Ireland		R. MacIlwaine, Union Offices, Kilkeel, Downpatrick	do.
Road Works, Athol-road	Withington (Lancs.) U.D.C.	A. H. Mountain, Civil Engineer, Town Hall	do.
Shop Fronts, &c., Southgate, Halifax		W. C. Williams, Architect, 29, Southgate, Halifax	do.
Electrical Plant, Shirley Warren	Southampton Guardians	J. W. G. Aldridge, Civil Engineer, 9, Victoria-street, Westminster	do.
Additions, &c., to Schools, Mornington-road	Bingley School Board	W. R. Nunns, Architect, Market-street, Bingley	Sept. 12
Warehouse, Hammerton-street, Bradford		A. Sharp, Architect, Market-street, Bradford	do.
Sewerage Works, Doncaster-road	Wakefield Town Council	R. Porter, Engineer, Town Hall	do.
Stables and Coach House, Maesycoed, Pontypridd	Mrs. Morgan	A. O. Evans, Architect, Pontypridd	do.
Retaining Wall, &c., Lower-terrace	Spilsby R.D.C.	T. A. Bushbridge, Civil Engineer, Council Offices	do.
Boundary Walls, Tough, Aberdeen		Brown & Watt, Architects, Union-terrace, Aberdeen	do.
Schools	Lochgelly (N.B.) School Board	J. Murray, Architect, 233, High-street, Kirkcaldy	do.
Sewer, Tor Point, Devon	St. Germans R.D.C.	F. W. Cleverton, 4, Buckland-terrace, Plymouth	do.
Blocks of Dwellings, Dogton Colliery	Thornton Colliery Co., Ltd.	J. Murray, Architect, 233, High-street, Kirkcaldy, N.B.	do.
Additions to Slaughter Houses	Carlisle Corporation	H. C. Marks, Civil Engineer, 36, Fisher-street, Carlisle	do.
*Flooring at Baths, Walthamstow	Walthamstow U.D.C.	See Advertisement	do.
*Breeze	Commercial Gas Company	See Advertisement	Sept. 13
*White Flare Burnt Chalk Lime	do.	Engineer, Commercial Gas Company, Stepney, E.	do.
Additions, &c., to Store Buildings, Langley Park	Aunfield Plain Indus. Co-op. Soc.	G. T. Wilson, Architect, 121, Durham-road, Blackhill	do.
Sewer	Briton Ferry U.D.C.	H. A. Clarke, Council Offices, Briton Ferry	do.
Houses, Regent-road	Salford Corporation	H. Lord, Architect, 42, Deansgate, Manchester	do.
Additions to Hospital, Llanelly		W. Griffiths, Architect, Falcon Bridge, Llanelly	do.
Granite Road Metal	Grays (Essex) U.D.C.	A. C. James, Surveyor, Grays	do.
Paving Works, Waterloo-terrace, Ashton	Preston (Lancs.) Corporation	Borough Surveyor, Town Hall	Sept. 14
Chapel, Talwrn, near Coedpoeth, Wales		Rev. J. Felix, Coedpoeth	do.
Retaining Wall, Exmouth-road, Devonport	Folkestone Burial Board	J. F. Burns, Borough Surveyor, Ker-street, Devonport	Sept. 15
Additions to Chapel and House	Mansfield Corporation	F. Newman, Architect, 4, Bouverie-square, Folkestone	do.
Street Works, Cromwell-street		R. F. Vallance, Borough Surveyor, Mansfield	do.
Heating Apparatus, &c., Neyland, Pembrokeshire	Maryport Brewery Co.	W. Powell, Neyland	do.
Rebuilding Blue Bell Hotel, Wigton	Bristol Docks Committee	G. Armstrong, Architect, 24, Bank-street, Carlisle	do.
Passenger Station, Avonmouth Dock	Leeds School Board	Dock Engineer, Cumberland Basin, Bristol	do.
Additions to Schools, Stanningley	*Llanelly School Board*	W. S. Braithwaite, Architect, School Board Offices, Leeds	Sept. 17
Schools, Park-street	Londonderry Cnty. Borough Cncl.	J. B. Morgan, Architect, Llanelly	do.
Sewers, Lovers' Glen	Caledonian Railway Company	Sir R. N. Chambers, Guildhall, Londonderry	do.
Hotel, Glasgow	Colchester Corporation	J. Miller, Architect, 223, West George-street, Glasgow	do.
Road Making, Walsingham-road	Shildon U.D.C.	H. Goodyear, Borough Surveyor, Town Hall	do.
Paving Works, Victoria-street	Pembroke School Board	C. Heslop, Surveyor, Council Chambers, Shildon	do.
School, Meyrick-street, Pembroke Dock	Northallerton R.D.C.	G. Morgan & Son, Architects, 24, King-street, Carmarthen	do.
Sewers, East Harlsey	Hertford Corporation	W. Fowle, Northallerton	do.
Fire Station, &c., Mill-road	Bilston U.D.C.	J. H. Jevons, Civil Engineer, Town Hall	Sept. 18
Club Buildings, South Kirby, Yorks	St. Albans Corporation	Garside & Pennington, Architects, Pontefract	do.
Roof Works at Market House	Eastleigh and Bishopstoke U.D.C.	J. D. Wassell, Town Hall	do.
Broken Granite (1,200 tons)	Kensington Vestry	City Surveyor, Victoria-street, St. Albans	do.
Sewerage Works	Tottenham U.D.C.	Lemon & Blizard, Engineers, Lansdowne House, Southampton	do.
*Sewer Works	Fulham Vestry	Surveyor's Office, Town Hall, Kensington High-street	do.
*Kerbing, Channelling, &c.	do.	P. E. Murphy, Engineer, 72, High-road, Tottenham	do.
*Asphalting Normand-road	Belper R.D.C.	Surveyor, Town Hall, Walham Green, S.W.	Sept. 19
*Making-up Roads	*Kingsbury* U.D.C.	do.	do.
Reservoirs	Merthyr Tydfil School Board	J. Erith, Engineer, Baslow	do.
Granite	Lichfield Grammar School	W. T. Mansfield, Public Offices, Kingsbury	do.
*Infants' School	Hertfordshire County Council	J. Llewellin Smith, Architect, Aberdare	Sept. 21
*School	West Ham County Council	See Advertisement	Sept. 22
*Three Shops, Barnes	do.	F. & W. Stocker, Architects, 90, Queen-street, E.C.	Sept. 24
*Police Cottages at Hatfield	do.	County Surveyor, 41, Parliament-street, S.W.	do.
*Quarter Sessions Court, &c.	H.M. Office of Works	Borough Engineer, Town Hall, West Ham, E.	Sept. 25
*Fencing	Sheffield Corporation	do.	do.
*Making-up Streets	do.	do.	do.
*Post Office at W. Brompton, S.W.	Chiswick U.D.C.	Mr. Wager, Office of Works, Storey's Gate, S.W.	do.
*Bridge	Hull Corporation	City Surveyor, Town Hall, Sheffield	do.
*Baths and Library	Aberdeen Corporation	do.	do.
*Alterations and Additions to Free Public Library	Shifnal Guardians	A. Ramsden, Surveyor, Sutton Court, Chiswick	Sept. 26
Pipes, &c.	Mansfield School Board	T. G. Milner, Town Hall	Sept. 27
Electric Generating Plant	Edmonton School Board	J. A. Bell, Engineer, Cotton-street, Aberdeen	Sept. 29
*Infirmary	*Hertford* and Ware Jt. Hosp. Bd.	Clerk, Guardians' Offices, Market Place, Shifnal, Salop	do.
*Schools at Pleasley Hill, near Mansfield	London County Council	Vallance & Westwick, Archts., White Hart Chmbrs., Mansfield	Oct. 1
*School at Croyland-road	Aske's Haberdashers' School	See Advertisement	Oct. 2
*Porter's Lodge, &c.		Clerk, Town Hall, Ware, Herts	Oct. 8
*River Wall at Wandsworth Park		Engineering Department, County Hall, Spring Gardens, S.W.	Oct. 9
*School at West Hampstead		See Advertisement	No date
Wool Warehouse, near Bradford		F. Holland, Architect, 11, Parkinson's-chambers, Bradford	do.
Inn, Netherton, near Rothbury		G. Storey & Co., Rothbury	do.
Ten Houses, Beeston, Leeds		T. Dawson, 13, Town-street, Beeston	do.
Residence, Crosshaven, near Cork		A. Hill, Architect, 22, George's-street, Cork	do.
Hospital, East Ham	Mr. R. Barter	S. Trevail, Architect, Palace-chambers, Westminster	do.
Three Houses, Fordingbridge, Hants		F. Bath, Architect, Salisbury	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
Sanitary Engineer	Brynmawr (Wales) U.D.C.	Not stated	Sept. 18
Clerk of Works	Uckfield R.D.C.	Not stated	Sept. 21

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xix. Public Appointments, p. —

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	s.	d.	
Hard Stocks	35	0	per thousand alongside, in river.
Rough Stocks and Grizzles	31	0	,, ,, ,, ,,
Smooth Bright Facing Stocks..	58	0	,, ,, ,, ,,
Shippers	42	0	,, ,, ,, ,,
Flettons.....	29	6	,, ,, at railway depôt.
Red Wire Cuts ..	35	0	,, ,, ,, ,,
Best Farnham Red	71	6	,, ,, ,, ,,
Best Blue Pressed Staffordshire ..	87	0	,, ,, ,, ,,
Do., Ballnose	92	0	,, ,, ,, ,,
Best Stourbridge Fire Bricks	84	6	,, ,, ,, ,,
Best White Glazed Stretchers.....	260	0	,, ,, ,, ,,
Headers	240	0	,, ,, ,, ,,
Quoins and Bull-nose	340	0	,, ,, ,, ,,
Double Headers..	320	0	,, ,, ,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	,, ,, ,, ,,
Quoins and Bull-nose	280	0	,, ,, ,, ,,
Double Headers..	280	0	per thousand at railway depôt.
Seconds Quality White and Dipped Salt Glazed	40	0	per thousand less than best.

	s.	d.	
Thames and Pit Sand	8	0	per yard, delivered.
Thames Ballast	6	9	,, ,,
Best Portland Cement	37	6	per ton ,,
Best Ground Blue Lias Lime..	24	0	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d.	per yard, delivered.
Stourbridge Fire-clay in sacks,	32s. 6d.	per ton at rly, dpt.

STONE.

	s.	d.	
Ancaster in blocks	2	0	per ft. cube, deld. rly. depôt
Bath ,, ...	1	7	,, ,,
Beer ,, ...	1	6½	,, ,,
Grinshill ,, ...	1	10	,, ,,
Brown Portland in blocks	2	2	,, ,,
Darley Dale ,,	2	1½	,, ,,
Red Corsehill ,,	2	5	,, ,,
Red Mansfield ,,	2	4½	,, ,,
Hard York ,,	2	4½	,, ,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	10	,, ,,
	s.	d.	
	2	7	per ft. super. at rly. depôt.
,, ,, 6 in. Rubbed Ditto..	2	10½	,, ,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1	3	,, ,,
,, ,, 3 in. self-faced Ditto	0	9	,, ,,

SLATES.

in. in.	£	s.	d.	
20 x 10 best blue Bangor..	11	5	0	per 1000 of 1200 at rly. dep.
,, best seconds ,,	10	15	0	,, ,,
16 x 8 best ,,	6	2	6	,, ,,
20 x 10 best blue Portmadoc ..	10	18	0	,, ,,
16 x 8 best blue Portmadoc	6	0	0	per 1000 of 1200 at rly. dep.
20 x 10 best Eureka unfading green.....	11	2	6	,, ,,
16 x 8 ,, ,,	6	15	0	,, ,,
20 x 10 Permanent green and Sedan green	10	0	0	,, ,,
16 x 8 ,, ,,	5	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles..	41	6	per 1,000 at rly. depôt.
Hip and valley tiles....	3	7	per doz. ,, ,,
Best Broseley tiles	48	6	per 1,000 ,, ,,
Hip and valley tiles....	4	0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000 ,, ,,
Do. ornamental Do.	60	0	,, ,, ,,
Hip tiles.....	4	0	per doz. ,, ,,
Valley tiles.....	3	9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000 ,, ,,
Hip tiles	4	1	per doz. ,, ,,
Valley tiles.....	3	8	,, ,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16	10	0	18	0	0
Deals: best 3 by 9	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12	10	0	13	10	0
Battens: best 2½ by 6 and 3 by 6 ..	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds.....	0	10	0	,, ,, ,,		

	At per load of 50 ft.					
Fir timber: Best middling Danzig or Memel (average specification)	4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Swedish balks.....	2	15	0	3	0	0
Pitch pine timber (35 ft. average)..	4	0	0	4	10	0

PRICES CURRENT (*Continued*).

JOINERS' WOOD.

	At per standard. £	s.	d.	£	s.	d.
White Sea: First yellow deals, 3 in. by 11 in.....	27	10	0	28	10	0
3 in. by 9 in.	24	0	0	25	0	0
Battens, 2½ in. and 3 in. by 7 in.	20	0	0	21	0	0
Second yellow deals, 3 in. by 11 in.	22	10	0	24	0	0
,, ,, 3 in. by 9 in.	20	0	0	21	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	18	0	0
Third yellow deals, 3 in. by 11 in. and 9 in.	16	10	0	18	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	25	0	0	26	0	0
Do. 3 in. by 9 in.	22	0	0	23	0	0
Battens.....	16	10	0	17	10	0
Second yellow deals, 3 in. by 11 in.....	18	10	0	20	0	0
Do. 3 in. by 9 in.	17	0	0	18	0	0
Battens.....	14	0	0	14	10	0
Third yellow deals, 3 in. by 11 in.....	15	0	0	16	10	0
Do. 3 in. by 9 in.	14	0	0	14	10	0
Battens.....	12	10	0	13	10	0
White Sea and Petersburg:—						
First white deals, 3 in. by 11 in..	15	10	0	16	10	0
,, ,, ,, 3 in. by 9 in. ..	14	0	0	15	0	0
Battens.....	12	10	0	13	10	0
Second white deals 3 in. by 11 in.	14	0	0	15	0	0
,, ,, ,, 3 in. by 9 in.	13	0	0	14	0	0
,, ,, battens	11	0	0	12	0	0
Pitch pine: deals.....	16	0	0	18	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—						
First, regular sizes	30	0	0	33	0	0
Broads (12 in. and up)	2	0	0	more.		
Oddments	22	0	0	24	0	0
Seconds, regular sizes	24	10	0	26	10	0
Oddments	20	0	0	22	0	0
Kauri Pine—						
Planks, per ft. cube	0	3	6	0	4	6
Danzig and Stettin Oak Logs—						
Large, per ft. cube	0	2	6	0	2	8
Small ,, ,, ...	0	2	4	0	2	7
Wainscot Oak Logs, per ft. cube ..	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	0	0	9
¾ in. do. do.	0	0	7	-	-	-
Dry Mahogany—						
Honduras, Tabasco, per ft. sup. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch..	0	0	10	0	1	0
Teak, per load	16	0	0	20	0	0
American Whitewood Planks—						
Per ft. cube.....	0	2	3	0	3	0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	9	7	6	-	-	-
Compound Girders ,, ,,	13	10	0	-	-	-
Angles, Tees and Channels, ordinary sections	12	10	0	14	10	0
Flitch Plates	12	0	0	-	-	-

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON.—						
Common Bars.....	10	0	0	10	12	0
Staffordshire Crown Bars, good merchant quality	11	5	0	11	15	0
Staffordshire "Marked Bars" ..	13	5	0	-	-	-
Hoop Iron, basis price.....	11	5	0	11	15	0
,, ,, galvanised	17	0	0*	-	-	-
(* And upwards, according to size and gauge.)						
Sheet Iron, Black.—						
Ordinary sizes to 20 g.	11	10	0	-	-	-
,, ,, to 24 g.....	12	15	0	-	-	-
,, ,, to 26 g.....	13	15	0	-	-	-
Sheet Iron, Galvanised, flat, ordinary quality.—						
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14	15	0	-	-	-
,, ,, 22 g. and 24 g.	15	5	0	-	-	-
,, ,, 26 g.....	16	15	0	-	-	-
Sheet Iron, galvanised, flat, best quality.—						
Ordinary sizes to 20 g.	18	10	0	-	-	-
,, ,, 22 g. and 24 g.	19	0	0	-	-	-
,, ,, 26 g.....	20	10	0	-	-	-
Galvanised Corrugated Sheets.—						
Ordinary sizes, 6 ft. to 8 ft 20 g.	14	0	0	14	15	0
,, ,, 20 g. and 24 g.	14	15	0	15	10	0
Cut nails, 3 in. to 6 in.....	11	10	0	-	-	-
(Under 3 in. usual trade extras.)						
LEAD—Sheet, English, 3 lbs. & up.	20	7	6	-	-	-
Pipe in coils	20	17	6	-	-	-
ZINC—Sheet—						
Vieille Montagne ..... ton	28	0	0	-	-	-
Silesian.....	27	10	0	-	-	-
COPPER—						
Strong Sheet..... per lb.	0	1	1	-	-	-
Thin ..... ,,	0	1	3	-	-	-
Copper nails ..... ,,	0	1	3	-	-	-
BRASS—						
Strong Sheet..... ,,	0	0	11	-	-	-
Thin ,, ,,	0	1	1	-	-	-
TIN—English Ingots ..... ,,	0	1	7	-	-	-
SOLDER—Plumbers' ..... ,,	0	0	8	-	-	-
Tinmen's ..... ,,	0	0	10	-	-	-
Blowpipe ..... ,,	0	1	0	-	-	-

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3½d. ,, ,,
,, ,, fourths.....	3d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths	5d. ,, ,,
Fluted sheet, 15 oz.	3¼d. ,, ,,
,, ,, 21 ,, ...	4¼d. ,, ,,
½ Hartley's Rolled Plate.....	3d. ,, ,,
⅜ ,, ,, ,, ...	3½d. ,, ,,
¼ ,, ,, ,, ...	4d. ,, ,,

PRICES CURRENT *Continued*).

OILS, &c.

	£	s.	d.
Raw Linseed Oil in pipes.....per gallon	0	3	1
,, ,, ,, in barrels ..... ,,	0	3	2
,, ,, ,, in drums ..... ,,	0	3	4
Boiled ,, ,, in pipes..... ,,	0	3	4
,, ,, ,, in barrels ..... ,,	0	3	5
,, ,, ,, in drums ..... ,,	0	3	7
Turpentine, in barrels ..... ,,	0	2	6
,, in drums..... ,,	0	2	9
Genuine Ground English White Lead ...per ton	27	10	0
Red Lead, Dry..... ,,	25	0	0
Best Linseed Oil Putty.....per cwt.	0	9	6
Stockholm Tar .....per barrel	1	7	0

VARNISHES, &c.

	per gallon. £	s.	d.
Fine Elastic Copal Varnish or outside work ..	0	16	6
Best Elastic Copal Varnish for outside work ..	1	0	0
Best Elastic Carriage Varnish for outside work	0	16	6
Best Hard Oak Varnish for inside work	0	10	6
Best Extra Hard Church Oak Varnish for inside work	0	10	6
Fine Hard Copal Varnish for inside work	0	16	0
Best Hard Copal Varnish for inside work	1	0	0
Best Hard Carriage Varnish for inside work....	0	16	0
Extra Pale Paper Varnish	0	12	0
Best Japan Gold Size	0	10	0
Best Black Japan	0	10	0
Oak and Mahogany Stain	0	16	0
Brunswick Black	0	9	0
Berlin Black	0	9	0
Knotting	0	15	6
Best French and Brush Polish	0	10	0

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M. & F.—W. S.—S. S. P. (Amounts should have been stated.)

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BARNET.—For the supply of granite road metal (500 tons), &c., for the South Mimms Rural District Council:—

	Per ton.
Granite.—A. & F. Manuelle, 57, Grace-church-st., E.C.*	10s. 8d.
Gravel.—Josiah Smart, Finsbury Park*	4s. 0d.
D. S. Hoggin.—Josiah Smart, Finsbury Park*	4s. 3d.
Ordinary Hoggin.—Josiah Smart, Finsbury Park*.....	3s. 9d.

BIRMINGHAM.—For the erection of a building (for nurses, &c.) at the workhouse, Gravelly Hill, Aston, for the Guardians of Aston Union. Mr. Cooper Whitwell, architect, 23, Temple-row, Birmingham. Quantities by the architect:—

	£		£
Harley & Son.....	10,962	Whitehouse & Sons	10,122
J. & W. Webb	10,900	A. Colin Hughes ..	9,977
Barnsley & Sons ..	10,700	T. Johnson, Birmingham*	9,900
Lee & Son	10,250		
W. Harvey Gibbs..	10,250		

BRADFORD.—For the erection of an electric-lighting station at the workhouse, for the Guardians. Mr. F. Holland, engineer, 11, Parkinson's-chambers, Hustlergate, Bradford.

	£	s.	d.
Masonry.—G. Day, Bradford	263	15	8
Joinery.—Toothill & Balmforth, Bradford.....	145	0	0
Plumbing.—C. Howroyd, Bradford..	67	10	0
Plastering.—J. Rawnsley, Bradford	76	14	6
Ironfounding. — Bagshaw & Sons, Ltd., Batley.	111	15	0
Slating.—J. Smithies, Bradford	54	10	0
Painting.—A. Walmsley, Bradford..	25	0	0

BRIDLINGTON.—For the erection of a fire brigade station, Portland-place, for the Corporation. Mr. E. R. Matthews, C.E., Borough Surveyor, Town Hall, Bridlington:—

	£	s.	d.
Sampson & Siddall, Marshall-avenue, Bridlington*	439	3	6

BROMLEY.—For alterations, redrainage, and repairs, &c., to Springhill, Bromley, Kent, for a school of domestic economy for the county, for the Kent County Council Technical Education Committee. Messrs. Wadmore, Wadmore, & Mallett, architects, 8, Bream's-buildings, Chancery-lane, E.C.:—

	£		£
F. W. Green.....	1,373	Syme & Duncan	1,110
Crossley & Son	1,339	D. Payne	1,110
Podger & Son	1,270	Arnaud & Son	1,020
R. A. Lowe	1,271	F. P. Duthoit, Bromley*	977
T. D. Graty	1,145		

[*See also next page.*

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BURY (Lancs.).—For the erection of shops, Crompton-street, for Mr. J. Whittam. Messrs. Openshaw & Gill, architects, 6, Fleet-street, Bury. Quantities by Mr. Wm. E. Gill :—

C. Brierley	£1,510	J. Hall	£1,276
Thompson & Brierley	1,406	S. Clough	1,250
Newhouse & Son	1,400	J. Tinline, Parker-st., Bury*	1,190
J. Comfort	1,383		
Jas. Byron	1,331		

CARDIFF.—For the erection of a chapel, Keppoch-street, Roath. Messrs. W. Beddoe Rees and J. H. James, architects, 37, St. Mary-street, Cardiff :—

G. Hallet	£4,750 0 0	Symonds & Co.	£4,306 7 0
Powell & Mansfield	4,559 0 0	Turner & Sons	4,245 0 0
Knox & Wells	4,500 0 0	D. Davies	4,190 0 0
J. Allen	4,467 0 0	Price Bros.	4,158 0 0
Lathy & Co.	4,387 0 0	W. T. Morgan	4,150 0 0
Evans Bros.	4,317 8 5	J. E. Evans	4,050 0 0
		Chubb & Co.*	3,750 0 0

[All of Cardiff.]

CASHEL (Ireland).—For additions to the workhouse for the Guardians. Mr. Henry Powell, architect, Cashel :—
Patrick O'Brien, Cashel £129

CUPAR FIFE (N.B.).—For the construction of a steel girder bridge over the river Eden, for the Police Commissioners. Mr. Henry Bruce, C.E., County Buildings, Cupar Fife. Quantities by Engineer :—

Somervail & Co.	£926 0 0	Balfour & Co.	£700 2 0
J. O. Brettell	883 8 10	Findlay & Co.	675 0 0
Brandon Bridge Building Co.	847 13 6	Schonfield & Co., Glasgow*	672 15 6
Smith & Co.	722 18 10		

DEVONPORT. — For erecting the Royal Sailors' Home, Devonport, for the Committee. Mr. H. J. Snell, architect, Plymouth :—

Tozer & Son	£9,640	W. Littleton	£8,695
W. H. Lethbridge	9,460	Wakeham Bros.	8,642
Pearn Bros.	9,450	T. May	8,487
J. P. Berry	8,939	J. Partridge, Plymouth*	8,470
A. Andrews	8,888		

FENNY STRATFORD.—For the erection of school buildings (new girls' school), for the School Board. Mr. John Chadwick, architect, Fenny Stratford. Quantities by architect :—

W. Wade	£4,788	Walter & Austen	£4,413
T. Yirrell	4,597	A. Taylor, Fenny Stratford‡	4,360
T. T. Coleman	4,585		
A. Adkins*	4,497		

‡ Accepted subject to approval of Education Department

HANLEY.—For the erection of Grove Schools for the Hanley School Board. Messrs. R. Scrivener & Sons, architects, Hanley :—

Ellis	£10,739	Grant	£9,900
Longden	10,355	Bagnall	9,793
Godwin	10,085	Tompkinson & Bettelley, Longton*	9,577
Bennett	10,050		

LONDON.—For repairs to six houses in Spencer-road Stoke Newington, N., for Mr. H. A. Cockerton :—
Robinson & Co. £105

LONDON.—For the putting in of sewers in five new roads, Ford's Park Estate, Canning Town, E., for Mr. J. E. Ford. Mr. S. Ford, architect and surveyor, 3, South-square, Gray's Inn :—
Killingback* £731
[Seven others tendered.]

PUDSEY.—For kerbing, channelling, and sewering Arundale-street, for Trustees of Thomas and Sarah Lund's Charity, R. E. Farrer, and G. B. Collins. Mr. Percy Dufton, C.E., 12, Somerset-road, Pudsey. Quantities by engineer :—

Loveday & Barnett	£470 9 0½	H. Wilson	£422 6 1
Ross, Wilks, & Crabtree	460 0 0	Wood Bros.	415 0 0
A. Overend	453 9 10	Hall & Sons	382 1 1
Milligan & Busfield	450 9 0	Walmough & Preston	372 9 3
		W. Hutton, Pudsey*	370 8 3

ST. GILES (Devon).—For the erection of school buildings, residence, &c., for the School Board. Messrs. Wise & Wise, architects, Launceston :—

J. & H. Rich	£1,266	J. Northcott, Ashwater*	£1,200
Broad & Werren	1,225		

SHIPSTON-ON-STOUR.—For the construction of a reservoir, and laying five miles C.I. mains, &c., for the Rural District Council. Mr. J. E. Willcox, C.E., 63, Temple-row, Birmingham :—

Herbert Holloway	£4,263	J. W. Lord	£3,200
H. Law	3,800	J. Jameson	2,934
Rowell & Sons	3,216	Thomas Vale	2,878

SKERRIES (Co. Dublin).—For the erection of sea-water baths, concert hall, &c., for the Skerries Baths Company, Limited. Mr. Frederick Shaw, architect, 20, Laurence-street, Drogheda :—

S. Henty	£1,799	Wm. Flanagan, Skerries*	‡£1,447
T. Creaser	1,750	F. Gogarty	1,350
B. McDonnell	1,600		

‡ For the building only. Baths, boiler, &c., will form a separate contract.

SOUTHALL (Middlesex).—For the erection of fire-engine house, High-street, for the Southall-Norwood Urban District Council. Mr. Howard R. Felkin, surveyor, Southall. Quantities by surveyor :—

E. Plaistowe	£588 5 7	P. Bell	£549 18 0
D. J. Kirby	586 11 0	A. & B. Hanson*	543 0 0
H. E. Willis	575 17 4		

[All of Southall.]

TUNBRIDGE WELLS.—For rebuilding No. 37 and alterations to No. 35, The Pantiles, Tunbridge Wells, for the executors of the late Mr. John Charlton. Mr. C. H. Strange, architect, 10, Grosvenor-road, Tunbridge Wells :—

J. Jarvis	£1,615	Mansfield & Son, Tunbridge Wells*	£1,495
Strange & Sons	1,584		

WALTHAMSTOW.—For six houses at Havant-road Walthamstow :—
R. C. Frost* ..... £1,[illegible]

WOLVERHAMPTON.—For rebuilding the Red Cow Inn, Wolverhampton. Mr. R. J. Rowe, architect. Quantities by Mr. W. Webb :—

Tildesley	£1,187	Skett	£1,150
Herbert	1,185	Gough	1,120
Morrell	1,170	Cave*	1,098

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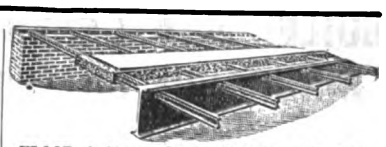

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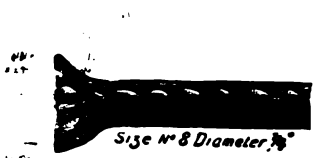

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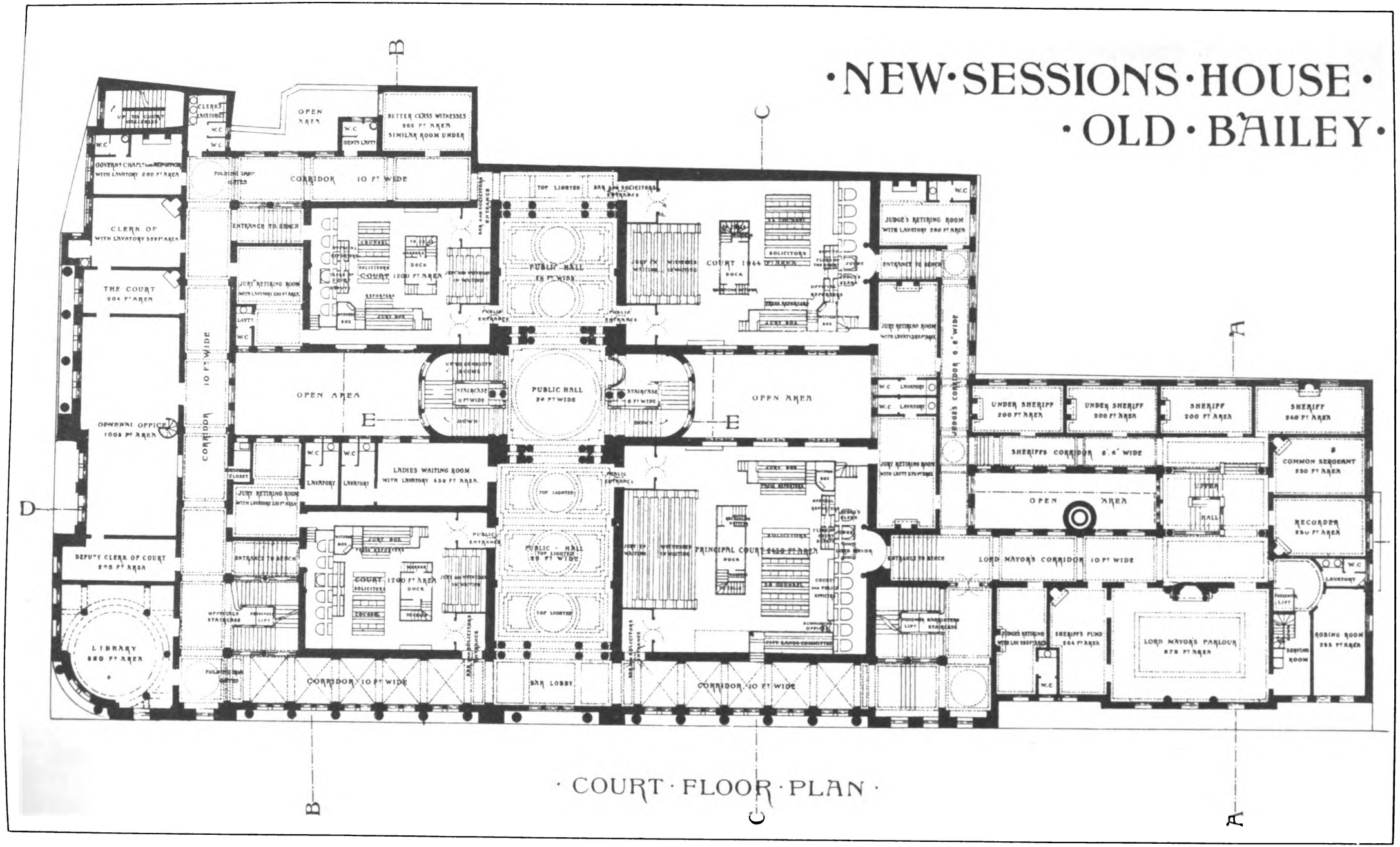

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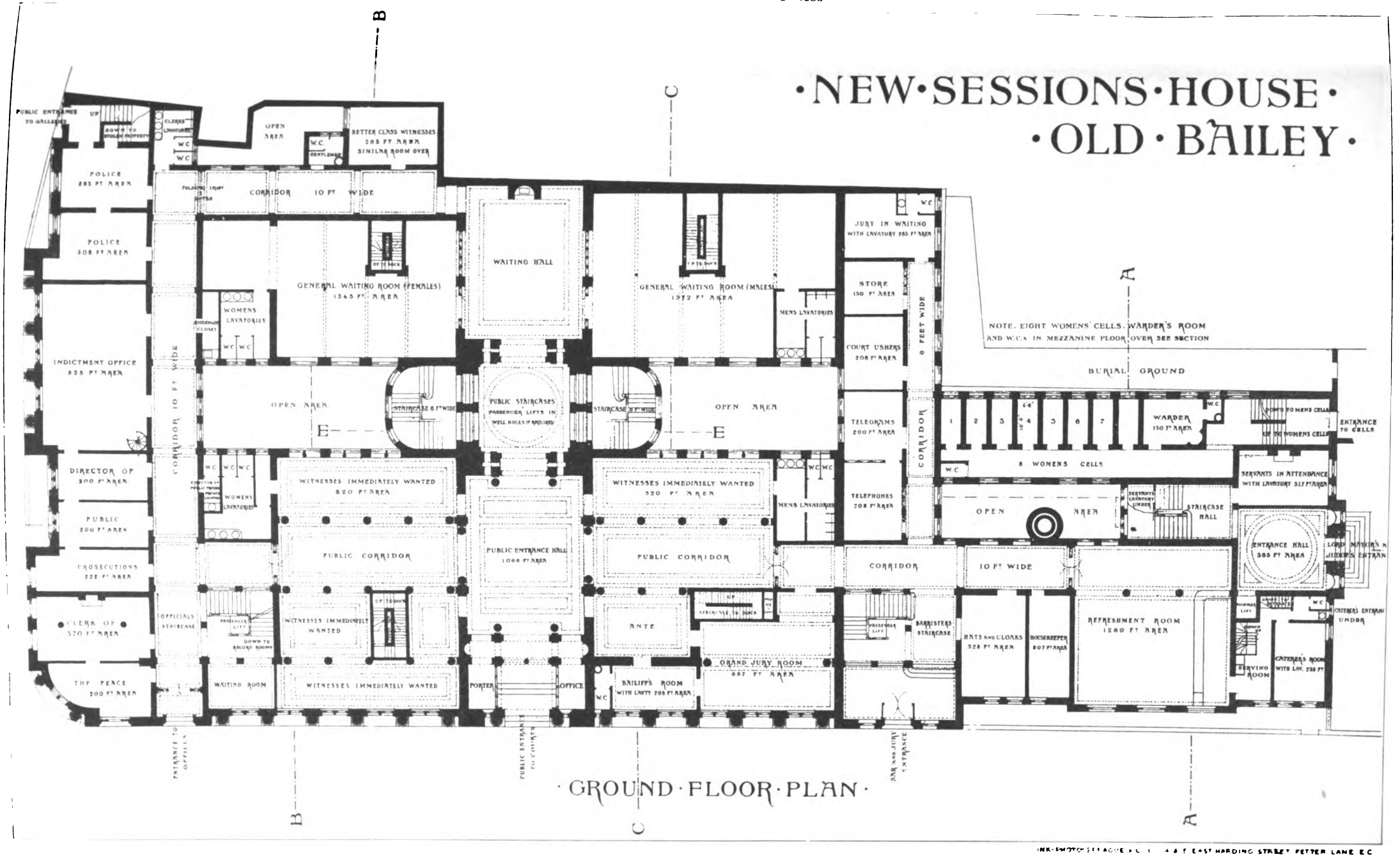

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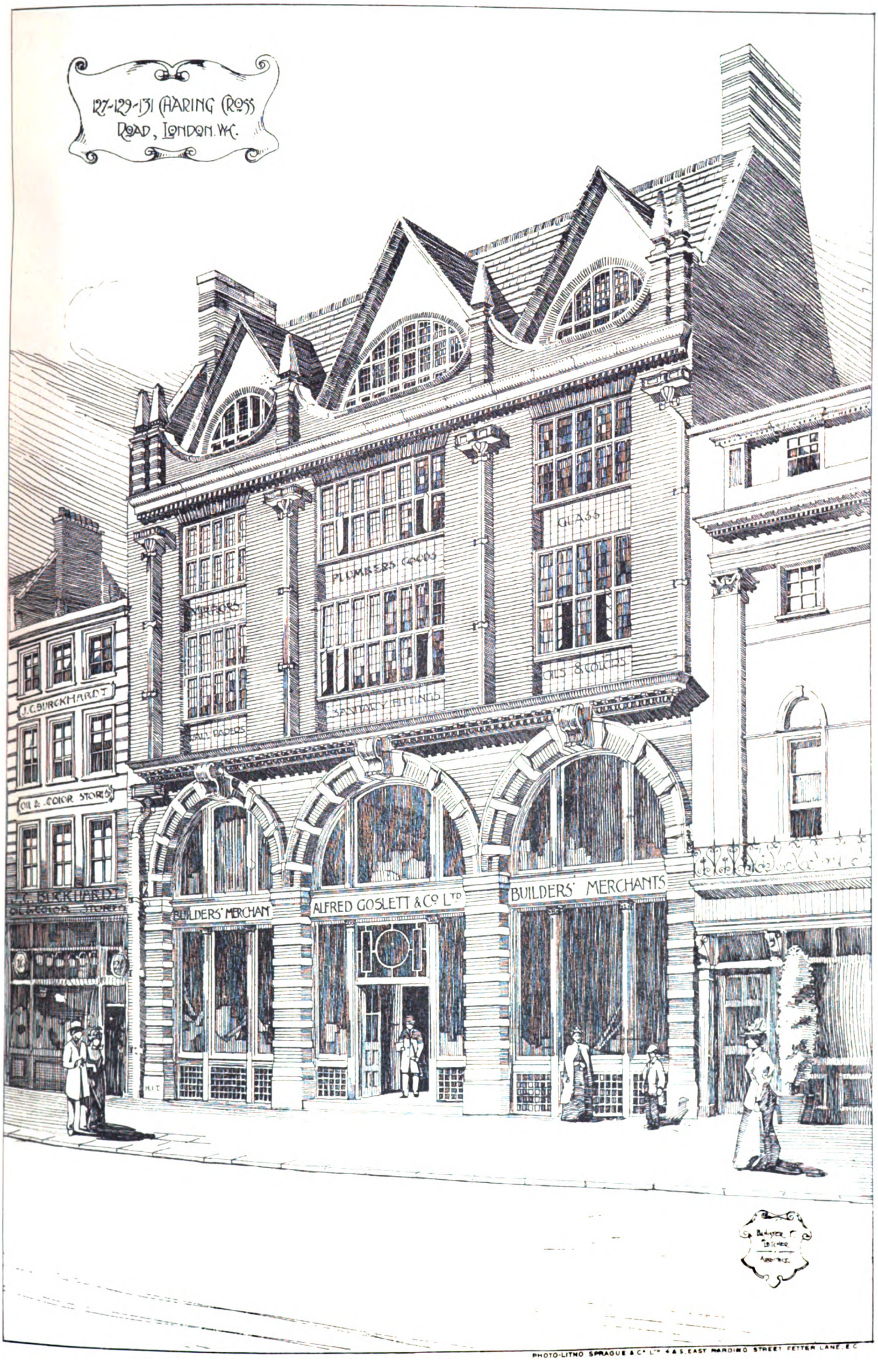

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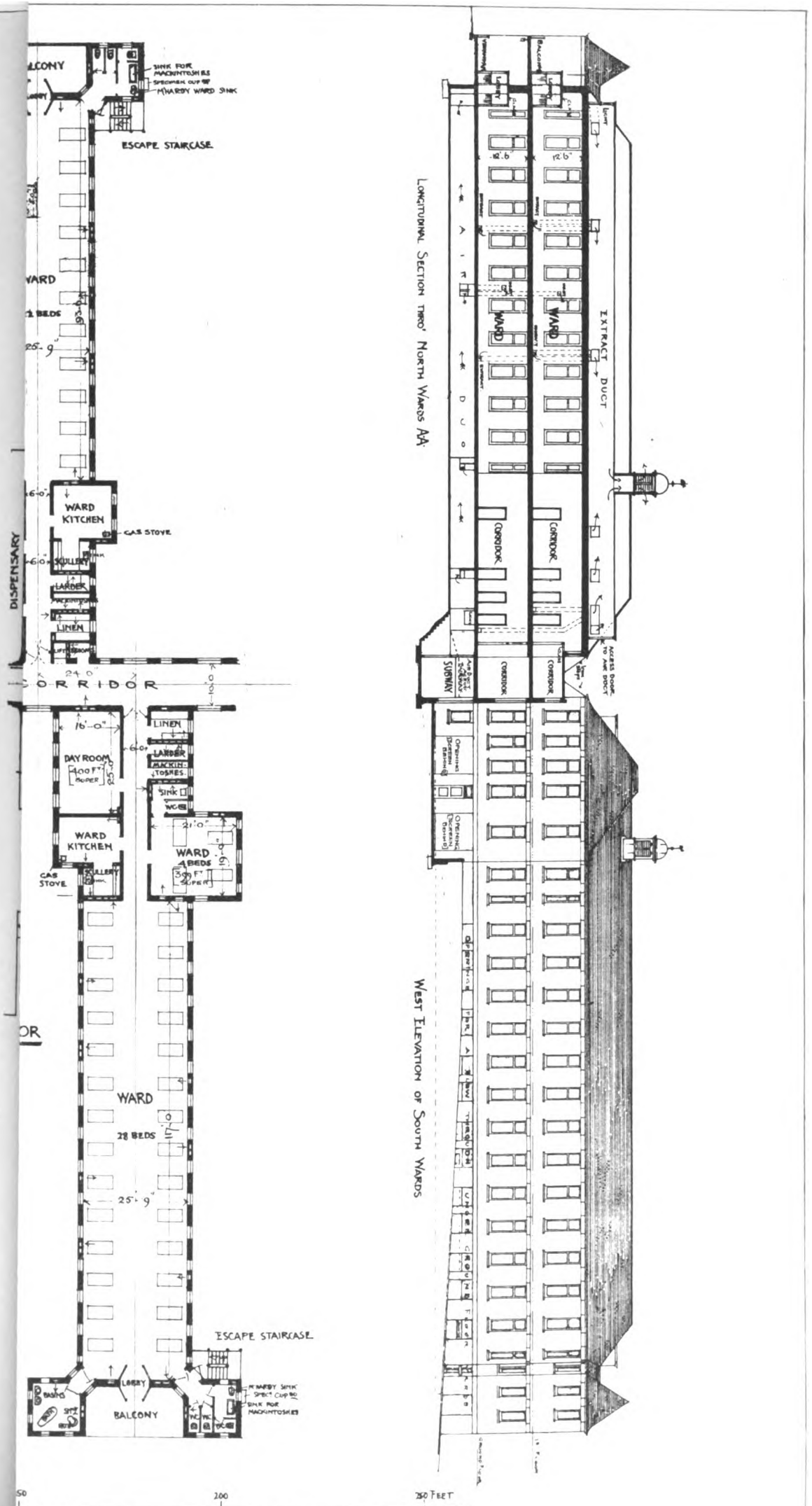

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Notes on the Swedish Timber Trade.

II.

THE Swedish export trade in logs and square timber is comparatively small. At many of the mills—even the largest — no more square timber is sawn than is required in the structures appertaining to the mills, such as quays, jetties, gangways, &c. The annual exports of logs and square timber amount to only about 100,000 standards, less than one-tenth of the output of deals, battens, and boards. The fact is, of course, that the British market is now supplied with square timber chiefly from the United States and Canada. Most European coniferous trees are too small for conversion into beams of even moderate scantling.

The first fact which strikes the visitor to the Swedish timber yards is the small size of the converted stuff. Stack after stack of small battens and deals follow each other for hundreds of yards; here and there are stacks of 9 in. by 3 in. deals, but at many of the ports one looks in vain for anything larger. The scantling most frequently seen is 7 in. by 2 in., but immense quantities of smaller stuff are stacked, the width varying by half inches down to as little as 3 in. The most common thickness is 2 in., but stuff 2½ in., 3 in., and 4 in. thick is also cut, and in one yard we noticed some battens measuring 5½ in. by 2⅜ in. In addition to these small battens there are large quantities of boards from 4 in. by ⅞ in. to 9 in. by 1⅜ in., the wide boards being chiefly for the Dutch market. Many sizes of deals are also cut, so that almost any size can be obtained from stock, either at one port or another. Among the larger scantlings we noticed were 8 in. by 2 in. and 3 in., 9 in. by 2 in. and 3 in. and 4 in., 10 in. by 3 in. and 4 in., 11 in. by 2 in. and 3 in. and 4 in., and 12 in. by 3 in. and 4 in., and other sizes can no doubt be obtained. This variety is a great advantage to the architect and builder, as nearly any specification can be carried out without waste of material.

The large scantlings cannot, however, be obtained at all the ports, at any rate, in great quantities. At some of the mills practically nothing larger than 7 in. by 3 in. is cut; perhaps there may be a small output of 9 in. by 2 in. and 9 in. by 3 in. stuff, but in comparison with the trade in battens the quantity of deals is quite insignificant. English measures are generally used both for length and cross sections.

A glance at the logs collected within the booms adjoining the mills suffices to explain the smallness of the scantlings which are obtained. At many of the ports the logs are nearly all less than 9 in. in diameter at the smaller end, and consequently cannot be converted into anything wider than about 7 in. These logs are often converted into six pieces by means of vertical saw-frames containing five saws, as shown in fig. 1. The pieces C and D are 2 in. thick, and are at once converted into a rectangular section, as shown by the dotted lines, by passing them through a pair of parallel circular saws set at the required distance apart. These may be afterwards sawn into two 1-in. boards, either by a circular saw or by a band re-saw, the latter being preferred, as the saw is thinner and consequently wastes less material. The pieces B and E form two boards 1 in. thick, and the slabs A and F may, if large enough, be utilised for thin narrow boards or small moulds, or otherwise sent to the charcoal yard and there converted into charcoal. Larger logs are often treated in a different manner, involving less labour and less waste. The log is first slabbed on two sides (at one operation), as shown in fig. 2, No. 1. It is then turned on to one of the slabbed sides, and passed through another saw-frame, by which it is converted into three or more deals and boards and two additional slabs (fig. 2, No. 2). From each of the four slabs a board can generally be obtained, but it will probably contain a good deal of sap. It will be observed that by this method the three deals are completed at two operations, whereas by the former method *each* deal must, after passing the saw-frame, be run through the parallel circular saws. Of course there are many other methods of conversion, different mills adopting different methods. The log shown in fig. 2 might be cut to yield a central piece 11 in. by 3 in. instead of 9 in. by 3 in., but this would involve more labour.

The converted deals are carried automatically along tables and gangways by means of revolving rollers (driven by power) placed at suitable intervals, and are discharged into tramway trucks, in which they are conveyed to the timber-yard. Here they are stacked according to size, being laid with open joints to facilitate the circulation of air, and being covered on the top with a sloping roof of loose boards to protect them from the burning heat of the summer sun.

The Stora Kopparbergs Company at Skutskär, near Gefle, in addition to this natural seasoning, has a large drying kiln—the first of its kind, we believe, in Sweden. It is a lofty structure with brick walls, and consists of two parallel rows of cells with upper and lower air-conduits between. There are sixteen cells in all, each capable of holding about twenty standards, and each has movable wood covers at the top. The kiln measures about 250 ft. by 75 ft., and raised above the top of it is a roof which is carried forward over a long and lofty store-shed beyond. Steam is brought in a wooden conduit raised on trestles, from a special boiler placed alongside the nine other boilers in the saw-mills, and is passed through pipes between which a circulation of air is maintained by means of fans. The hot air passes along the upper of the two conduits which run between the rows of cells, and is admitted to the cells through shutters which can be regulated as required. The wood in the cells is stacked with open joints, part being laid on tiers of iron brackets projecting from the walls. After passing through the cell the air returns along the lower conduit. One row of cells is at

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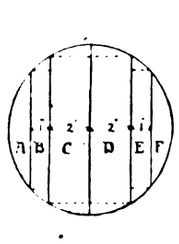
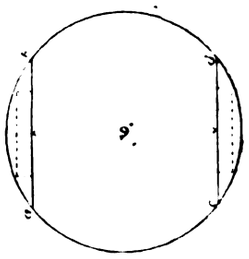


Fig. 1.



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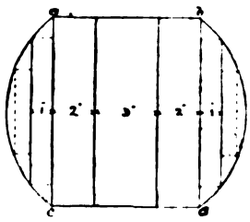

No. 2.

Fig. 2.

work, while the other is being emptied and refilled. Two electric cranes, travelling, respectively, over the two rows of cells, are used for raising the wet wood, carrying it as required and lowering it into the cells, and also for lifting the dried wood from the cells and conveying it into the store-shed beyond. In from two to four days, according to the size of the scantling and other factors, the wood is dry enough for shipment.

The Korsnäs Company, also at Gefle, is following the Stora Kopparbergs Company's lead, and other companies will, no doubt, soon do the same. The great wonder is that such kilns have not been built years ago, as they give better results than months of natural seasoning, besides effecting a great saving of storage space and of time; logs can be converted into a cargo of deals, and these can be dried and shipped without undue detention of the vessel.

The deals and battens are not generally cross-cut—*i.e.*, the ends are not sawn off—until a vessel is waiting for them. The deals are run in trucks to one of the many sheds built for the purpose—we are describing now the method in operation at the Stora Kopparbergs Works—and each deal is seized by two men, one at each end, who lay it on a table marked with feet and metres, and with pencils indicate where the defective ends must be cut off. A lever is pressed, and revolving rollers rise through the table and carry the deal forward to a boy, who, by pressing another lever, raises a circular saw which cuts off the end of the deal at the first mark. The operation is repeated at the second mark, and the deal travels forward to the barge or lighter which is moored at the end of the shed. There two boys are at work, stencilling the brand on the ends of the deals. These are then ready for conveyance to the vessel which is moored to an adjacent quay. Electric motors supply the power in these sheds. The ends cut from the deals are piled by women into stacks, according to their size and quality, part being used for firewood and part for conversion into boards for boxes or other small articles.

There is no waste in a Swedish sawmill. At some of the mills, as at Sundsvall, much of the "offal" is cut into 3-ft. lengths and sold as firewood to the small coasting steamers. The best is shipped to England (being sold by the cubic fathom, *i.e.*, 6 ft. by 6 ft. by 6 ft.), to be there sawn and split into firewood for domestic purposes. The chips, shavings, and sawdust are used as fuel for the boilers of the works, being conveyed to these automatically by "paternoster" belts running in wooden troughs in the lower story of the mill. Other offal, such as the small convex slabs sawn from the logs, is converted into charcoal, a small part of which is used for the blacksmith's forges in the sawmills, the greater part, however, being sold for smelting the well-known Swedish iron.

The usual method of charcoal-burning consists in building a circular pile of wood (the pieces being placed vertically) about 18 yards in diameter and 12 ft. high. Boards are fixed horizontally around this, forming a series of shelves so that the exterior can be covered with charcoal dust or saw-dust to exclude the air. The fire is lit at the centre of the top, and the whole of the top is covered with saw-dust. The burning continues for five or six weeks before it is complete and the charcoal ready for raking out. A brick charcoal-kiln at the Stora Kopparbergs Works does the work equally well in about six days, and has the advantage of separating the tar and wood-spirit so that these can be drawn off by pipes.

The commonest defect of Swedish deals, battens, and boards, is sap, a defect which is unavoidable so long as small logs are converted into the largest possible scantlings, and boards are cut from slabs. The best boards, of course, are cut from the central parts of the logs, either directly or, more generally, by re-sawing battens, but other boards are obtained from the outer portions of the log, as shown in figs. 1 and 2, and these are certain to be more or less sappy. The deals and battens also in many cases trench so closely upon the periphery of the log that they include a considerable proportion of sapwood. Indeed, a great many logs are converted into larger scantlings than they are properly capable of making, the result being that the deals and battens are wany for a considerable proportion of their length. The presence of sap not only discolours the wood and renders it unfit for varnishing, but makes it more liable to decay. There can be no doubt that this is a most serious defect in Swedish wood generally, but especially in wood from ports where comparatively small scantlings only can be obtained. Where the logs are of larger size, as at Gefle and some of the most northerly ports, deals are often obtained practically free from sap. Thus the central deal in fig. 2, No. 2, will be of this kind, and the two side deals will contain only a small amount of sap at the angles nearest the periphery of the log.

It is only natural that the owners of the saw-mills try to get the largest possible scantlings out of a log, as much better prices can be obtained for larger stuff. Thus, in December last, a Petersburg standard (*i.e.*, 165 cubic feet) of 7 in. by 2½ in. Gefle red ("Mixed" quality) was worth 12*l.*, but the same quantity of 9 in. by 3 in. stuff was worth no less than 16*l.*, an increase of 33 per cent. in value, due solely to the extra size of scantling, the quality and the number of cubic feet being the same in both cases. In this connexion it may be interesting to give the prices for the other qualities of red wood per standard, and to compare them with the prices current a year before. These figures are extracted from the British Consul's last report on the trade of Gefle:—

Scantling.	Quality.	Price per Standard. Dec., 1898.	Dec., 1899.
		£ s.	£ s.
9 in. by 3 in.	Mixed.	13 0	16 0
"	Thirds.	11 0	14 0
"	Fourths	8 10	11 0
"	Fifths.	7 10	10 0
7 in. by 2½ in.	Mixed.	10 10	12 0
"	Thirds.	8 10	10 0
"	Fourths.	7 10	8 15
"	Fifths.	6 15	8 0

The prices for 1899 show an increase over those for 1898 of about 27 per cent. for 9 in. by 3 in., and about 16 per cent. for 7 in. by 2½ in. These figures prove the increasing scarcity of large scantlings. Indeed, a builder recently informed us that, in reply to his inquiry for 11 in. by 4 in. stuff, an English timber merchant declared that he had none either in stock or on the way. The time does not appear to be far distant when English architects will be compelled to specify that all joists and roof-timbers larger than, say, 7 in. by 3 in. must be of pitch-pine or other American wood.

Swedish boards are sold in the rough as they leave the saws, or planed and thicknessed; in the latter case, they are sometimes also tongued and grooved. Beaded boards are also made as well as moulds for door-panels, moulded architraves, and other joiners' woodwork. Into the details of manufacture of these goods we need not enter. Suffice it to say that the requirements of different countries appear to be carefully studied. Holland prefers floor-boards about 9 in. wide, while for Great Britain boards 6 in. or 7 in. wide are made. Holland also prefers a bead with deeper quirks than are desired in this country.

The trees are generally felled during the winter, from December to March or April, and the logs are run down to the frozen rivers and lakes; when the snow and ice melt the logs float down to convenient places near the mouths of the rivers, where they are sorted according to their different owners, and the sorted logs are then passed on to the different mills. At Sundsvall, for example, the logs are sorted at the mouths of the Indals and Ljungan rivers, and then formed into rafts and towed by steam-tugs to the thirty-nine saw-mills scattered about the harbour. The Stora Kopparbergs Company's logs are, however, sorted at Farnäs on the Dal River, and floated thence to the saw-mills along a private canal about six miles long, constructed at a cost of nearly 30,000*l.*; alongside this canal a circular wooden conduit about 4 ft. in diameter conveys fresh water to the wood-pulp mill belonging to the company.

In conclusion the qualities and brands now adopted by a few of the Swedish saw-mills will be given, partly to show the various classifications adopted and partly in order that architects may have some guide to the quality of wood supplied to their buildings. The brands are arranged according to the different districts, beginning at the north and proceeding southwards and finally up the west coast to Gothenburg. The double classification adopted in the

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Skelleftea district is worth notice. The different meanings of the term "Unsorted," or "U/S," ought also to be considered. Sometimes the term is accurately applied, and includes wood of all qualities. This is generally the case with white wood. Occasionally, also, it has this meaning when applied to red wood, but very much more frequently "Unsorted" red wood includes only "Thirds" and lower qualities, and *not* "Firsts" and "Seconds" (or "Mixed").

—		Sawn.
Piteå, Storfors and Bergvik,	1sts and 2nds..	STOR
,,	3rds and 4ths..	FORS
,,	Unsorted..	STF
,,	6ths..	✱✱✱✱
Skelleftea, Öhrviken,	Mixed red..	♚O♚
,,	3rds ,, ..	O✱B
,,	4ths ,, ..	◆O◆
,,	5ths ,, ..	OWB
,,	6ths ,, ..	OHAB
,,	1sts ,, (Mixed and 3rds)	O♚F
,,	2nds red (4ths and 5ths)	O✱F
,,	u/s red..	OBF
,,	u/s white..	OBG
Skelleftea, Ursviken,	Mixed red..	SA♚B
,,	3rds ,, ..	S—A—B
,,	4ths ,, ..	S=B
,,	5ths ,, ..	—S—
,,	6ths ,, ..	✠
,,	1sts ,, ..	SK♚AB
,,	2nds ..	SK✱AB
,,	u/s ,, ..	SAB
,,	u/s white..	SAB
Skelleftea Habergrund,	u/s red and white..	H✱B
Skelleftea, (Markstedt & Son)	Mixed..	AM&S
,,	3rds..	A+M
,,	4ths..	MA
,,	5ths..	MS
,,	u/s..	AMS
,,	Inferior 5ths..	MST
Umea, Homefors,	Mixed..	NO♚RD
,,	3rds..	NO✱RD
,,	4ths..	NORD
,,	5ths..	NO+RD
,,	u/s..	HR
,, Mo,	Mixed..	JCK
,,	3rds..	C+K
,,	4ths..	K+K
,,	5ths..	KKK
,,	6ths..	VVV
,,	Wrack..	VVVV
,,	u/s..	M+D
Örnsköldsvik, Husum,	Mixed and 3rds..	HUSUM
,,	4ths..	HUS
,,	5ths..	GIDA
,,	6ths..	H✱H
Örnsköldsvik, Domsjö (as Mo, Umeå).....		

—	Sawn Red and White.	Planed. Red.	Planed. White.
Hernösand, Kramfors, 1sts..	..	KR♚FS	..
,, 2nds..	..	KR✱FS	..
,, Mixed..	L♚O	KR♚FS	KR♚FS
,, Boards..	KRAMFORS	..	..
,, 3rds..	LO	KFORS	KFORS
,, 4ths..	W✱W	..	..
,, 5ths..	W	..	..
,, u/s..	K♚S	K♚S	K♚S
Hernösand, Marieberg, 1sts..	BERGERE	+++	
,, 2nds..	BERGER	++	
,, 3rds..	ELB	+	
,, 4ths..	K×M	(Unmarked)	
,, 5ths..	D♚B	..	
,, u/s..	B♚R	B♚R	
Hernösand, Bollsta, 1sts..	BOLLSTA, or BST	..	
,, 2nds..	H+G	..	
,, 3rds..	B+B	..	
,, 4ths..	B+B+B	..	
,, 5ths..	B+B+B+B	..	
,, u/s..	GVAB	..	
for battens Mixed and 3rds	BOLLSTA♚	..	
for battens 4ths and 5ths	BOLLSTA	..	

—		Sawn.	Planed.
Sundsvall, Svartvik,	1sts..	..	SV♚VIK
,,	2nds..	..	SV✱VIK
,,	Mixed..	S♚V	..
,,	3rds..	SDD	SDD
,,	4ths..	D✱S	..
,,	5ths..	S✱K	..
,,	6ths..	K◆W	..
,,	u/s..	SWK	SWK
Sundsvall, Fagervik,	Mixed..	F♚W	FTA
,,	1sts..	..	F♚W
,,	2nds..	..	F✱W
,,	3rds..	F✱W	F=W
,,	4ths..	F=W	F IV W

—		Sawn.	Planed.
Sundsvall, Fagervik,	5ths..	F=W	..
,,	6ths..	FSW	..
,,	u.s..	FAW	FAW
Sundsvall, Strand,	Mixed	AXEL	..
,,	3rds..	AXL	..
,,	4ths..	AXE	..
,,	5ths..	AXX	..
,,	6ths..	—XX—	..
,,	u/s..	—RAND	..
Sundsvall, Carlsvik,	Mixed..	·H♚B·	..
,,	3rds..	H⊥B	..
,,	4ths..	H—B	..
,,	5ths..	H=B	..
,,	6ths..	H✱✱B	..
,,	u/s..	HUB	..
Sundsvall, Hofvia,	Mixed..	HO♚ID	..
Sundsvall (G. P. Braathen)	3rds..	GPB	..
,,	4ths..	H✱D	..
,,	5ths..	HWO	..
,,	6ths..	BWH	..
,,	u/s..	B●H	..
Hudiksvall, Hudiksvall	1sts .	..	♚HTA♚
,,	2nds..	..	HT♚AB
,,	Mixed..	H♚H	..
,,	3rds..	H✱H	HTAB
,,	4ths..	HHH	..
,,	5ths..	⊞HB	..
,,	6ths..	MDM	..
,,	u/s..	+HH+	HWALL
Hudiksvall, Enänger	1sts..	..	♚PAT♚
,,	2nds..	..	♚P+P♚
,,	Mixed..	PAT	..
,,	5rds	PP	♚A+A♚
,,	4ths..	AA	..
,,	5ths..	TT	..
,,	6ths..	PPP	..
,,	u/s..	AIB	..
Söderhamn, Ljusne-Woxna	Mixed .	W♚K	..
,,	3rds..	WK	..
,,	4ths..	K	..
,,	5ths..	K✱K	..
,,	6ths .	KWK	..
,,	u/s..	✱W✱	..
Söderhamn, Bergvik Co (Sandarne, Nyhamn, & Djupvik)	Mixed...	BSSC	..
	3rds .	BC	..
	4ths..	BBB	..
	5ths..	↑↑↑	..
,,	Inferior 5ths..	◆◆◆	..
,,	Inferior redwood..	B ↑ ↑ B	..
,,	u/s..	B—Co.	..
Söderhamn, Längrör	Mixed	O♚W	..
,,	3rds..	IWL	..
,,	4ths..	EWL	..
,,	5ths..	AWL	..
,,	6ths..	WMW	..
,,	u/s..	OWL	..

Quality.	Sawn.	Planed. Redwood	Planed. Whitewood.
Gefle, Korsnäs, Extra 1sts..	..	♚ KAB	..
,, 1sts..	KAB	K♚B	..
,, 2nds..	NAS	♚ NAS	..
,, 3rds..	✱✱✱	✱✱✱	..
,, 4ths..	✱✱	..	..
,, Unsorted..	K♚B	..	K♚B
Gefle, Stora Kopparbergs, Extra 1sts..	..	♚SKB♚	..
,, 1sts..	..	SKB	SKB
,, 2nds..	..	DOM	DOM
,, Mixed..	SKB	..	..
,, 3rds..	DOM	DM	DM
,, 4ths..	DM	..	..
,, 5ths..	D✱M	..	..
,, u/s red..	XXX	..	..
,, u/s white..	BBB	..	♚Skutskär♚
,, Discoloured..	..	F♚B	..
Gefle, Holmsund, 1sts..	..	HS♚ND	
,, 2nds..		HS✱ND	
,, Mixed..	H♚D	..	
,, 3rds..	HDD	HLND	
,, 4ths..	HND	..	
,, 5ths..	HFD	..	
,, 6ths .	HMS	..	
,, Inferior 6ths..	HSUS	..	
,, u/s..	HSUND	HSUND	

—	Sawn.	Planed. red.	Planed. white.
Gothenburg, Tingstad, 1sts	..	T♚S	
,, 2nds..	..	TAS	
,, Mixed..	T♚S		
,, 3rds..	TAS	SAT	
,, 4ths..	SAT	..	
,, 5ths..	SFT	..	
,, Safvenas, 1sts..	..	S♚F	..
,, 2nds..	..	SAF	..
,, Mixed..	S♚F	..	S♚F
,, 3rds..	SAF	FAS	FAS
,, 4ths..	FAS	..	..
,, 5ths..	OO	..	..
,, u/s red..	SABS	..	..
,, u/s white..	S♚F	..	..
,, Strömman 1sts..	..	S♚L	
,, & Larsson, 2nds..	..	SAL	
,, Mixed..	S♚L	..	
,, 3rds..	SAL	SOL	
,, 4ths..	SOL	..	
,, 5ths..	+S+	..	
,, U/S..	SFL	SFL	

—	Red.	White
Stockholm, L. W. Lundborg, Mixed..	L♚W	..
,, 3rds.	LWL	..
,, 4ths..	LL	..
,, 5ths..	L	..
,, u/s..	WLL	WL
Norrköping, M. Ljungqvist, Mixed..	M♚L	..
,, 3rds..	M+L	..
,, 4ths..	M✱L	..
,, 5ths..	M-L	..
,, u/s..	MLT	..
Westervik, L. W. Lundborg, Mixed..	LWF	..
,, 3rds..	LEF	..
,, 4ths..	LSF	..
,, 5ths..	LTF	..
,, u/s..	LLF	LFL

NOTES.

The Ordnance Survey.

THE recently-issued Report of the Ordnance Survey shows that the Department has been very busy in providing maps for the troops in South Africa. The 1-in. map of England being complete, the bulk of the current work, we presume, is disposed of, though resurveys are, of course, always being requisitioned. One fact recorded in the Report is a little interesting to those familiar with foreign Government maps. It is that "a selection of Ordnance Survey maps has been sent to form part of the British exhibit at the Paris Exhibition." There was a time when the productions of our Survey were looked up to by interested persons on the Continent; but it is not too much to say that the maps of most Continental countries are now far better than the British maps. The French, German, and Russian official maps of similar scales are more detailed, and they are clearer. The method of classifying roads and their cartographic representation, are far ahead of anything we have produced in England—so foreigners will not be much enlightened by this display at the Paris Exhibition on the part of the Ordnance Survey Department.

No. 187, Fleet-street, and St. Dunstan's-in-the-West.

BUILDING operations have been begun for an enlargement, on the east side, of the offices of the Law Life Assurance Society, No. 187, Fleet-street, which were designed by John Shaw the younger. The new buildings are being erected by Messrs. Howard & Co., after plans and designs prepared by Mr. W. E. Clifton. They occupy the forecourt, on the west side, of the tower of the church of St. Dunstan's-in-the-West (1831-2) designed by John Shaw the elder. The Consistory Court of London issued in August of last year a faculty for building over the forecourt flush up to the tower, Dr. Tristram, Q.C., Chancellor of the Diocese, stating that "the Court is of opinion that it would not be justified in . . . refusing to sanction an alteration which the Court holds will not be detrimental to the interior part of the church." The trustees under the Act 10 Geo. IV., c. 96, for rebuilding the church, have sold the open space to the Society for 4,500*l.* It was stated in Court that the purchase moneys are to be devoted to the building of a rectory house on the east side of the tower, so that the body of the church as now seen from the street will be blocked in, and the architectural effect of the tower rising from the ground will be quite destroyed.

The Haberdashers' Company's Schools.

THE Board of Education have signified their approval of a scheme drawn by the Charity Commissioners for the administration of

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Aske's Charity, of which the income, derived from house property in Hoxton and 1,500 acres in Kent, amounts to 16,500*l.* per annum. The scheme establishes a governing body of nineteen persons, of whom three shall be women, comprising representatives of the School Board for London, the County Councils of London and Middlesex, the Senate of the University of London, and the Court of Common Council. Of the existing four schools, there are two at Hatcham, one at Hampstead, and one—in temporary premises—at Acton. For a new school at Acton, of which Mr. Henry Stock was appointed architect last year, a sum of 60,000*l.* is set apart out of the endowment fund, and preference will be given to the children and grandchildren of freemen of the Company; a yearly sum of 1,500*l.* is also to be devoted in benefit of poor freemen. Mr. Henry Stock is architect also of the new Aske's School to be erected at West Hampstead. The buildings of the former school at Hoxton now belong to the London Technical Education Board and are being adapted for purposes of a Polytechnic for East London. They were erected in 1825-6, after D. R. Roper's plans and designs, on the site of the Aske's Hospital, built in 1691 from the designs of Robert Hooke, the celebrated mathematician, and remarkable for its classical piazza or colonnade with an ambulatory 340 ft. long, which fronted all of the ground floor between the two wings. The north wing, known as "Haberdasher's House," remained until 1887, when the Company leased the site for artisans' dwellings. It was a conspicuous building of red brick, square on plan, three stories high, with a mansard roof and high angle-pedimented dormers in the attic floor, being very similar to Edial Hall, Lichfield, where Dr. Johnson kept his school. By his will (1688) Robert Aske bequeathed a sum of 20,000*l.* in trust to the Company to be laid out by them in buying ground within one mile from London for an almshouse for twenty poor freemen, and other land to yield each pensioner 20*l.* a year. He directed that the remainder of the money should be invested in land on behalf of as many boys as the income derived therefrom would support, at the rate of 20*l.* each for his schooling and maintenance. A model in wood of Hooke's building is preserved at Haberdashers' Hall.

Prismatic Lighting.

DURING the last few years the principle involved in the Fresnel lens has been applied with considerable success for aiding the transmission of light to dark interior spaces in buildings. Prismatic lights of various kinds have proved to be so useful that they are regarded by architects and builders as indispensable adjuncts to certain types of buildings in large cities. It is, therefore, interesting to notice that the subject is now receiving attention at the hands of the Franklin Institute. A brief review of the art of prismatic lighting is contained in a paper recently read before the Institute by Dr. W. H. Greene. Omitting from consideration pavement lights, for which only one form, the right-angled prism, is admissible, the author proceeds to discuss the two general classes into which prismatic window-lights may be divided. One group comprises those in which the glass has prisms, or lens segments, of any desired angle on the front surface, whilst the back of the sheet is plain. In the other group are included devices consisting of sheets having a series of prisms or lenses on both sides. In considering the relative merits of parallel and divergent light transmission, it should be remembered that the former system, sometimes aimed at by makers, cannot be so effective as the latter. By transmitting light into a room in parallel lines inconvenience must be experienced from shadows projected from opaque objects in the path of the entering light, and there will be little or no reflection from the walls and floor. On the other hand, by the method of divergent transmission, even more light is thrown into the room, and, moreover, its distribution is more advantageous, because repeated reflections effect the practical obliteration of shadows, and the uniform diffusion of light to all parts of the interior. Attention is very properly directed to the necessity for correct disposition of the angles or curves of prismatic or lenticular surfaces as the case may be. Inaccurate angles or curves may seriously diminish efficiency by the dispersion or loss of light, resulting from reflections in the interior of the glass. Dr. Greene describes several types of lighting glass coming within the two general divisions previously mentioned, and he especially commends one form having prisms on the interior surface, and lenticular panels on the exterior surface but arranged transversely to the direction of the prisms. This form of construction possesses admirable powers of diffusion both in horizontal and vertical planes, and when two windows are employed for one apartment the overlapping and reflected rays of light tend to prevent the occurrence of shadows such as are generally produced by other methods of prismatic lighting. The paper was freely discussed, and the subject generally has been referred to the Committee on Sciences and Arts for further investigation.

Fire Insurance Rules.

THE increasing use of electricity for power purposes, and the higher pressures at which it is now being delivered at the consumers' terminals, has induced several fire insurance companies to issue supplements to their rules for electrical installations. The new supplementary rules of the Royal Insurance Company will prove interesting reading to electrical engineers and to the users of electricity for power purposes. They deal with the special safeguards to be observed when installing electrical power plant in textile mills and other special risks. Electrical contractors, before installing a power plant, would do well to provide themselves with a copy of these rules, as otherwise troublesome, and sometimes expensive, alterations may have to be made after the completion of the installation, or extra rates will be charged. The supplementary rules of the Royal Insurance Company for special risks seem to us to be very reasonable, and although their adoption may lead to a slightly greater initial expense, yet the consumer will subsequently get the benefit in having less to pay for maintenance and repairs, apart altogether from the fire risk. For example, in cold stores and ice factories ordinary insulating materials for the wires would soon break down, owing to the clammy dampness associated with low temperatures, and hence armoured or lead-sheathed conductors should be used throughout. We were not surprised to notice that special precautions have to be taken for the electrical heaters for the glue and paste kettles used in bookbinding works. In addition to the sheet metal protection for the surface of the table the heaters should stand on feet, so as to be at least 3 in. above the table, and must have wire guards round them to prevent papers or books from touching them. When a motor is supplied at 500 volts the company very properly advise that a magnetic cut-out should be used, as with this pressure it is very difficult effectually to break the circuit with an ordinary fuse. The question of whether the case of the motor should be earthed or not is left to the consideration of the Board of Trade. In towns where there are electric tramways which work on the overhead system special precautions have to be taken in houses supplied with telephones, call bells, &c., to prevent fires caused by an overhead wire breaking and coming into contact with the trolley wire, and thus conveying a current to the house which might burn up the electrical instrument fixed in it and thus cause a fire. The minimum protection recommended is a fusible cut-out.

The Manchester Sewage Scheme.

AT last the Manchester Corporation has decided upon a scheme for the treatment of the sewage of the city. It is not too much to say that unless great pressure had been brought to bear by the Local Government Board and the Mersey and Irwell Joint Committee the Fabian methods of the Corporation would have been pursued still further. Early in July the Corporation was prosecuted by the Joint Committee on account of the foul effluents from the sewage works, and the stipendiary magistrate, tired of imposing nominal fines, granted penalties of 50*l.* a day for the five days respecting which evidence was tendered, and added, significantly, "If nothing is decided in September, we shall have no option but to impose penalties, if asked to do so, *de die in diem*." The Corporation knew that the Joint Committee "meant business," and as a fine of 18,000*l.* per annum was no trifle, even for a city like Manchester, the Corporation has taken the magistrate's threat to heart, and has "decided in September" what scheme it will adopt. After the report of the three experts, to which reference has already been made in these columns, it was practically certain that bacterial purification would be selected, but the details of the scheme recommended by the experts did not commend themselves to the Local Government Board. The area of the filter-beds was considered too small by 50 per cent., and a greater area of land was also demanded. Some bellicose members of the Corporation wished to resist these demands, but wiser counsels prevailed, and eventually the scheme of bacterial purification, as amended by the Local Government Board, was adopted, although eighteen members still recorded their votes in favour of the culvert scheme. The first cost of the adopted scheme is estimated at 487,283*l.*, or about 120,000*l.* more than the experts' scheme. The Rivers Committee gave some figures as to the comparative cost of working the proposed system of purification and the existing precipitation process, but these figures are far from convincing. Sir Bosdin

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Leech, in presenting these estimates, said that a saving of 7,000*l.* per annum would be effected by doing away with chemical precipitation, equal to a capitalised sum of 200,000*l.*, and added that the first cost of the new scheme was therefore "practically reduced by 200,000*l.* if they deducted the saving in chemicals and sludge." But a little later in his speech, after stating that the annual cost of maintenance of the adopted scheme would be "under 20,000*l.*," he declared that this is "roughly the amount now spent at Davyhulme for maintenance, including precipitation." Where, then, is the saving of 7,000*l.* per annum? Again, the amount of sludge which will be retained in the open septic tanks is an unknown quantity, but the experiments at Leeds show that it will be very considerable, unless it is allowed to pass on to the filters, in which case the capacity of the filters will be rapidly reduced.

London Telephone System.

THE Post Office system of telephones in London, which will probably start working in a few months, marks a new era in the history of telephony in this country. The network will extend from Reigate northward to Waltham Abbey, and from Romford westward to Harrow, embracing an area of 640 square miles. At the present time many of the streets in the City and elsewhere are opened up, and hundreds of workmen are employed making trenches for the telephone cables. The central exchange will be in the Savings Bank building, Queen Victoria-street, and there will be exchanges at Westminster, Kensington, Wimbledon, Putney, Richmond, Chiswick, Kingston, and Twickenham, which will be opened at the same time. The switchboards for the central exchange will be sufficient for 10,000 subscribers, and the sub-stations will have capacities varying between 600 and 2,000, but provision will always be made for subsequent additions. The materials employed are all of the most substantial description; the wires are sheathed with lead, and are insulated with paper so as to make the capacity between the twin conductors a minimum, and hence the sounds transmitted will be as clear and distinct as possible. The ducts to be used for the wires are made of glazed earthenware, and there are sometimes as many as fifty of them in one trench. The manholes which will be used for jointing and testing are made of several sizes, but the arrangements are all uniform throughout. The system of working employed will be that known as the "central battery system," and the batteries will be kept in the City and the inner sub-exchanges. In this method the mere act of lifting the receiver from the hook lights a lamp at the exchange, and thus the attention of the operator is called to the subscriber without the noisy ringing of bells. This will greatly ameliorate the conditions of working for the exchange girls, and ought to produce a better service. The opening of these exchanges will give employment to many hundreds of girls. The payments of subscribers will either be annual or on the toll-rate system. In the latter system the subscriber will pay 3*l.* per annum, and 1d. per call when he rings up successfully, and nothing, of course, when he is rung up. One effect of this toll-rate system will be to make the majority of shops public call offices.

PARIS EXHIBITION:

NOTES ON ENGINEERING EXHIBITS, &c.

AMONGST exhibitors of cement in Group VI. the Société Générale & Unique des Ciments de la Porte de France should be mentioned. The works of this firm were established at Grenoble in 1842 for the manufacture of Portland cement from a stratum of stone discovered by M. Félix Breton, a retired Colonel of Engineers. A useful little pamphlet is published by the company giving sections of water conduits, sewers, roads, and cornices, together with the most suitable proportions for adoption in works of this kind. An interesting stand in the same section is that of the Bridgewater Portland Cement Company, Limited, Somerset. Examples of a new paving material are exhibited in Class 28 of the same group by the Cie. du Granit-Asphalte of Paris. This system of paving is recommended as being hygienic and non-slippery, and practical examples may be seen in the arrival courtyard of the new Gare de Lyon, and in the courtyard of the new Gare d'Orléans, in Paris.

Class 28 also contains a small but noteworthy exhibit of sound-resisting parquet and paving, consisting of a light, non-combustible material termed "Liége agglomerate," and made by M. C. E. Bourry, of Paris. A small structure is shown for the purpose of demonstrating the practical application of this substance in the formation of floors, roofs, and partitions.

In the Palais des Mines several large displays of constructional iron and steel will be found worthy of close inspection. One particularly noticeable trophy is that of the Cie. Française des Metaux, consisting largely of solid drawn copper and tin tubes. About halfway down this building the Expanded Metal Company of France has a stand, where the visitor may witness the operation of a machine used in the production of this familiar material.

We may here also direct attention to the testing machines exhibited by Messrs. Olsen & Co., of Philadelphia. The stand of this firm is situated in the machinery palace, Class 22, and it includes apparatus suitable for testing many different kinds of materials. A new impact testing machine is shown, where the falling weight is at the end of a light pendulum bar, and the force applied at each blow is indicated by the scale on an inverted quadrant of the same radius as that of the arc described by the weight. This machine is used in Cornell University, U.S.A., in the Royal Navy yard, Spezia, Italy, and in other well-known establishments. An automatic appliance for cement testing has lately been introduced by this firm. The load can be applied at a regular rate at any weight varying from 100 lbs. to 600 lbs. per minute, the rate of application being obtained by operating the beam from a shaft of constant velocity. Improved grips, hung on pivot-bearings, ensure a perfectly straight pull on the specimens. The full capacity of the machine is registered on the beam, and the small divisions are shown upon a dial vernier provided at the beam end. Another apparatus which ought to be seen is Olsen's Autographic testing machine, with micrometer attachment. The capacity of the apparatus is from 100,000 lbs. to 200,000 lbs., and it is intended for testing metal, stone, cement and other materials, By the micrometer attachment a multiplication of 500 times is obtained, and the actual conditions of each test are recorded on a diagram card. Power for operating the machine is derived from two belts, and two electric circuits are required, one for the beam poise, the other for the pencil on the recording cylinder. The Cresson gold medal was awarded by the Franklin Institute for this machine. Amongst other exhibits Messrs. G. Salter & Co., of West Bromwich, show one of the well-known Kuhlmann testing machines for cement. Messrs. Brown & Sharp, of Providence, U.S.A., exhibit at Vincennes a selection of measuring instruments and tools for architects and engineers, but principally for the latter.

Machinery and appliances used in the manufacture of cement, bricks, tiles, and earthenware goods are to be found both in the Palace of Civil Engineering and in the decoration and furniture departments on the Esplanade des Invalides. French machinists appear to deal in a fairly comprehensive manner with the requirements of the important industries in question, but their exhibits in general are not particularly novel, nor are they striking from an engineering point of view. In Class 28, M. Charles Morel shows some useful appliances for cement manufacture, including a workman-like crushing machine with jaws; a vertical mill in which grinding is performed by the action of centrifugal force upon four heavy balls, and a sifting machine with conical screens, to which two movements are imparted, one vibratory and the other rotary. The meshes of the upper sieve are kept clear by two fixed brushes, and sifted material can be delivered into sacks from an outlet at the bottom. Particles too large for passage through the second sieve are ejected through an orifice at the side of the collecting hopper.

MM. Chambrette-Bellon & Cie., of Bèze (Côte d'Or), make a speciality of plant for bricks, tiles, and pottery. The machines exhibited are worthy of inspection, and are characterised by solidity of construction, although in some instances the design might advantageously be modified. A selection of clay-working machinery is exhibited by M. G. Lacroix (de l'ancienne maison Boulet, Lacroix, & Cie.), of Paris. This maker issues a pamphlet which, although termed a catalogue, is rather an epitome of plant and machinery intended for use in quarries, and in brick, tile, and pipe works. Notwithstanding the comprehensive manner in which the subject is treated, this book affords a typical indication of the backwardness exhibited by the French in some departments of mechanical engineering. Amongst numerous well-worn woodcuts representing appliances of primitive appearance, a few process-blocks of newer machines are interspersed, whilst the most modern illustrations and descriptive matter refer to drying plant and accessories, chiefly of American manufacture.

Turning to the foreign section we find some excellent examples of Swiss ingenuity and mechanical skill in the machines exhibited by M. Adolphe Buhler, of Uzwill. The most noteworthy of these is a Broyeur-Mélangeur, or mixing mill for clay in a humid state, and invented by M. J. Schmidheiny. This apparatus consists essentially of three or four vertical mills in series one above the other, turned by a central shaft common to all and actuated at the upper end either by belting or by an electric motor. The material is fed into the top pan from a suitable stage or platform. The grinding cylinders are case hardened castings revolving on their own axes, and travelling in a circle around the central shaft in pans with perforated bottoms permitting the passage of crushed stones or other foreign substances. Repetition of the process in other mills of the series effects the adequate mixing of the material and its reduction to any desired state of subdivision. One form of the multiple mill is made so that each unit may be attached to girders supported by the walls of a building. Other forms are entirely self-contained, the several mills being fixed between four cast iron columns three of which are continued to afford support for the gearing. In the larger plants of this type circular galleries are supported by brackets outside the columns giving access to the lower stages, but the top pan is always approached by an upper floor or staging.

Ingeniously hidden in a colonnade facing the central avenue of the Esplanade des Invalides is a most interesting enclosure occupied by a complete brickmaking plant manufactured by the American Clay-Working Machinery Company, of Bucyrus, Ohio. The other specialties of this firm are tile, sewer-pipe, roofing-tile, terra cotta, and clay refining machinery. The company is also interested in the Bucyras steam Tunnel-Dryer for brick and tile work. Owing to the unfortunate loss of the s.s. *Pauhac* the original shipment of machinery for the Exhibition found a resting-place in the Atlantic. A new exhibit for Paris was therefore necessary, and although the works were occupied day and night in the endeavour to cope with other demands, the first plant was duplicated within ten days. That is the American way of business; some day we hope it may be the English way. We can only refer specifically to two machines shown by this firm. The first is the Eagle double-die brick press for re-pressing paving brick and face brick, in either plain or ornamental shapes. Bricks or blocks of clay to be treated are produced in an ordinary brick machine; they are placed on an automatic feed attached to the feeding-table of this press. They are then forced automatically two at a time into steel-lined mould-boxes and subjected to full pressure from above and below. The lower pressure foot continues its upward motion, carrying the re-pressed bricks to the top of the moulds. Here they are automatically pushed towards and removed by the delivery belt,

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from which they are transferred by "hackers" to the drying cars. This cycle of operations goes on continuously during the running of the machine. The press moulds are stationary; downward pressure is effected by a cross-head actuated by cranks and hammered steel connecting rods at each end; upward pressure is exerted by a cam on the main shaft, operating in connexion with the lower cross-head. This machine weighs 7,500 lbs. and occupies a floor space of 8 ft. square. The power required is about 2 h.-p., and the output averages about 2,000 bricks per hour.

The second machine for mention is the Giant Auger machine, of a kind suitable for the making of building, paving, and fire bricks, hollow building blocks, drain pipes, &c. For the purpose of this machine the clay should be thoroughly plastic, and of such consistency that the product can be "hacked" as soon as made. Clay is inserted into a feed opening, 18 in. square, at one end of the cylindrical body. It is then forced forward by the knives and auger on the main shaft, so that it is compressed in the conical end of the cylinder, and forced through the die. When the machine is used in brick manufacture the material emerges as a solid clay bar of extreme density, which moves along an endless band to the cutting table. The machine is self-contained and of massive construction throughout. It has a forged steel shaft with heavy gearing of cast steel, and all the bearings are fitted with dust-proof oil chambers. Removable hard metal discs sustain the wear due to end thrust; the casting in the back gear frame holding the discs forms an oil reservoir, and the discs are grooved so that oil may be distributed equally over their surfaces. The augers are of hard, polished white metal, and the knives are of forged iron faced with steel. Augers of different shapes are supplied according to the class of work, and the knives can be shifted to various positions to regulate pugging capacity and rapidity of feed. Motion is communicated by a friction clutch pulley 42 in. diameter by 10 in. wide, running at 200 revolutions per minute; the floor space occupied by the machine is 12 ft. by 6 ft., and the weight is 7,000 lbs. About 3,000 bricks per hour is the average output of the machine shown at Paris, which requires from 25 h.-p. to 30 h.-p.

The cutting table working in conjunction with the Auger brick machine is of the automatic oscillating type, and whilst making a cut it travels with, and at the same speed as, the bar of clay. A perfectly rectangular cut is thus ensured, and upon its completion the cutting device is automatically thrown out of gear, and the frame is brought back to its original position for the next cut. Owing to the oscillating movement, the wires always move in a downward shearing direction, and cutting is performed during the forward and the backward motion. The cutting bars are driven by cranks at each end of the machine, thus ensuring correct alignment and an even cut. Rollers are provided which lubricate the under surface and sides of the clay bars to prevent sticking, all the rollers being supplied with oil from a small overhead tank. The table is built of iron and steel, all working parts moving on anti-friction rollers. It is built with an endless delivery belt, which travels slightly faster than the clay, and thus facilitates the operation of removal to the drying cars. From 2,500 to 4,000 bricks per hour can be cut on this machine, which, with 10 ft. of delivery belt, occupies a floor space of 15 ft. by 5 ft., and weighs 2,000 lbs.

Leaving brick-making machinery, we find a solitary example of masonry plant in the group devoted to mechanical engineering. Trier's patent stone-dressing machine, which is here exhibited in working order, cannot be described as a novelty, as the inventor has already received gold and silver medals from the Paris Exhibition of 1878 and from the Health and Inventions Exhibitions of 1884 and 1885. The essential feature of the machine is to be found in the circular cutters which revolve as they are moved up and down the surface of the stone. In this way all irregularities of the material are split off by a rolling wedge-like action, leaving a true surface with straight toolmarks at right angles to the length of the stone. The stone is carried on a table running on a planed bed, and progressive motion is imparted by suitable gearing. The table is fitted with wheels, so that it can be run on rails from any part of the yard up to the bed of the machine. By the employment of cross trolleys and return rails two or more tables can be used, thus reducing to a minimum the time occupied in the operation of changing stones. Adaptations of the same principle are found in grindstone and emery wheel dressers exhibited by the same firm. One important advantage possessed by all these appliances is that practically no dust is communicated to the atmosphere, as the small particles detached by the cutters gravitate at once to the floor. This characteristic requires no recommendation to engineers who have machinery in the vicinity of grinding appliances, or to stonemasons who study the well-being of their employees.

In wood-working machinery, the French exhibits are more remarkable for the superficial area covered than for novelty or excellence of design. Some ingenious saw sharpeners are, however, well worthy of inspection. The well-known Swedish firm, Messrs. Bolinders, have a remarkably fine show of wood-working appliances, and there are various types of saw-sharpeners both in the Swiss and German sections. Amongst American exhibitors the stands of Messrs. Fay & Egan and the Symonds Saw Company ought to be seen. Messrs. Baker Bros., of Toledo, Ohio, show the Colburn universal saw-bench, with attachments rendering the machine extremely useful for small workshops where several different kinds of work have to be performed.

The Oliver wood trimmer, made by the American Machinery Company, of Grand Rapids, Michigan, is to be seen in several types, some for attachment to a bench, and others provided with independent stands. Briefly described, the trimmer consists of a double-edged knife, triangular in form, and actuated by a lever, at the end of which is a pinion engaging a rack bolted to the back of the knife-blade. A substantial metal frame affords a fulcrum for the lever and guides for the knife. The frame has a rectangular opening and is bolted to a planed bed having adjustable gauges, by which the wood to be trimmed can be set at any angle. Although in no way competing with power-driven machine tools, this trimmer will frequently prove to be a most handy and economical substitute for the hand-saw and the chisel.

So much is heard in the present day of American superiority in every department of engineering, that it is always gratifying to recognise merit in the productions of our own manufacturers. We have seen no American wood-working machines which equal those exhibited at Paris by Messrs. A. Ransome & Co., of London and Newark. So far as general design is concerned, these machines are characterised by correct and graceful proportions, whilst all their mechanical details have been carefully considered and properly carried out. Owing to the limited area obtainable at the Exhibition, only a few representative machines are on view in Paris, and because of our own limits of space, we can only mention two or three of these examples.

Ransome's patent cross-cut steam saw, working for part of its length in guides, is directly attached to the piston-rod of a steam cylinder of small diameter and long stroke. The cylinder is pivoted on gudgeons supported by a carriage, the lower face of which has planed grooves and runs on a cast-iron bed. The pivoting motion is controlled by a hand-wheel turning a worm which gears into a quadrant cast at the end of the steam cylinder, and the sliding carriage can be moved longitudinally by a hand-wheel and screw. This machine is intended for cross-cutting logs in saw-mill work, and is produced in two sizes, for logs of 4 ft. and 6 ft. diameter, requiring 2 h.-p. and 3 h.-p. respectively. A high-speed single deal and flitch frame, for rapidly re-sawing deals and flitches into boards of various thicknesses, is a very fine machine. The feed can be instantaneously varied from 1 ft. to 10 ft. per minute. Fifteen saws are carried by the machine, for which about 6 h.-p. is required. Another good tool is a circular saw-bench with automatic roller feed. The fence is fitted with rollers, and may be set at any angle; a corresponding adjustment of the feed roller is also possible, so that proper bearing surface may be ensured when bevelled material is being cut. We noticed an admirably designed combined saw-bench for light work. Two saws are carried, one for ripping and the other for cross-cutting, either of which can be brought into work at pleasure.

Ransome's moulding machine, designed for working stuff up to 7 in. by 3 in., is driven at unusually high speed, in order that a rapid feed from 20 ft. to 30 ft. per minute may be maintained without deterioration in the quality of the work. Other tools deserving examination are a combined trying-up, planing, and thicknessing machine; a single spindle upright moulding machine with safety circular fence; a joiner's tenoning machine in which the table is mounted on ball slides; and an automatic cutter grinding machine for plane irons, entirely dispensing with retouching by hand. The most striking machine in Messrs. Ransome's exhibit is the "Marbut" rapid moulding carver. It would be difficult to describe the mechanical details of this machine without diagrams, but generally it may be explained that carved designs are cut upon plain mouldings by groups of chisels fixed in separate slides, which are actuated in different directions by suitable mechanism, whilst two of the slides have a circular movement for the execution of convex or concave designs. An endless steel band with projecting pins serves to carry the moulding past the chisels, and its motion is momentarily checked during each stroke. An endless variety of designs can be produced by chisels of different forms, and mouldings may be carved up to 8 in. wide by 3 in. thick, with two or three lines of carving on the different members. On the occasion of our visit a pattern was being executed in a state of perfect finish at the rate of about 1,000 ft. run per hour; but we understand that smaller mouldings can be worked at a speed of 2,400 ft. in the same time.

While we are anxious to do justice to the ingenuity and finish of Messrs. Ransome's machine, it is hardly necessary to say that our praise of it in this respect is not to be taken as implying any approval of machine carving, which we regard as an entire mistake, and we can only wish that the talents of the designer and makers of this machine had been applied to some less questionable object.

Another interesting exhibit is that of Messrs. Thomas Robinson & Son, of Rochdale. This firm is not only engaged in the making of wood-working machinery, but also owns extensive saw-mills and joinery works. The behaviour of different machines can, therefore, be studied first hand by the makers, who are consequently the better able to appreciate and to remedy any constructional or other shortcomings. During recent years visits have been paid by practical members of the firm to other countries with the view of acquiring information as to the nature of foreign timber and as to the most suitable methods of treatment. Our general impression of the machines shown at Paris is that they are massive, rigid, and essentially workmanlike tools. Large wearing surfaces and wide belt pulleys are invariably provided; all bearings are of the self-lubricating type, and the moving parts appear to be well balanced. An improved sand-papering machine, having a cylinder 30 in. wide, with reciprocal as well as rotary motion, is worth examination. Although the time-hallowed expression "sand-papering" is used, the covering of the cylinder actually consists of glass-cloth. A second machine which attracted our notice was Young's patent diagonal dovetailing machine for jointing boxes and other light work, and another was a chain-cutter mortising machine of improved construction suitable for timber of any size up to 12 in. deep by 6 in. wide. In this machine the familiar chisel is replaced by a series of cutters mounted, according to the width of mortise required, on a vertical revolving chain moving down to the wood, through which the cutters eat their way. The advantages claimed for this method of work are that no boring or boredriving is required, and that reversing on short mortises is rendered unnecessary.

MM. Sussfeld, Lorsch, et Cie., of Paris, show a complete outfit of box-making plant by the Morgan Machine Company, U.S.A., including machines for dovetailing, assembling, and finishing. There is also a nailing machine which may be used for fixing the bottoms of boxes, either in conjunction with the previously mentioned set, or as an independent appliance.

Messrs. A. B. Miller & Co., of London and Glasgow, exhibit the Doig box-nailing machine, another American invention, capable of turning out packing-cases up to 50 in. by 40 in. by 40 in., and driving fifteen nails at one operation. Two machines are generally used together, one for framing and nailing the sides, the other for putting on the bottom.

Both in the Champ de Mars and in the annexe at Vincennes an infinite variety of machine tools and other metal-working appli-

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ances are on view. In this department of industry British machinists fairly hold their own so far as intrinsic merit is concerned, but it is distinctly noticeable that American firms are very much more at home on the Continent than our own people. A great number of the leading American houses have permanent agencies in Paris, and not a few stands are under the exclusive control of Frenchmen, many of whom do not include a knowledge of the English language amongst their other accomplishments.

The Q and C Company, of Chicago, are makers of stationary and portable cold sawing machinery for iron and steel bars, I-beams up to 15 in., and light architectural steel sections. One type of the Bryant sawing-machine with revolving base and electric motor is specially useful for sawing long pieces at any required angle. An automatic saw-grinding machine shown by the same firm is an effective and well-made tool.

An electric 30-ton travelling crane, built by the Shaw Electric Crane Company, of Muskegon, Mich., to be seen at Vincennes, was used for erecting all the machinery in the American Pavilion, some 3,500 tons in all. This crane is of the four-motor type, having two motors for each hoist, one for the bridge and one for the trolley. It has an auxiliary 5-ton hoist.

Another powerful lifting appliance, an electric "grue titan," by M. J. le Blanc, of Paris, which was employed for erecting heavy machinery, remains as an exhibit in the French machinery gallery on the Champ de Mars. It is in the form of a massive gantry carrying a bridge of inverted bow girders on which the hoisting gear is placed. There are three running wheels on each side, the central wheel of each set being geared by bevel teeth to a long rod extending to the top, where it is operated by electric power.

In the Foreign machinery gallery there is a very striking electric traveller capable of lifting 25 tons to a height of over 40 ft. and having a range of 85 ft. This appliance, built by Herr Carl Flohr, of Berlin, has a skeleton frame of arched form, composed of light braced girders, and its total width is close upon 210 ft. The lifting hook is worked by two 18 h.-p. motors, the carriage by a 8 h.-p. motor, and the crane by a 35 h.-p. motor; the approximate rates of working being 20 ft., 130 ft., and 118 ft. per minute respectively. The electrical equipment was furnished by the German Thompson-Houston Company.

An excessive amount of space was originally provided for civil engineering exhibits, and we presume the absurdly lavish display of cabs, carts, and other vehicles was interpolated in this section as an afterthought, when it was discovered that docks, canals, bridges, and other extensive public works would not be forthcoming as exhibits. Most of the plant used by contractors for civil engineering works is, of course, to be found in other parts of the Exhibition, but there are many interesting stands and a large number of valuable drawings and models in the Palais du Génie Civil.

Immediately adjoining the tasteful enclosure of the Austrian Society of Engineers and Architects is a collection of drawings and models contributed by the Commission for Canalisation of the Molday and Elbe in Bohemia. Amongst the models are some representing barrages, steel "fermettes du barrage," excavators, dredgers, and other auxiliaries. Some useful information on the subject of dredging may be acquired by a visit to the stand of the Société anonyme "Chantiers Conrad" de Haarlem. M. J. Massalski, who represents this company in Paris, was a delegate from the French Society of Civil Engineers to the International Congress of Navigation held at Brussels in 1898, and is the author of some interesting contributions upon dredging operations to the transactions of the Society.

MM. Sulzer Frères, of Winterthur, have a realistic stand in the Civil Engineering Section showing the rock-drilling apparatus employed on the Simplon Tunnel, and a memoir giving some particulars relative to this undertaking is published by the firm.

The Ingersoll-Sergeant Drill Company of New York has exhibits both in the Machinery Section on the Champ de Mars and in the Mining Department at Vincennes. At each place air-compressors and rock drills are shown of types suitable for mines, quarries, railway cuttings, tunnels, canals, and submarine rock work.

An ingenious form of conveying apparatus is exhibited by the Robins Belt Conveyor Company, of New York. Briefly described, the conveyor is an endless moving trough formed of cotton belt having the inner surface protected by a lining of indiarubber, which is thicker at the centre than at the sides. The loaded belt runs on idle pulleys, arranged in sets of three, the centre pulley being horizontal and the other two at an angle to curve the belt into a trough-like form. Sets of three horizontal pulleys are fixed for the returning line of unloaded belt. Hollow shafting is used for the pulleys so that grease enters the bearing at the centre, towards the ends of which it is forced, thus forming a dust-proof collar. Two model conveyors in the Palace of Mining and Metallurgy and two full-sized conveyors at Vincennes are fitted with "trippers" capable of discharging the load at any point or points along the line of the conveyor. Trippers consist essentially of two pulleys in a suitable framework, and the belt is caused to pass over the pulleys so as to describe a course similar in form to a letter S. At the first downward turn the load is discharged into a shoot leading to one side of the conveyor. But as only part of the material has to be unloaded at the point selected, the tripper is made automatic by the provision of a two-way shoot, one branch delivering into a hopper or bin, and the other leading back to the conveyor. Then, when the hopper is full, the material continues to progress along the belt uninterrupted by the tripper. By this arrangement material can be deposited at a number of points in the line of a long conveyor. Sometimes a moving tripper is applied, to which motion is imparted by the belt itself in such a way that the tripper travels constantly backwards and forwards along the conveyor, discharging its load as it goes. The Robins conveyor is largely used in the United States for transporting ore, coal, gravel, sand, and excavated materials generally.

An idea very prevalent in the United States is that, when a given work has to be done, the best plan is to get it over quickly and start the next job. The Goodwin car is one outcome of this sentiment. It is built entirely of plate steel, angles, and malleable iron castings, and will carry 80,000 lb. weight, or 30 cubic yards. From it any material capable of passing through an opening of 16 ft. by 4 ft. can be promptly discharged simply by the gravity of the load itself, and without tilting or moving the car body in any way. Unloading can be effected on either or both sides or in the centre, and the angle of discharge is 31 deg. from the horizontal. A train of cars can be promptly unloaded, as all the hinged sides and bottoms are under the control of mechanical appliances, which can be operated simultaneously by one man from any part of the train. If discharged when the car is running, the load spreads from 5 ft. to 30 ft. from the track, according to the speed. The car has been successfully employed in connexion with reservoir and railway construction in the United States, and a train of cars is now in use by the Great Northern Railway Company. No doubt the main idea is an old one, but its realisation on this extended scale and in this eminently practical form is new.

Another old idea which is being taken up seriously in the United States is that of pneumatic despatch. We all know the system was first applied in London nearly half a century ago, and that it has since then been largely adopted by the postal service. In no case, however, do the tubes used in this country exceed 3 in. in diameter, consequently only letters, telegrams, and very small packages can be transmitted, and no successful attempt has hitherto been made to deal with the conveyance of merchandise. An improved system, devised by Mr. Batcheller, is illustrated at Paris by the exhibit of the Pneumatic Transit Company, of Boston, U.S.A., who have already laid down complete installations with 6-in. and 8-in. tubes in Boston, Philadelphia, and New York for the postal authorities, and are now preparing to organise services in which parcels will be delivered by the aid of 12 in. tubes. In the Batcheller system bored tubes, similar to cast-iron water pipes, in 12 ft. lengths are used for transmission. Short bends are of seamless brass tubing ¼ in. thick. The carriers are thin cylinders of steel closed at the front end by a convex disc of steel carrying a butter of felt and leather, whilst the back end is closed by a hinged lid secured by a lock. The tubes are jointed with yarn and lead, and are supported on a firm foundation of concrete; the brass bends are covered with about 8 in. concrete, or brick laid in cement. Ingersoll-Sergeant Corliss type air compressors furnish the motive power in large installations, and the pressure used does not exceed 25 lbs. per square inch. Inasmuch as building materials are chiefly classified with decorations and furniture, and as domestic heating and ventilating apparatus finds a home in the Palace of Agriculture and Food, it is by no means surprising that some models exemplifying American building construction and domestic engineering should be grouped with civil engineering and means of transport. Although English architects may not be disposed at present to adopt the American system, they will find some interesting features in the exhibit prepared by the George A. Fuller Company, building constructors, of New York. A complete model of the skeleton framework of the Broadway Chambers building, New York, is exhibited, in which every structural detail is faithfully reproduced, from the foundations to the roof. The work is neatly executed in copper, to scale, and comprises 25,000 separate pieces. Three sectional models to larger scale represent the methods of floor and wall construction at different stories. A model in plaster to the scale of half an inch to the foot reproduces the building in full detail. There are also architectural and engineering drawings relating to the same structure, and some photographs showing the rapidity with which buildings of this class are erected. Exact particulars are furnished with regard to the engineering plant, including steam boilers, engine, dynamo, as well as to the systems of heating, lighting, plumbing, and sanitation.

The objects which we have mentioned incidentally and in detail are sufficiently numerous, but they present a very inadequate picture even of the isolated sections of the Exhibition, to which our notice has been more particularly directed.

THE BRITISH ASSOCIATION AT BRADFORD.

THE annual meeting of the British Association was opened at Bradford on Wednesday, the 5th inst. Considering the number of congresses held this year, it is not a little remarkable that the Bradford meeting should have turned out so successful. At the same time, many prominent scientists were missing, and, if we may say so, the whole meeting was rather amateurish. The value of the British Association meetings is always marred to a great extent by the unbounded hospitality showered upon the members, whereby the scientific aspect of the congress is often lost. Bradford has not been behind other cities in showing that it knows the way to receive visitors, and some sections have greatly profited, both scientifically and in the spread of general knowledge, by visits to works and factories in the vicinity.

On Wednesday evening the President, Sir William Turner, Professor of Anatomy in the Edinburgh University, delivered his address on the structure and history of the cell as the basis of life.

On Thursday the main work of the day was the reading of the presidential addresses in the several sections. These were of abnormal length, some almost rivalling the address of the President of the Association in that respect. Several were merely accounts of the development of the particular science treated of during a long series of years—short histories, in fact, that could be read in text-books. The address of the President of the Chemistry section dealt with the "Modern System of Teaching Practical Inorganic Chemistry and its Development." He pointed out the necessity for reform in the teaching, particularly that instead of much of the usual qualitative and the quantitative analysis, practical exercises similar to the following would be found to be of much greater educational value, viz.—(1) The careful experimental demonstration of the fundamental laws of chemistry and physical chemistry. (2) The preparation of a series of compounds of the more important metals, either from their more common ores or from the metals themselves. (3) A course in which the student should investigate in certain selected cases:—(*a*) the conditions under which action takes place; (*b*) the nature of the products formed; (*c*) the yield obtained. (4) The determination of the combining weights of some of the more important metals.

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The President of the Geology Section, whilst expatiating on the great advances made in the study of geology during the nineteenth century, did not improve the position of the science by mentioning some absurd theories as to the number of years that have elapsed for the bringing about of certain evolutionary phenomena.

Sir Alexander Binnie, President of the Mechanical Science Section, dealt with several matters of general interest to mechanical engineers, drawing upon history for the illustration of many of the subjects introduced.

Mr. James Watson, Waterworks Engineer to the Bradford Corporation, was a little more practical in a paper read before the same section on water supply. He said the works for the supply of the city of Bradford were of ancient origin, dating back to 1744, when a small company of ten shareholders subscribed the money to bring water from the hills by means of pipes. In 1700, when the population was 6,000 (it is at present 300,000), an Act was obtained for improving these works. In 1854 the Corporation acquired the property. The population served at present is 450,000 (including "out towns"); the daily average consumption is 12,000,000 gallons, or about 26½ gallons per head per day. Within the city, however, the consumption for all purposes is 41 gallons per head per day, though of this quantity 21 gallons were for trade purposes. Another interesting paper was read by Mr. John McTaggart on the disposal of house refuse in Bradford. In 1880, he said, they had a refuse destructor of six cells, which were subsequently doubled. In 1897 these and other cells which had been erected were pulled down and replaced by a destructor of the Horsfall type, and in the present year the Horsfall Company was given the contract for building twelve more cells. The total quantity of refuse collected is 125,000 loads per annum. The by-products of the destructor were referred to, amongst which are bricks, paving slabs, cement, concrete, &c. A new destructor is about to be built; it is estimated that when complete it will be capable of destroying refuse at a cost of 5½d. per ton for labour only, and it is hoped that finally the whole of the house refuse of the city will be destroyed without nuisance and without cost.

In the section of Anthropology Professor John Rhys, the President, delivered his address on the early ethnology of the British Isles, the subject being approached from the standpoints of language and folklore. In the afternoon Mr. Arthur Evans read an important paper on "Writing in Pre-Historic Greece," based on discoveries made in his recent excavations in the Mycenæan palace at Knossos, in Crete, the latest elements of which, he said, could hardly be brought down later than the thirteenth century B.C. The clay documents found consist of two apparently contemporary classes—viz. (1) those with hieroglyphic or conventional pictographic script; and (2) those (forming the majority) inscribed with linear script, and exhibiting a free, upright style of writing fundamentally different from that of the hieroglyphic class, and far ahead of it in development. In this latter class some seventy characters seem to have been in common use, and of these about ten show resemblance to the later Greek, ten to the Cypriote syllabary, and ten were common to this class and the hieroglyphic class. In the first class the hieroglyphic script shows a certain parallelism with the Hittite inscriptions of Anatolia and Northern Syria. In the same section Mr. F. H. Griffith contributed a paper on the system of writing in ancient Egypt.

After the President's address had been read in the Botany section Mr. Samuel Margerison read a paper on "British Sylviculture." He pointed out that recent supplies of timber were largely foreign, though there was much land in this country at present only slightly productive which might be put to better and more economical use. The crops produced by Continental sylviculture are treble or quadruple those grown in Britain.

On Friday, in the Chemistry section, Mr. F. H. Neville read the report of the committee on the Nature of Alloys. It was stated that most students believed that certain definite chemical compounds existed in alloys. To prove this, however, certain means must be adopted to abstract the particular compounds. Ordinary chemical means of isolation were of no use under the circumstances. Fractional solution was effective in some cases, and by means of it several distinct metal compounds had been isolated from alloys, such as platinum-tin, copper-tin, zinc-copper, and other compounds. Another method was by observation of the "freezing point"; the molten mixture was cooled down slowly and the temperature noted at which solid matter began to separate from the liquid. This varied with the proportion of the constituents, and by making many observations with varying proportions, a curve could be obtained of these solidifying temperatures, any irregularity pointing to the formation of something other than a mere mixture. By this means many interesting facts had been indicated which had subsequently been rendered evident by examination under the microscope. A long list of known and supposed alloy compounds was given in the report, and it appeared that the atomic relations generally recognised by chemists did not hold good in the case of alloys.

In the Geology Section, amongst other papers, the Rev. W. Lower Carter presented a report on the underground waters of north-west Yorkshire.

The Mechanical Science Section considered a paper by Professor Hele Shaw on the "Resistance of Road Vehicles to Traction." The recent remarkable development of motor vehicles with a legal limit of speed as high as twelve miles an hour, and the generally increased speeds of tram-cars in cities owing to the introduction of electricity and steam, give, the author thought, some reason for thinking that the general rate of speed on common roads might reach, or even exceed, the present legal limit applying to motor vehicles. Forty or fifty miles an hour had been safely maintained for more than 300 miles upon the common road in France. Another paper, by Mr. W. T. E. Binnie, was read, containing a description of a self-registering rain gauge, in which the record is obtained by collecting the fall in a funnel, at the delivery orifice of which is an ingenious device for maintaining a uniform size of drop. The recording part is electrical. Each drop as it falls is caused to make and break contact, and in this way a diagram is traced on a revolving paper drum. A short discussion followed the reading of the paper, in the course of which members spoke of its great promise as enabling a check to be kept on the existing forms of gauge.

An interesting paper was read by Mr. A. T. Walmisley on the "Use of Expanded Metal in Concrete," which we print on another page.

One of the most interesting communications made on Saturday was by Sir W. H. Preece, in the Section of Mathematical and Physical Science, on the subject of wireless telephony. The first experiments in this direction were made, he said, in the month of February, 1894, across Loch Ness, in the Highlands, when trials were made to determine the laws governing the transmission of Morse signals by his electro-magnetic method of wireless telegraphy. Two parallel wires well earthed were taken, one on each side of the lake, and arrangements were made by means of which the wires could be systematically shortened, with a view of ascertaining the minimum length necessary to record satisfactory signals. It occurred to Mr. Gavey, who was experimenting, to compare telephonic with telegraphic signals—*i.e.*, to ascertain whether articulate speech could be maintained under the same conditions as Morse signalling. The trials showed that it was then possible to exchange speech across the loch at an average distance of 1½ mile between the parallel wires when the length of the wires themselves was reduced to four miles on each side of the water. The sensation created in 1897 by Mr. Marconi's application of Hertzian waves distracted attention from the more practical, simpler, and older method. Mr. Evershed and Principal Oliver Lodge had in the meantime much advanced the system by introducing admirable call systems. In 1899 the speaker conducted some careful experiments on the Menai Straits which determined the fact that the maximum effects were produced when the parallel wires were terminated by earth plates in the sea itself. It became quite evident that the ordinary inductive effects were much enhanced by conductive effects through the water, and that in consequence shorter wires were practical. No special apparatus seemed necessary, and the ordinary telephonic transmitters and receivers were used. It became desirable to establish communication between the islands or rocks known as the Skerries and the mainland of Anglesey, and it was determined to do this by means of wireless telephony. The lighthouse at the Skerries was wanted to be in communication with the coastguard station at Cemlyn, the latter being connected with the Post Office system. The bottom of the channel being too rough and the currents too violent for a cable, a wire 750 yards in length was erected along the Skerries, and on the mainland one of 3½ miles from a point opposite the Skerries to Cemlyn, each line terminating by an earth plate in the sea. The average distance between the parallel portions of the two wires was 2·8 miles. Telephonic communication was readily maintained and the service was a good one. Further experiments with wireless telephony had recently been made between Rathlin Island, on the north coast of Ireland, and the mainland. The east and west portion of the island of Rathlin was about eight miles from the mainland, but a tongue of land projected southward to within a distance of four miles. Communication was required between the lighthouse near the north-eastern corner of the island and the mainland, and the question for solution was whether an overhead line running the whole length of the island from east to west was necessary to obtain good communication, or whether a shorter line across the neck of the southern peninsula would serve. The preliminary experiments proved conclusively that communication, both telegraphic and telephonic, could be readily maintained by means of temporary wires established across the neck of the peninsula along the shorter line. Wireless telephony across the sea was thus now a practical and commercial system.

The Geology Section was entertained by a paper by Professor Sollas on a "Concealed Coalfield beneath the London Basin." The author had, apparently, nothing new to say, and it is difficult to understand why this subject should be threshed out annually before the Association.

On Monday the first paper taken in the Mechanical Science Section was on "The Automobile for Electric Street Traction," the author being Mr. J. G. W. Aldridge. After a reference to the drawbacks and difficulties incident to the usual means of carrying street traffic, he described a system which had been devised in France. The electric motor vehicles derived power from a pair of trolly wires supported on short brackets along one side of the road; on these wires ran a two-wheel trolly containing a small electric motor for its own propulsion, the whole being connected to the omnibus by a flexible cable attached to a pole on the roof, devices being also provided to keep the cable sufficiently taut and to obviate any risk of derailing the trolly. Continuous current at 500 volts was supplied to the omnibus motor via the trolly wheels and flexible cable, which also contained three small conductors which served to convey back to the trolly motor the three-phase current driving it. This was derived from the omnibus motor, which was provided with three collecting rings on the armature at the end remote from the commutator, and connected to suitable points in the winding. By this arrangement synchronism was maintained between the speeds of the vehicle and trolly motor, but in addition there was provided on the trolly motor an electro-magnetic brake which would be energised at will through a sixth wire in the flexible cable. The system was in actual use in the outskirts of Paris. The omnibuses illustrated were specially built vehicles, weighing about three tons empty and five tons loaded, and were furnished with solid rubber tires; at ordinary speeds the power required to propel them was from 130 to 160 watt-hours per ton-mile on level roads.

Two papers were next read on the interesting subject of single rail railways. Mr. William Dawson, Deputy Engineer to the city of Bradford, made a communication on "Recent Tramway Construction," the chief feature in which was a description of the Demerbe rail, which has been in successful use for some time in Bradford. This rail, which differs entirely from other types, consists of a hollow trough rail. The fishplates, by which the different lengths are joined, are placed inside under the ends of the rails and exactly fit their contour, the point of application being immediately under the head of the rail. By means of cotters the fishplates are driven close up to the underside of the rail. When in position the rail is completely filled with concrete. The tie bars are flat. The rail is inserted into two oblique grooves, one of which is cut so as to exactly fit its outer side, while the other is

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wider to facilitate its introduction. The space left is filled up with a wedge of soft steel. In this way the rail becomes attached to the concrete foundation and is actually a part of the carriage-way. It will, therefore, withstand the strains caused by the cars and also all other strains and vibrations caused by ordinary vehicular traffic without any loosening of the joints or displacement of the paving. The system has been in use in Leeds six years, and the author considered that no repairs would be necessary during the life of the rail once it is properly laid. The life he would estimate to be about twenty years.

Tuesday, like Monday, did not produce much of interest to our readers. In the Chemistry Section Mr. F. W. Richardson read a paper on "Bradford Sewage and its Treatment." He remarked that Bradford sewage was among the worst in the kingdom, owing to the influx of woolcombers' waste-products and of dyeworks' effluents. It required much precipitant and produced a great deal of wet and settled sludge. Difficulties arose from the peculiar emulsive character of wool-grease and the excessive amount of nitrogenous impurities. Various experiments had been tried with it, with, briefly, the following results:—Lime gave a clear but bad effluent with a large amount of sludge; copperas, followed by lime, produced a turbid but better effluent; aluminia-ferric, *i.e.*, aluminia sulphate, gave unsatisfactory results at a high cost; acid ferric sulphate gave a high degree of purification, but with an acid effluent; neutral ferric sulphate yielded as good results, but with less acidity; and basic ferric sulphate gave a 62 per cent. purification and a neutral or slightly alkaline effluent, but proved costly. With bacterial treatment nitrification ensued and 70 per cent. purification might be obtained, but the grease soon choked the filters. There could be no doubt that if the woolcombers' suds and effluents were entirely removed the whole of the city's sewage could be treated biologically, with an immense saving in the cost of chemicals and the treatment of the sludge. Failing the elimination of the wool-suds, the best method would seem to be a preliminary treatment with the cheapest precipitant obtainable and the biological purification of the effluent, either on bacteria beds or on land, preferably on both.

Amongst several papers read in the Mechanical Science Section was one by Mr. E. Kilson Clark on "Shop Buildings." This contribution comprised a large number of details of what was considered desirable in the construction and arrangement of walls, roofs, floorings, heating, lighting, and other details. The same section was also interested by a communication by Professor Arnold, of Sheffield, on "The Internal Architecture of Steel," which explained the effects of various alloys on the structure and qualities of the metal.

The proceedings of the concluding day, Wednesday, were brief, though there were yet several communications to be disposed of. The Director of the National Physical Laboratory explained to the Mathematical and Physical Science Section the construction of practical standards for use in electrical measurements. His report recommended that a particular sample of platinum wire be selected, and platinum thermometers be constructed therefrom to serve as standards for the measurement of high temperatures. Other papers in the same section dealt with a new form of Wheatstone bridge, and on an improved standard resistance coil.

The usual votes of thanks to the President, the Presidents of Sections, and local bodies and individuals concluded the proceedings.

SUNDAY SCHOOL, LEEDS.—The new Sunday-school premises in connexion with the Woodsley-road Congregational Chapel, Leeds, were opened on the 1st inst. The buildings comprise a schoolroom 55 ft. long and 28 ft. wide, with an open timbered roof 22 ft. high in the centre, and lighted by mullioned windows to the front and one side. Opening out from it are arranged five classrooms, underneath the schoolroom, with both external and internal approaches, and a gymnasium 44 ft. long, 28 ft. wide, and 13 ft. high, with cloakroom, lavatory, &c. The school portion is connected with the chapel by corridors. The new buildings are built of pressed bricks with stone dressings, and all internal work is of pitch pine, the windows being glazed with leaded lights. The whole of the works have been carried out from the designs and under the superintendence of Mr. G. F. Danby, architect, Leeds, at a cost of about 2,100*l.*

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—The sketching club of this Association, by invitation of the President, Mr. F. Batchelor, visited on the 8th inst. the installation of the Septic system of sewage disposal on the Burnaby Estate, Greystones. The members, numbering eighteen, were met at the station by the President, who at once conducted them to the site of the septic tanks. The sewage first passes through a storm chamber, where it is separated from an abnormal rainfall by vertical slate slabs, and then into a grit chamber where any stone or gravel brought with the flow is deposited. Thence it passes into the septic tank, a light-proof sunken concrete chamber, 40 ft. by 9 ft. by 7 ft., in which it is acted upon for twenty-four hours by the micro-organisms which multiply enormously in the absence of light. After the resolution of the crude sewage into ammonia water, carbonic acid, and nitrogenous compounds, the tank effluent is conveyed through an ingenious automatic system of valves over the three filter beds, consisting of 4 ft. of clinker, each of the beds being in operation for eight hours. At the conclusion of the process the purified effluent is collected by means of field drain pipes, and is conducted into a neighbouring stream. The system, which is designed for 500 inhabitants, is so planned as to be easily enlarged. The President explained the various points of interest in the scheme, and had the working drawings available for the members' inspection. At the conclusion of the visit the party were entertained to tea at the President's house.

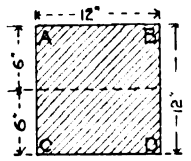
THE USE OF EXPANDED METAL IN CONCRETE.*

THE subject of the judicious introduction of iron and steel sections as a tensile element in the construction of concrete beams and slabs is one which at the present time is very much engaging the attention of engineers.

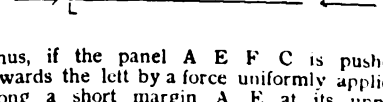
The different kinds of fire-resisting floors are too numerous for comparison upon the present occasion, but in various ways concrete has been combined with fire-resisting materials to form such floors. It is acknowledged that a concrete floor containing a brick aggregate in approved sizes and preferably of firebrick properly mixed is superior to a stone landing, as the latter when exposed to a severe heat so easily collapses. The selection of the aggregate is quite as important in the formation of satisfactory concrete as the use of the best cement. Iron and stone structures are fireproof in the sense that iron and stone are non-inflammable materials, but they are not proof against collapse by fire. Few kinds of stone will endure intense heat without crumbling away, though stone and brick are each capable of retaining their strength at a greater heat than unprotected iron.

Metal has been employed in various continued sections ever since iron and steel plates have been expanded or rolled into various shapes for use in construction, but the special development of a plate into open or lattice work by partially dissevering a solid plate of metal into strands having uncut connecting intersections was only thought of in recent years, and since the paper read before this Association at its Liverpool meeting in 1896 explaining the system of its manufacture, its applicability to various purposes has subsequently been favourably considered, especially for introduction into concrete in order to supply that tensile element which concrete without metal generally lacks.

The attempts of Monier, a Parisian florist, to obtain large vessels of a material more durable than wood and lighter than concrete resulted in the introduction by him of wires embedded in concrete, a d after subsequent working out by Herr Gust. / Adolph Wayss, of Berlin, rods were introduced in the place of wires, and extensive trials were made in the year 1890 in the building yard of the Royal Hungarian Government at Budapest. Similar efforts have been made with the Hennibique system, in which stirrups are introduced to hold up the tension rods with the object of contributing to resistance of shearing stress. Also in the Matrai system, in which wires are embedded in the concrete diagonally between the supported ends. All these contrivances, however, though very ingenious, need supervision in setting out in order to place the metal inserted in the concrete at the specified distances apart. Metal lathing has also been introduced, that by the Bank's system having been employed in partition work and ceilings made of flat steel wire or ribbon twisted and woven into meshes of convenient size. At first the use of expanded metal was restricted almost wholly to lathing for plastering, in which, as stated upon the makers' catalogues, "the key is the thing," but as the machinery for its development has been improved, it has become recognised as an effective binder for heavy floors, canal walls, docks, locks, and reservoirs, as well as for reclamation walls facing the sea in sheltered positions. The concrete is entangled in the meshes, and continuity of the metal work throughout can be secured by slightly overlapping the sheets. Uniform distribution of strength combined with an effective keyage is also provided, and it needs no special supervision, as when independent rods or plates are introduced, to place the lattice work horizontally in a correct position in the concrete, but as regards its position vertically in the section, we may now profitably consider its effect. In order to appreciate the superiority of expanded metal in affording ample without extravagant iron or steel tensile aid to a slab of concrete, let us for the sake of argument calculate a concrete beam 12 ins. square in transverse section, assuming the neutral axis first of all to pass if possible



through the centre of gravity of the section. If the beam be supported at both ends of its length, and loaded between the supports, the upper portion will be in compression and the lower portion in tension. The stress will be nil at the neutral axis, and a maximum along the outside top and bottom edges. The safe compressive working maximum stress may be taken approximately at, say, 400 lbs. per square inch, while the corresponding safe tensile maximum working stress would then, according to accepted data, be only 40 lbs. per square inch. Thus it will be seen that with a central neutral axis the beam would theoretically fail in tension long before the compression became prejudicially affected. This tendency to fail in tension would, however, be partially resisted by the fact that practically a flat arch is formed within the beam, which would appear to create the conversion of a large part of the vertical pressure into lateral thrust, but which really causes the section to act as a bar with a hollow curved soffit, and it is evident that the neutral axis under the influence of such a load would not remain coincident with the centre of gravity of the section, but would rise above it, until the tensile and compressive resistances were equal, so that the equilibrium of any short length of the beam resulted in a couple.



Thus, if the panel A E F C is pushed towards the left by a force uniformly applied along a short margin A E at its upper section, its lower section C F will be thrust towards the right with an equal force as represented in direction by the arrows, or vice versa. This couple or pair of contrary forces, if acting alone, would exert upon the panel A E F C a rotating tendency, but we have the vertical effects of the reaction at the supports K L together with the action of the weight intervening between the support and the panel under consideration, K A C L each exercising their influence in the balance of moments round a turning point. The mean stress which can be applied upon the upper portion of the beam $= \frac{400+0}{2} = 200$ lbs. per square inch and that upon the lower portion $\frac{0+40}{2} = 20$ lbs. per square inch. In each case the resistance will be the mean stress of the area influenced, multiplied by two-thirds of the depth of the portion so influenced which we have under

* A paper read on September 7 by Mr. A. T. Walmisley, M.Inst.C.E., before the British Association at Bradford.

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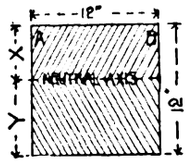
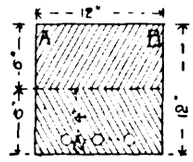
consideration, that being the distance of the centres of pressure of the upper and lower portions above and below the neutral



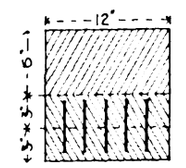
axis. Let X and Y represent respectively the depths of the top and bottom outside surfaces from the neutral axis. Then the resistance of the upper part in compression will be $200 \times (12 \times X) \times \frac{1}{2}X = 1{,}600\ X^2$ inch-pounds. And the resistance of the lower part in tension will be $20 \times (12 \times Y) \times \frac{1}{2}\ Y = 160\ Y^2$ inch-pounds. If these are equal then $1{,}600\ X^2 = 160\ Y^2$ or $10\ X^2 = Y^2$. But $X + Y = 12$, $\therefore X + X\sqrt{10} = 12$ and $X = \frac{12}{4{\cdot}16} = 2{\cdot}88$ and $Y = (12 - 2{\cdot}88) = 9{\cdot}12$. The limit of capability is therefore not a compression of $200 \times (12'' \times 6'') \times 4'' = 57{,}600$ inch-pounds, but $200 \times (12 \times 2{\cdot}88) \times \frac{1}{2}\ (2{\cdot}88) = 13{,}271$ inch-pounds. This divides the depth in the proportion of 24 to 76 instead of two halves, and gives the percentage.

We will now consider the effect of introducing three tension rods in the lower portion



of the beam. To maintain the neutral axis in the centre of the section the quantity of iron with a unit stress of five tons to the square inch needed to furnish the required balance of resistance would be, if applied at the centre of pressure, $\frac{57{,}600 - 5{,}760}{5 \times 2{,}240 \times 4} = \frac{51{,}840}{44{,}800} = 1{\cdot}15$ square in. as the quantity of iron needed to furnish the required resistance. Assuming three rods of $1\frac{1}{16}$ in. diameter equal to three times an area of ·37 square in., we have the requirement approximately attained. The chief requisite in construction is to provide sufficient cover underneath the iron to protect it from the action of fire. Should these rods be only embedded $1\frac{1}{2}$ in. (centres) above the lower edge C D, then their distance from a central neutral axis would be $4\frac{1}{2}$ in., and their diameter would be $\frac{51{,}840}{d^2 \times 3 \times {\cdot}7{,}854 \times 5 \times 2{,}240 \times 4\frac{1}{2}} = \frac{51{,}840}{151{,}200\ (·7{,}854)\ d^2} = \frac{{\cdot}43}{d^2}$, or $d = \frac{11}{16}$ in. approximately, the same as before, although theoretically each rod would need 16 per cent. less sectional area than when placed $\frac{1}{2}$ in. nearer the neutral axis.

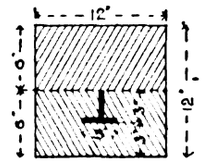
Let us next consider the insertion of 4 in. × $\frac{1}{16}$ in. wrought-iron plates, with $\frac{1}{4}$-in. cross rods and symmetrically disposed in the centre of the



lower half, 2 in. apart, five in number. This gives us 5 (4 in. − $\frac{1}{4}$ in.) × $\frac{1}{16}$ in. = $\frac{75}{64}$ square inches = 1·17 square inches, and $\frac{75}{64}$ square inches × 5 tons (2,240) × $3\frac{3}{8}$ = 43,125 inch-pounds, and concrete (12 in. − $\frac{5}{16}$ in.) = $11\frac{11}{16}$ in. × 6 in. × 20 × 4 = 5,610 inch-pounds; total, 43,125 + 5,610 = 48,735 inch-pounds, so that in this case the neutral axis would become slightly raised above the centre line in order so to increase 48,735 inch-pounds, the tensile element, and to decrease 57,000 inch-pounds, the compressive element, until they form a couple that would produce equilibrium.

To avoid the expense of drilling or of punching the holes for the interlacing rod, Messrs. Lindsay & Co. in their system introduce alternate rods passing over and under the sections of iron or steel, arranged in pairs, thus saving the consequent weakening of the section, and in large floors these rods maintain light rolled joists in position placed a good distance apart.

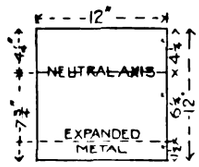
If instead of vertical plates as above we next consider an inverted tee section 3 in. × 3 in. × $\frac{1}{2}$



in. inserted with the top of the metal web touching the neutral axis, we have then from the iron section, first, the stress at the junction of the web with the flange as follows: $= \frac{2\frac{1}{2}}{3}$ or $\frac{5}{6}$ of 5 tons = 9,333·3 lbs.; web $2\frac{1}{2}$ in. × $\frac{1}{2}$ in. × $\left(\frac{0 + 9{,}333{\cdot}3}{2}\right) \times \frac{1}{2}$ ($2\frac{1}{2}$ in.) = 9,722-inch pounds; flange 3 in. × $\frac{1}{2}$ × $\left(\frac{9{,}333{\cdot}3 + 11{,}200}{2}\right)$ × 2·8 = 43,120 inch-pounds, giving a total of 52,842.

The area of cross section of tee iron = 2·75 square inches, and the area of concrete below the neutral axis = (72 − 2·75) = 69·25 square inches, and 69·25 square inches × 20 lbs. × 4 in. = 5,540 inch-pounds, and 52,842 + 5,540 = 58,382 inch-pounds. Supposing the compression of the upper portion above the neutral axis to balance this amount, we should have $\frac{58{,}382}{(12 \times 6) \times 4}$ = 202·8 lbs. per square inch as the working unit stress above the neutral axis, or practically a stress of 200 lbs. per square inch as above assumed.

Lightness, combined with stiffness, may be attained in heavy floors by introducing the tubular system into the compressive element of the concrete, whereby the upper thickness can be placed at a comparatively greater distance from the neutral axis, the increased depth of the beam so attained, supported at both ends, tending to obviate deflection, but the alternative system of introducing hollow lintels below the neutral axis when the upper half depth is covered with solid concrete is unscientific, as it increases the area of the portion subject to compression, while reducing the area of the portion subject to tension, without contributing thereto by the aid of metal. It will be seen that the insertion of wires or rods or bars or other separate sections contributes strength in the direction of length in which they are placed, but are evidently weak transversely, leaving the intermediate concrete unaided.



Expanded metal, however, contributes strength laterally as well as longitudinally. It also provides keyage by its depth. The advantage gained by the lattice shape of the metal, prevents a continuous line of stress as obtained in systems in which the stress is mainlygiven in one direction only, so that with the use of a diamond-shape plate with open centres we have to allow a factor approximately of 2 to compensate for the angle of stress in its weakest direction. Thus, assuming so low a stress as 5 tons to the square inch in order to harmonise with the low units taken in the above calculations, we have $\frac{5 \text{ tons} \times 2{,}240}{2} = 5{,}600$ lbs. per square inch, and supposing we employ expanded metal to "size No. 10," having a 3-in. mesh with strands $\frac{3}{8}$ in. by $\frac{3}{16}$ in., *i.e.* $\frac{3}{16}$ in. thickness by $\frac{3}{8}$ in. width of plate we obtain in a width of 1 ft. run, a transverse section of $4\ (\frac{3}{8} \times \frac{3}{16}) \times 2 = \frac{9}{16}$ square inch, capable of sustaining as expanded metal a safe stress in any direction of $\frac{9}{16} \times 5{,}600 = 3{,}150$ lbs., which, if laid $1\frac{1}{2}$ in. above the under surface of the beam, or $6\frac{1}{2}$ in. below the neutral axis (as sketched in the accompanying section) would provide a moment of resistance of 19,687 inch-pounds, which added to concrete (12 in. × $7\frac{1}{2}$ in.) below the neutral axis = 93 square inches × 20 lbs. × $\frac{3}{8}$ ($7\frac{1}{2}$ in.) = 9,610 inch-pounds, giving a total tensile resistance of 29,297 inch-pounds, so that in the portion above the neutral axis we have a unit working stress in compression to balance this amount of $\frac{29{,}297}{(12 \times 4\frac{1}{2}) \times \frac{1}{2}\ (4\frac{1}{2})} = \frac{58{,}594}{289} = 203$ lbs. per square inch, or practically 200 lbs. per square inch as the mean compressive unit strength. The consideration of beams of greater width than 1 ft. would result in the same decision, as the expanded metal would be uniformly increased in width with the concrete.

The present machinery at work at West Hartlepool is limited to sheets of 8 ft. in length, but larger machines are in contemplation to enable sheets of wider areas to be supplied. In order to maintain a definite distribution of the character of the stress, the author considers that all slabs of concrete in which metal is embedded below the neutral axis should not be fixed at the supports, but merely rest free on proper bearings. The units assumed in the preceding cases under review in this paper may be deemed to be over-cautious. Of course, the use of steel having now supplemented iron for such purposes, a unit stress of $6\frac{1}{2}$ tons per square inch may be taken. This, if anything, is, however, an additional argument in favour of the use of expanded metal, as the employment of other sections is seen to be in excess of requirements, whereas an expanded metal section gives sufficient but less sectional areas than in the other calculations. With an increased unit stress it is evident the moment of resistance contributed by the steel embedded in the section would bring down the neutral axis nearer to the level of the position of the centre of gravity, and hence under those considerations would increase the area available to resist compression. It will be observed that independently of facility of construction and uniform distribution of tensile resistance, the use of even a heavy section of expanded metal gives only 49 per cent. of the metal introduced with iron wires or bars, and about 20 per cent. of a tee-iron section.

Results of Experiments to Ascertain the Tensile Strength of the Following Pieces of Steel Made by Messrs. David Kirkaldy & Son for the Expanded Metal Company, Limited.

Test No.	Description.	Original Ultimate Stress. Size.	Area	Total	Per sq. in. of original areas.	Fractured. Size.	Area	Difference area per cent.	Stress per sq. in. of fractured area.	Extension in 2 in. In.	Extension in 2 in. Per cent.	Appearance of fracture.
		Inch.	sq. in	lbs.	lbs. tons.	inch.	sq. in		lbs.			
II.	Pieces 1 in. wide partially sheared longitudinally shaped											
2547	Untreated portion. Piece 1 in. by $\frac{3}{16}$ in. sheared and one portion treated	·140 × ·202	·028	1677	59893 = 26·7	·030 × ·100	·003	67·8	186333	0·55	27·5	Silky
2548	Treated or stretched portion (narrower)	·133 × ·191	·026	1849	71115 = 31·8	·003 × ·100	·009	65·3	205444	0·17	8·5	Do.
2549	Untreated.....	·138 × ·200	·028	1771	63250 = 28·2	·090 × ·125	·011	60·7	161000	0·41	20·5	Do.
	Do.											
2550	Treated	·137 × ·190	·026	1986	76384 = 34·1	·095 × ·130	·012	53·8	165500	0·15	6·7	Do.
2551	Untreated	·140 × ·187	·026	1495	57500 = 25·7	·095 × ·082	·008	69·2	186875	0·58	29·0	Do.
	Do.											
2552	Treated	·139 × ·174	·024	1656	69000 = 30·8	·100 × ·094	·009	62·5	184000	0·15	7·5	Do.
	Mean of Untreated pieces.			.....	60214 = 26·9			65·0			25·7	
	" " Treated pieces.			.....	74106 = 32·2			60·5			7·6	

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The following tests are useful for a comparison,—giving particulars of tests carried out by Messrs. Fowler & Baker upon experimental slabs for flooring purposes, with and without the use of expanded metal, the slabs being supported at their opposite ends :—

Reference Letter.	Date when made.	Size of Slab.	Clear Span of Slab.	Expanded Metal. Area and Mesh.	Expanded Metal. Strand.	Composition of Concrete (by Volume). Portland Cement.	Thames Ballast.	Unscreened Sand.	Water.	Date when Broken.	Age of Slab.
A	20/1/96	4′×2′×3″	3′ 6″	Made without expanded metal		3	0	1	1½	23/3/96	63 days.
B	20/1/96	4′×2′×3″	3′ 6″	Do.		3	0	1	1½	23/3/96	63 days.
C	30/1/96	4′×2′×3″	3′ 6″	Do.		3	0	0	1	17/4/96	77 days.
D	30/1/96	4′×2′×3″	3′ 6″	Do.		1	0	2	½	17/4/96	77 days.
E	30/1/96	4′×2′×3″	3′ 6″	Do.		1	0	1	½	17/4/96	77 days.
F	20/1/96	4′×2′×3″	3′ 6″	Do.		1	2	1	½	23/3/96	63 days.
G	17/1/96	4′×2′×3″	3′ 6″	4′×2′×3″ mesh	⅜″ × ⅜″	1	2	1	½	20/3/96	63 days.
H	30/1/96	4′×2′×3″	3′ 6″	4′×2′×3″ mesh	⅜″ × ⅜″	1	2	1	½	17/4/96	77 days.
I	20/1/96	7′×2′×3″	6′ 6″	None		3	0	1	1½	23/3/96	63 days.
J	20/1/96	7′×2′×3″	6′ 6″	None		3	0	1	1½	23/3/96	63 days.
K	20/1/96	7′×2′×3″	6′ 6″	None		1	2	1	½	23/3/96	63 days.
L	17/1/96	7′×2′×3″	6′ 6″	6′8″×2′×3″ mesh	⅜″ × ⅜″	1	2	1	½	20/3/96	63 days.
M	20/1/96	7′×2′×3″	6′ 6″	None		1	2	1	½	23/3/96	63 days.
N	1/1/96	7′×2′×3″	6′ 6″	6′8″×2′×3″ mesh	⅝″ × ⅜″	1	2	1	½	4/3/96	63 days.
O	30/1/96	7′×2′×3″	6′ 6″	6′8″×2′×3″ mesh	⅝″ × ⅜″	1	2	1	½	17/4/96	77 days.
P	30/1/96	7′×2′×3″	6′ 6″	6′8″×2′×3″ mesh	⅝″ × ⅜″	1	2	1	½	17/4/96	77 days.
Q	30/1/96	4′×2′×3″	3′ 6″	4′×2′×3″ mesh	⅜″ × ⅜″	1	2	1	½	17/4/96	77 days.
R	20/1/96	4′×2′×3″	3′ 6″	None		1	2	1	½	23/3/96	63 days.
S	1/1/96	4′×2′×3″	3′ 6″	4′×2′×3″ mesh	⅜″ × ⅜″	1	2	1	½	4/3/96	63 days.

Reference Letter.	Total Number of Rails required to break the Slabs.	Total Load (Uniform) to break the Slabs.	Deflections in Centre. At ⅓ Breaking Load.	At ½ Breaking Load.	At ⅔ Breaking Load.	Ultimate.	Breaking Load per Square Foot.	Remarks.
		Cwts.					Cwts.	
A	5	30	No appreciable deflection.				4·28	Broke in centre.
B	6	36	..	do.	..	..	5·14	Broke in centre.
C	3	18	..	do.	..	..	2·57	Carried weight of third rail one second.
D	2	12	..	do.	..	..	1·71	Carried second rail a few seconds.
E	3	18	..	do.	..	..	2·57	Carried third rail for one second.
F	3	18	..	do.	..	..	2·57	Broke in centre.
G	20	120	Nil	3/32″	1/16″	9/32″	17·14	Broke under one timber. The strands of expanded metal were not broken. The concrete sheared.
H	25	150	1/16″	5/32″	1/8″	11/32″	21·43	Carried the twenty-fifth rail about half a minute.
I	3	18	..	do.	..	..	1·39	Broke under one timber.
J	3	18	..	do.	..	..	1·39	Broke in centre.
K	1	6	..	do.	..	..	0·46	Broke near centre after weight had been on for one minute.
L	11	66	1/16″	1/16″	1/16″	1 1/16″	5·08	Broke under one timber. The strands of expanded metal were not broken through.
M	1	6	..	do	..	..	0·46	Broke immediately weight was put on in centre.
N	10	60	Nil.	1/16″	1/8″	1 1/16″	4·61	Broke in the centre. The strands of metal were broken through.
O	11	66	1/8″	5/16″	1″	1 5/16″	5·07	Carried the eleventh rail about half-minute.
P	10	60	1/16″	7/16″	1/8″	1 5/16″	4·61	Just carried the weight of tenth rail one second.
Q	23	138	3/32″	7/32″	3/8″	17/32″	19·73	Carried the twenty-third rail about half-minute.
R	3	18	No appreciable deflection.				2·57	Broke immediately in centre.
S	14	84	1/16″	11/64″	1/4″	9/32″	12·00	Broke under one timber. The strands of expanded metal were broken through.

Note.—The average weight of rails is taken at 6 cwt. each.

In another test made by the Expanded Metal Company in May, 1900, upon a slab 12 ft. 6 in. by 11 ft. clear span, 5 in. thick, composed of 4 parts of fine clinker to 1 of Portland cement, with expanded metal embedded in the under surface, the expanded metal was 3 in. mesh, ¼ in. by 1/16 in. strands, and was in four sheets, which were laid on the temporary centering with a 12 in. lap, and the meshes overlapping were clipped together with steel clips. After the concrete was set and the centering removed, the expanded metal was completely hidden in the under side of the concrete. The slab was allowed to remain for seven weeks, and was supported with a 3 in. bearing on its four sides on a timber sole plate. Thames ballast was thrown upon the slab in quantities of a cubic yard at a time, uniformly distributed until the load amounted to 35 tons, with slab supported on all four ends.

When the slab was loaded to 1 cwt. to the foot super there was no deflection.

At 1¼ cwt. to the foot super there was ⅛ in. deflection in the centre.

At 2 cwt. to the foot super there was ¼ in. deflection.

At 2½ cwt. to the foot super ¾ in. deflection.

At 3 cwt. per foot super the test was adjourned for the day with a deflection of 5/16 in.

On May 24 the test was resumed, when the deflection was found to be 1¼ in.

At a load of 3½ cwt. a slight crack was observed on the under side of the slab, radiating from one corner towards the centre.

At 4 cwt. to the foot super there was a deflection of 1⅞ in.

At 4¾ cwt. the slab showed a crack across the centre in the direction of the longest span.

The slab was ultimately loaded to 5¼ cwt. to the foot super, and bore this load for 1½ hours when it collapsed, the fractures occurring at each of the four corners.

A Joint Committee of representatives of the Northern Architectural Association, the Newcastle, Gateshead, and Tyne District Master Builders' Association, and the Council of the Building Trades' Exchange appointed a sub-committee in 1899 to test the comparative breaking strengths of concrete slabs made with and without the addition of expanded metal. For this purpose twelve slabs were set up on wood centerings and brick piers in the foundry yard of the Gallowgate Iron Works belonging to Messrs. Henry Walker & Sons, Limited, on July 20 and 24, the centerings being removed on the following August 16. The concrete for the 5 in. slabs was specified to be composed of 4 parts clean washed gravel to pass a 2 in. gauge, 1 part of clean sand, and 1 of Portland cement. The concrete for the 3 in. slabs was specified to be composed of 2 parts clean washed gravel to 1 in. gauge, 1 of clean sand, and 1 of Portland cement. The cement used is stated in the Joint Committee's Report to have been procured from a merchant in the ordinary way. When tested there was no residue through a 50 sieve, and only 2 per cent. through a 70 sieve. It, however, only weighed 94 lbs. per striked bushel. The slabs, after they were cast in wooden boxes, remained exposed in the open to a continuous hot sun, which had "spider's webbed" the surface of the cement. All slabs were 4 ft. wide, so that the areas given are nett, the remaining width providing the wall support free at each end. The slabs were gradually weighted with pig-iron on September 19 and 20, 1899, the carefully recorded results being as follows, those containing metal being marked with an asterisk. The slabs were supported at their opposite edges.

Generally speaking there was reported to have been only slight deflection before breaking.

No. 1 broke before the test began, two men and six pigs of cast-iron being on it, *i.e.*, about 9 cwt.

No. 2 shows ⅛ in. deflection under 75 cwt.; ½ in. deflection under 175 cwt., cracked at 220 cwt., and broke under a load of 237 cwt. 3 qr. 14 lbs.

No. 4 was unbroken under a load of 340 cwt. 1 qr. 21 lbs., when it was found inconvenient to pile the pig-iron to a greater height. It showed 1⅝ in. deflection, but returned to nearly its original straightness when this load was removed.

No. 5 broke accidentally while the men were piling up the weight upon No. 4 slab.

No. 9. The cracks on this slab were in form as sketched.

No. 10 was unbroken with a load of 270 cwt. 2 qr. 2 lbs., at which load the piling was 11 ft. high. Under a load of 261 cwt. 2 qr. 12 lbs. it indicated slight deflection but returned.

The co-efficients of expansion of the two constituents, iron or steel and concrete, are considered for all practical purposes to be identical. The expansion of steel at 500 deg. Fahr. is an inch in 28 ft., and at 1,000 deg. an inch in 14 ft.; when dull red-hot, iron is 1,300 deg. Fahr.

Cement adheres more firmly to iron and steel when left with its natural surface, and not treated by any anti-rust process. When surrounded with good concrete, while free from air, there is little fear that it will gradually corrode.

In some investigations made by the Engineer

No.	Expanded Metal.	Nett Length.	Nett Area sq. feet.	Thickness in ins.	Concrete Proportions.	Breaking Weight.	Remarks.
1	None.	8 ft.	28	8	5 to 1	9 cwt.	See note above.
2*	No. 10.	8 ft.	28	5	5 to 1	237 cwt. 3 qrs. 14 lbs.	See note above.
3	None.	6′ 6″	22	8	5 to 1	22 cwt. 2 qrs. 18 lbs.	Broke under this load.
4*	No. 10.	6′ 6″	22	5	5 to 1	Unbroken.	See note above.
5	None.	8 ft.	28	4½	3 to 1	Not recorded.	See note above.
6*	No. 8.	8 ft.	28	3	3 to 1	96 cwt. 1 qr. 17 lbs.	Broke under this load.
7	None.	5 ft.	16	8	5 to 1	124 cwt. 2 qrs. 20 lbs.	Broke under this load.
8*	No. 8.	5 ft.	16	3	3 to 1	213 cwt. 3 qrs. 8 lbs.	Broke under this load.
9	None.	5 ft.	16	4½	3 to 1	10 cwt. 3 qrs. 10 lbs.	Broke under this load. See also note above.
10*	No. 10	5 ft.	16	5	5 to 1	Unbroken.	See note above.
11	None.	6′ 6″	22	4½	3 to 1	17 cwt. 1 qr. 25 lbs.	Broke under this load.
12*	No. 8.	6′ 6″	22	3	3 to 1	113 cwt. 0 qr. 22 lbs.	Broke under this load.

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of the St. Louis Merchants' Bridge Terminal Railway on the strength and adhesion of 2-in. diameter iron anchor bolts set 11½ in. in masonry with lead sulphur and cement, it was found that a rod provided with a screw thread to improve the grip of the cement began to yield under a test load of 32,000 lbs. and broke at a load of about 50,000 lbs. without developing the strength of the cement joint, while in the case of a rod left plain and smooth the cement began to yield at a load of 34,000 lbs., but did not entirely part, when the rock broke at a load of 67,000 lbs. *The Engineering and Building Record* of 1891 in reporting these experiments states that the larger blocks of stone could not be accommodated in the machine, but it was inferred that in a suitable setting the cement joint on a smooth rod might be made to break the rod. Professor Bauschinjer, of Munich, found that the adhesion of concrete to iron was about 569 lbs. to 668 lbs. per square inch, which, it will be noticed, is greater than the unit assumed for the concrete in this paper, and therefore the latter may, under favourable circumstances, be increased above an assumption of 400 lbs. per square inch. The use of twisted rods certainly offers a better grip than flat bars or wires. The finer a cement is ground the greater is its adhesive strength. In practice it will be found that the adhesion varies not only with the quality as well as the quantity of the cement, but also with the quality as well as the quantity of the sand, the porosity of the substances joined together, their degree of saturation and of course the length of time during which they have been joined. While the sand-carrying capacity of a cement bears a proportion to its adhesive capability, yet beyond the proportion of 2 to 1 sand detracts from the resistance more and more rapidly.

the supporting column of the pier. The surface so exposed is very small, compared with the various systems of trough flooring that have been patented.

Channel irons, 6 in. by 2 in. (12 lbs.), 5 ft. centres, have been successfully used in 16 ft. span arches and 4 ft. centres for 20 ft. 6 in. spans, with Portland cement 4½ in. clinker concrete, 4 to 1, and No. 10 expanded metal. After placing the centering in position and filling the haunches the expanded metal is laid down horizontally, the sheets being placed lengthwise across the beam, and overlapped at the sides and ends. The concrete is then finished off to the required level while the under concrete is still green, so that the whole arch forms one homogeneous section, leaving a level top with a smooth under surface when the centering is taken away. It may be remarked that the presence of the transverse channel metal arch, firmly held between the longitudinal joists, enables the centering to be removed at an earlier stage than otherwise; but it is prudent not to strike the centreing for at least ten days.

Mr. A. Baker, of the Beckton Gasworks, conducted an experiment with a concrete and expanded metal structure, under the instructions of Mr. G. C. Trewby, M.Inst.C.E., consulting engineer to the Gas Light and Coke Company, in which the concrete consisted of ordinary Thames ballast, passed through a ¾-in. sieve, and Portland cement (of 112 lbs. per bushel 10 per cent. residue on 2,500 mesh sieve, 450 lbs. tensile strength, after twenty-eight days' immersion) in the proportion of one of cement to four of ballast. The expanded metal was introduced in sheets 17 ft. by 5 ft. 6 in. wide, 3 in. mesh, ½ in. by $\frac{3}{16}$ in. strands. The structure consisted of a 6 in. slab of concrete, 17 ft. clear span by 10 ft. wide, supported for

Particulars of Tests carried out by Messrs. Fowler & Baker upon Concrete Arches with a view to comparing with Flooring Slabs made with Concrete and Expanded Metal.

Number or Mark on Arch.	Date when Made.	Clear Span of Arch.	Width of Arch.	Thickness at Crown.	Rise of Arch.	Composition of Concrete.			
						Portland Cement.	Thames Ballast.	Unscreened Sand.	Water.
Arches.									
1	21/1/96	6′ 6″	3′ 0″	3″	5″	1	2	1	½
2	21/1/96	6′ 6″	3′ 0″	3″	5″	1	2	1	½
3	21/1/96	6′ 6″	3′ 0″	3″	5″	3	0	1	1½
4	21/1/96	3′ 6″	2′ 0″	3″	3″	1	2	1	½
5	21/1/96	3′ 6″	2′ 0″	3″	3″	1	2	1	½
6	21/1/96	3′ 6″	2′ 0″	3″	3″	3	0	1	1½

Number or Mark on Arch.	Date when Made.	Date when Broken.	Age of Arch.	Total Number of Rails required to Break the Arch.	Total Load (Uniform) to Break Arch.	Deflections in Centre.				Breaking Load per square foot.
						At ¼ Breaking Load.	At ½ Breaking Load.	At ¾ Breaking Load.	Ultimate.	
					Cwts.					Cwts.
1	21/1/96	23/3/96	62 days	14	84	—	¾ in.	1¼ in.	2⅜ in.	4·31
2	21/1/96	24/3/96	63 days	—	—	—	—	—	—	—
3	21/1/96	24/3/96	63 days	10	60	¾ in.	1⅛ in.	1 $\frac{15}{16}$ in.	2½ in.	3·13
4	21/1/96	24/3/96	63 days	24	144	$\frac{1}{16}$ in.	⅛ in.	¼ in.	⅜ in.	20·57
5	21/1/96	25/3/96	64 days	28	168	$\frac{1}{16}$ in.	$\frac{1}{16}$ in.	$\frac{1}{16}$ in.	1 $\frac{1}{16}$ in.	24·00
6	21/1/96	25/3/96	64 days	24	144	$\frac{3}{32}$ in.	¼ in.	½ in.	1⅜ in.	20·57

Number or Mark on Arch.	Date when made.	Clear Span of Arch.	Width of Arch.	Remarks.
1	21/1/96	6′ 6″	3′ 0″	When the load was equal to 42 cwts.—half the ultimate load—a crack first appeared in the centre of the arch. This gradually increased until it was $\frac{1}{16}$ in. wide on the underside before collapse.
2	21/1/96	6′ 6″	3′ 0″	Arch got damaged and could not be tested.
3	21/1/96	6′ 6″	3′ 0″	Cracked when quarter breaking load was on.
4	21/1/96	3′ 6″	2′ 0″	When five-sixths of the breaking load was on the work was left, and loading proceeded at 6.30 a.m. next day till the arch broke. It broke suddenly.
5	21/1/96	3′ 6″	2′ 0″	Broke gradually.
6	21/1/96	3′ 6″	2′ 0″	

Note.—The average weight of rails is taken at 6 cwts. each.

The spans may be considerably extended by the aid of the channel arch. The only objection is the exposure of the under surface of the channel metal rib, but this can be kept well painted for preservation, and as regards security the concrete will be, in time, able to do without it in the same way as cylinders filled with concrete for piers simply form a casing for the pier, the interior concrete itself forming

purpose of experiment upon three jack arches spaced at 4 ft. 9 in. centres. These arches were formed of curved channel irons, 6 in. by 2½ in. section (at 12½ lbs. per foot), with a rise of 2 ft. in the 17 ft. span, filled up with concrete 6 in. above the soffit, thus making a level bearing on which the slab rested.

The abutments were built with steel joists secured by five wrought iron straps 4 in. by 1 in., the foundation being formed of ordinary railway sleepers laid crosswise on the firmest ground that could be found upon the site. After setting thirty-four days the trial weight in the form of rails (56 lbs. per yard) was gradually applied. These rails were laid on top of a course of blue Staffordshire bricks to ensure an evenly distributed load. With a load of 27 tons a slight crack was observed running diagonally through the concrete of No. 1 arch about 6 ft. from the north abutment, and a similar flaw was noticed in No. 3 arch in about the same position when 38 tons had been applied. But as these did not widen out or extend in any way during the remainder of the test, very little importance was attached to them, as they were considered to have been caused by a slight spreading out of the abutments. At this point the average deflection of the three channels was $\frac{3}{16}$ in. A certain number of rails were added each day until 100 tons (equivalent to 11·8 cwt. per superficial foot) was equally distributed over the slab; but this did not seem to have any appreciable effect on the structure, the deflection of the channel irons being 1 in. and of the concrete slab barely ½ in. In places the channel irons parted a little from the concrete, but not more than ⅛ in. In Mr. Baker's report he states that, after letting this weight remain for three weeks, an additional 26 tons were added, the result being a slightly increased deflection. Soon after commencing to load the next morning it was seen that one corner of the foundation was sinking, throwing the weight over on that side. No. 3 channel iron showed signs of buckling close to the foot, and the concrete in the three arches began to disintegrate by the abutment. The total weight evenly distributed over the structure was 128 tons 5 cwt., equal to 15·09 cwt. per square foot. The slab was carefully examined at this stage and found to be intact, with a deflection in the centre of ⅛ in. The average deflection of the channel irons was $1\frac{3}{16}$ in., all three keeping their shape very well with the full load on.

Area of slab ..... 170 square feet.
Structure finished ... November 2, 1899.
Commenced loading December 4, 1899.

Date.	Weight on.				Average Deflection	Load per sq. ft.
	tons.	cwts.	qrs.	lbs.	ins.	cwt.
1899						
December 5	14	17	1	22	—	1·75
,, 6	27	10	3	22	⅛	3·24
,, 7	38	2	0	22	¼	4·48
,, 8	46	11	0	22	⅜	5·48
,, 12	54	14	0	22	$\frac{7}{16}$	6·44
,, 13	62	17	0	22	$\frac{9}{16}$	7·40
,, 14	71	0	0	22	⅝	8·35
,, 15	79	3	0	22	$\frac{11}{16}$	9·30
,, 16	87	6	0	22	¾	10·27
,, 18	91	7	2	22	$\frac{13}{16}$	10·75
,, 19	99	15	0	0	1 $\frac{1}{16}$	11·74
,, 20	99	15	0	0	1⅛	11·74
1900						
January 16	126	9	3	0	1 $\frac{3}{16}$	14·88
,, 17	128	5	3	0	1 $\frac{3}{16}$	15·09

It may be of interest to hear that expanded metal has been used in many of the new buildings at Beckton with satisfactory results.

The cost of the use of expanded metal depends in no small degree upon the extent of the work. The makers prefer to include the concrete in their contract when they are expected to undertake responsibility for the stability of a structure involving the use of expanded metal. The saving, however, is mainly in weight and head room, although, as hinted in this paper, there may be cases where a tubular top might be advantageously introduced, whereby strength would be attained without increased weight, though at the expense of reduction in headway.

The fact that the introduction of metal into concrete as a tensile element is advantageous is generally accepted, and the author trusts that his paper may elicit a discussion upon the subject suggestive of desirable improvements (if any) in the size of the meshes which are formed in the metal or of further experiments needed in the application of expanded metal to concrete structures. Hitherto it has been chiefly used in cases where the steel work for floor construction has been already designed. The best and most economical results would be obtained by a disposition of framework calculated to suit the carrying-power of the concrete with the aid of expanded metal whereby the user could employ concrete of a wider span than when employing plain concrete.

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The stock sizes of expanded metal are as follows :—

Size of Mesh.	Strands.	Size of Mesh.	Strands.
6"	½" × ½" bare.	¾"	5/32" × 20 G bare.
6"	½" × ½" ,,	¾"	5/32" × 18 G ,,
6"	½" × ½" ,,	¾"	5/32" × 16 G ,,
6"	½" × ½" ,,	¾"	½" × 16 G ,,
		¾"	½" × ½" ,,
3"	½" × ½" ,,	⅞"	5/32" × 16 G ,,
3"	½" × 16 G ,,	⅞"	5/32" × 18 G ,,
3"	½" × ½" ,,	⅞"	5/32" × 20 G ,,
3"	½" × ½" ,,		
3"	½" × ½" ,,		
3"	½" × ½" ,,	1"	5/32" × 18 G ,,
		1"	5/32" × 18 G ,,
1½"	5/32" × 18 G ,,	1"	5/32" × 20 G ,,
1½"	½" × 16 G ,,		
1½"	½" × 16 G ,,		
1½"	½" × ½" ,,		
1½"	½" × ½" ,,		
1½"	½" × ½" ,,		

Illustrations.

COLNEY CONVENT.

OUR illustration showing the Tower Entrance to All Saints' Convent, Colney Chapel, St. Albans, is in reality a detail of a portion of the main front of this building, a bird's-eye view of which we published on February 3, 1900. We gave a general description of the building at the time, and it is only now necessary to say that the works are rapidly approaching completion. Mr. H. Wilson has undertaken to model the groups of sculpture, &c., shown in the illustration.

As before stated, this convent is for the sisters, whose head house is now in Margaret-street, Cavendish-square. Messrs. Wm. King & Sons, of Westminster, are the builders, and Mr. Leonard Stokes is the architect.

CHATEAU MAURICIEN, WIMEREUX.

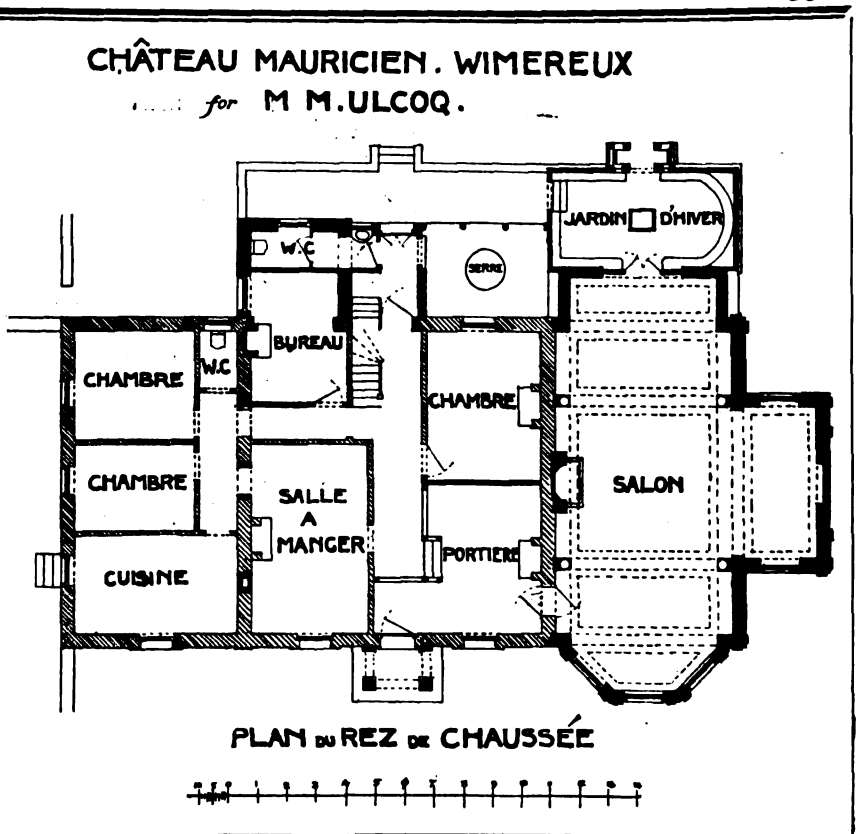
THE view represents part of the additions to the Château Mauricien. The house has been practically rebuilt in the "Empire" manner, to which period the original building belonged. The blacked-in parts on plan show new work and the hatched parts old.

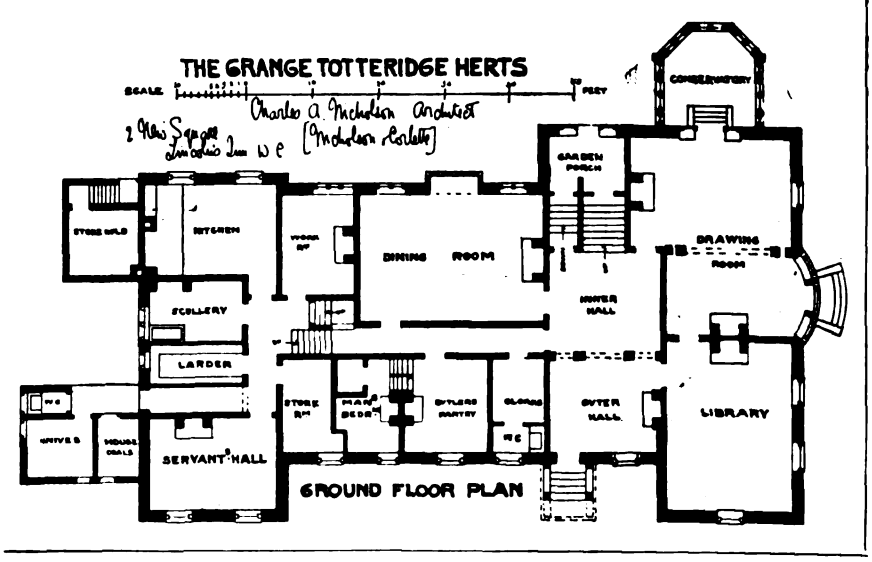
The whole of the work has been carried out by local workmen, with satisfactory results, from the drawings and full-sized details supplied to them. The interest displayed by them in the decorative details, the trellis-work, the garden buildings and accessories was such as may be looked for in vain from the British workman. JOHN BELCHER.

THE GRANGE, TOTTERIDGE, HERTS.

THE old Grange was destroyed by fire in 1899; but the brick vaults of the cellars preserved the foundations of the earliest portion of the house, and these naturally suggested some of the lines of the new work which has recently been completed. But otherwise little trace of the old plan remains, except that the dining-room occupies much the same position as it did formerly.

The greater part of the present south front, the east wall of the drawing-room, the east and north walls of the principal staircase, the north and west walls of the entrance-hall, and the walls separating the drawing-room from the library, and from the staircase and hall, indicate generally the positions of the old foundations. The front entrance and covered porch has been placed on the west, not on the south, as it was before. By this arrangement the new plan provides a hall 30 ft. by 17 ft., from which the principal rooms are approached. On the left lies the dining-room, which is 28 ft. by 19 ft.; and on the opposite side is, first, the library, 25 ft. by 19 ft.; and next the drawing-room. The latter is one large room separated into two parts by some pilasters and piers, which support a girder carrying a wall above. The length of this room from east to west is 30 ft., with a mean width of 21 ft. But either portion alone would be large enough for ordinary purposes as a separate room. The larger section is 24 ft. by 16 ft., and the other 19 ft. by 13 ft. With this idea in view allowance has been made for connecting the latter both with the hall and the library if necessary.





The kitchen, servants' hall, and offices being necessarily on a lower level than the reception rooms, made it possible to introduce a mezzanine floor, an arrangement which, in this case, is convenient since it provides for the maid-servants' bedrooms on a level between the ground and first floors, instead of on a second floor, or in the roof. Connected with the butler's pantry are separate bedrooms for two men-servants. One of these is on the basement level, the other in the mezzanine.

The upper hall is lighted from the ceiling, as well as by the large window on the main staircase, and from it there is access to the studio (24 ft. by 16 ft.), and the writing-room, as well as some of the bedroom suites. A corridor leads out of it to the bachelors' quarters and smoking-room, which are over the mezzanine. The dining-room table and sideboards were made by Mr. H. Read, of St. Sidwells, Exeter; and the carved mantelpieces by Mr. H. K. Kuchemann, of Pitsea, Essex, from the architect's designs. Messrs. Maides & Harper, of Croydon, were the builders.

WALWORTH MISSION CHAPEL.

IT had been proposed that the chancel of this chapel should be slightly remodelled and the whole of the interior decorated. The drawing shows one suggestion that was made in order to indicate the way in which a little room could be provided for a chancel and choir. This was done by placing a screen on a platform two steps higher than the nave to the west of a small chancel. The latter was to be formed by building up a 9-in. brick wall, with a clergy vestry on the north, and one for the choir on the south. Aoove the choir vestry was the organ with its loft over the sedilia. These were made to be part of a simple scheme of decoration in conjunction with a new altar, reredos, and dossal. The brick walling of the vestries being carried over from the north to the south by an arch gave an opportunity for using the whole of this walling as a ground for plaster to which some bright and fresh colour could be applied. Over the chancel and a little above the arch was a wooden ceiling decorated in white and green with a little black. The main roof of the building was only to be cleaned and painted so as to destroy the heavy and depressing colour of its varnish.

COMPETITIVE DESIGN FOR CENTRAL LIBRARY, KINGSTON-UPON-HULL.

THIS building was designed to comprise in the basement a book store, heating chamber and coal store, with a staff circular staircase and book lift leading right up to the gallery of the reference book store; and upon the ground floor a lending library with the space for the public immediately opposite the main central entrance, with the staff dining-room, work room, librarian's entrance and staircase, and staff lavatories on the one side, and the public

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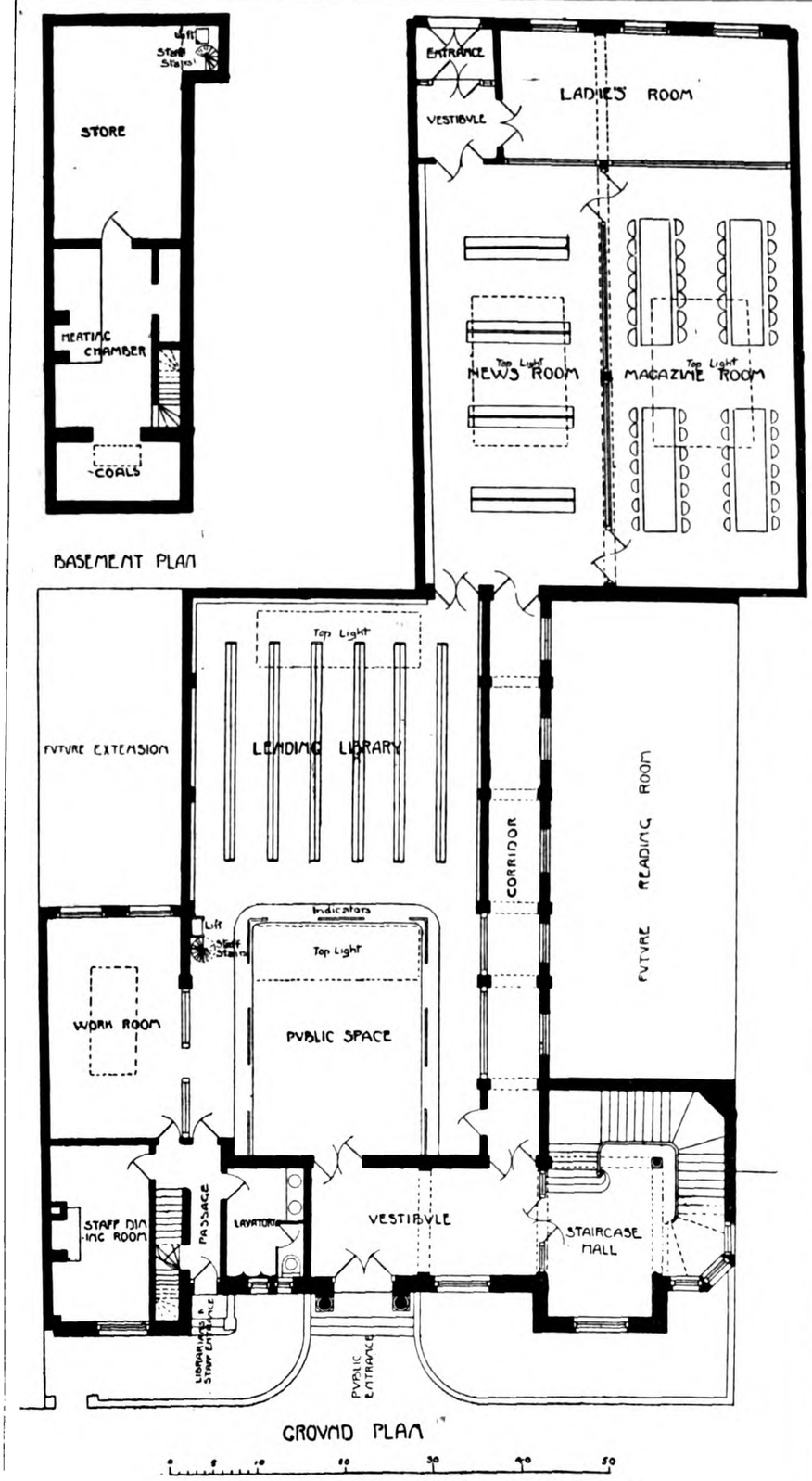

Design for Central Library, Kingston-upon-Hull. Plan.

staircase on the other side, with a corridor leading to the news and magazine room, and ladies' room, and entrance from Baker-street. On the first floor a reference library with a book gallery round the walls at half its height, under which are placed book cases at right angles to the wall, book store and librarian's room.

It was proposed that it should be built of brick with stone facings, slate roof, the floor generally to be fireproof laid with wood block, except the vestibules and corridors, which were to be laid with mosaic, and staircases of patent stone. JOHN F. DUTHOIT.

DESIGN FOR CARDIFF LAW COURTS.

THIS illustration is the north-east elevation of the design submitted by Messrs. W. A. Pite and R. S. Balfour in the competition for Cardiff Law Courts. As the authors are out of town, we are not able to give any particulars of their design.

INTERNATIONAL CONGRESS ON THE TEACHING OF DRAWING, PARIS.

THE first "International Congress on the Teaching of Drawing" was held in Paris at the Cercle de la Librairie, from August 29 to September 1, and proved one of the most interesting congresses that have been held in Paris during the Exhibition. The Committee of Organisation was as follows:—President, M. Paul Colin, Inspecteur Principal de l'Enseignement du Dessin et des Musées, Professeur à l'École Polytechnique, &c.; President of the First Section, "General," M. Jules Jean Pillet, Inspecteur Honoraire de l'Enseignement du Dessin et des Musées, Professeur à l'École Nationale des Beaux Arts et au Conservatoire Nationale des Arts et des Métiers, &c.; President of the Second Section, "Technical," M. Paul Jacquemart, Ingénieur Civil des Mines, Inspecteur Général des Écoles d'Arts et Métiers et de l'Enseignement Technique au Ministère du Commerce et de l'Industrie; President of the Third Section, "Special," M. Louis Guébin, Inspecteur Principal de l'Enseignement du Dessin dans les Écoles de la Ville de Paris. General Secretary, Mme. Luisa Chatrousse, artiste peintre, professeur de dessin dans les écoles de la ville de Paris, Vice-Présidente de l'Association des Professeurs de Dessin de la Ville de Paris.

The Congress was opened on August 29 by Monsieur Leygues, Minister of Public Instruction, who touched upon the many advantages which might be derived from a general discussion on the various methods employed in the different countries for the teaching of drawing, and the important place that drawing should take in general education. In his opinion no education was complete without it, and consequently he considered drawing should be made an obligatory subject.

Details were discussed in separate sections, and the resolutions proposed were afterwards brought before a full meeting of the members of the Congress to be finally adopted and passed. The main points of the discussion were as follows:—

Drawing to be made a compulsory subject.

That the initiative of the teacher and the individuality of the student should be encouraged as much as possible.

That the artist and the workman should be brought nearer together by the former giving more attention to the exigencies of the trade or craft for which he designs, and that for the latter a more liberal art education should be provided.

The want of a more scientific training for the architect and a more artistic training for the engineer was also very fully discussed, and it was considered most desirable that the two should work in closer contact with each other.

Two mornings of the Congress were devoted to visiting the Educational Art Sections of the Exhibition under the guidance of MM. Guébin, J. J. Pillet, and Francken, and the explanations given by these gentlemen on their own sections proved most instructive.

At the close of the proceedings it was proposed by M. Germon, the Swiss delegate, that a permanent International Committee should be formed with the view to continue the work of the present Congress, and for the organisation of others in the future.

The proceedings were brought to a close by an address by the Minister of Fine Arts, who congratulated the Congress on the admirable resolutions passed, and said that he should do all in his official capacity to assist in having them carried out.

On the first evening of the Congress the members were entertained by the "Association Amicale des Professeurs de Dessin," of which M. Ed. Valton is President, and on the last afternoon they were received by the Mayor at the Hotel de Ville, when the reception-rooms were lighted up for the occasion. A banquet in the evening at the Exhibition terminated the social functions. Before separating, hearty votes of thanks were proposed by the representatives of the various nationalities to the Commission of Organisation for the thorough way in which the proceedings of the Congress had been carried out, and for the cordial welcome that had been extended to all.

COMPETITIONS.

JOINT ISOLATION HOSPITAL SCHEME, DEVIZES.—At a meeting of the committee appointed to carry out the erection of a joint isolation hospital for the combined urban and rural districts, the clerk, Mr. O. Sheppard, reported that in response to an advertisement he had received applications for particulars from 104 architects who were desirous of submitting sets of plans in competition for the premiums of 20*l.* and 10*l.* respectively. It was resolved to appoint Mr. C. E. Ponting, F.S.A., as professional assessor to advise the committee as to the selection of the plans, &c. It was resolved to inform the competitors that the committee would lay gas and water mains to the proposed site for the hospital.

TECHNICAL INSTITUTE, PORTSMOUTH.—The following are the chief points from the instructions to architects in the competition for a new Technical Institute at Portsmouth:—1. The

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competition is confined to local architects. 2. The total cost must not exceed 43,000*l.* 3. Gothic designs will not be considered suitable. 4. The author of the first premiated design will receive 100*l.*, of the second 75*l.*, and the next 50*l.* 5. If the first premium plan is used the premium will be merged in the commission. Mr. Alfred Cross, F.R.I.B.A., will assist the Committee in determining the merits of the several designs.

ARCHÆOLOGICAL SOCIETIES.

EAST RIDING ANTIQUARIAN SOCIETY.—The members of the East Riding Antiquarian Society recently visited Pocklington and Warter. The party assembled at Pocklington Church at two, and, after examining its exterior, had its history briefly narrated by Dr. Leadman, of Pocklington. Dr. A. Lex Leadman, F.S.A., explained from his book on the church and school that Christianity made its way into those parts about A.D. 627, and the first church was a wooden structure. About 1070 or 1080 the stone edifice replaced this in the Norman style. Of that fabric there were still some remnants in the north pier of the chancel, and in a few carved stones built in the porch. About the end of the twelfth century, or early in the thirteenth, the north aisle was added, of which remains the arcade with its remarkable and beautifully-carved capitals. Fifty years later saw the addition of a southern aisle, of which both the arcade and centre wall still existed. The chapel was added on the north side of the chancel in the thirteenth century, and then there seems to have been a pause in the building for about 100 years. Then the chancel was rebuilt, the clearstory put in, the grand tower added, and new roofs to all parts of the church. The tracery and the stained glass were modern. The style of the present building is Perpendicular, and its most striking feature is the tower. The font is old, and worth notice. Its basin, of eleventh century work, is cut into a single square piece of fossil limestone. On the north wall is a tablet in white marble in memory of the Sotherby family. Against the south wall of the chancel is a fine monument to the memory of Robert Denison, of Kilnwick Percy, over which is a fine series of elaborate carvings, supposed to be the work of Albert Durer, and brought from Italy. The registers, which dated as far back as 1559, contained several interesting entries, including the coronation of James I., the execution of two witches by burning in the market-place, charges of being witches, and accounts of various plagues.—Afterwards the party proceeded in carriages to Warter Priory. The Rev. M. C. F. Morris, F.S.A., in describing the excavations at Warter, said that in September last he and Mr. W. H. St. John Hope carried out the excavations on the site of the Priory, which had been kindly placed at their service by Mr. C. H. Wilson, M.P., who also undertook to defray all expenses. In 1132 a priory of Black Canons was founded at Warter by Jeffrey Pain, and in the time of Henry VIII. the clear annual income of the Priory was given as 144*l.* 7s. 8d. In 1536 the Priory was suppressed, and its site and possessions granted to Thomas, Earl of Rutland, a descendant of the founder. The excavations were made on a level plateau on the north and east of the parish church. The latter was a wholly modern structure, but appeared to stand on the site of the old church which was destroyed in 1804. Trenches were cut through the more prominent mounds, but the results were disappointing, for although occasional fragments of ashlar and stonework were turned up, the mounds themselves contained nothing but rubbish. It was evident that the nave of the Priory had served as the parish church. In places the foundations had been utterly destroyed. Although the efforts to trace the walls had such unsatisfactory results the excavations yielded finds of a more interesting character. In tracing the pavement it was possible to ascertain the position of the steps up to the altar. The altar had originally been of some architectural pretensions, but at the end of the thirteenth century had become old-fashioned, and a new block of chalk was built upon the old plinth. The length was extended to 15 ft., which was the only extensive extension he had met with. A stone coffin was discovered in front of the altar. It had lost its lid, and had been much broken by the fall of heavy material. The contents had been disturbed, and only a few bones were left. A grave slab was also discovered. It had been cracked across by fallen material, but was otherwise complete, and was in admirable preservation. The slab was of fine sandstone, and measured 6 ft. 9½ in. by 3 ft. 2½ in. in breadth, with a thickness of 7 in. It bore the incised effigy of a Black Canon beneath a crocketed canopy, with an inscription containing the name of Thomas Brydlington, who was the twenty-fifth Prior of Warter in 1495. The excavations were not very extensive, nor did they lead to anything of much importance beyond establishing the site of the Priory. But as the result of one week's work with from only five to eight labourers the results could not be called unsatisfactory. At any rate, they produced three unusual features. There was a marked absence of architectural and, indeed, of any other fragments or details, so thoroughly had the place been destroyed and spoiled.—*Hull News.*

Correspondence.

To the Editor of THE BUILDER.

RE SOUND-PROOF FLOORS.

SIR,—I am much obliged for your answer to my query respecting above.

Would you please say if nailing to the undersides of joists fibrous slabs, which are claimed to be "non-conductive," would dispense with the pugging suggested? ARGUS.

*** Fibrous plaster slabs are fairly, but not perfectly, "non-conductive" of sound, and the pugging would be a valuable addition.—ED.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

10. POLYPHASE CURRENTS—POWER TRANSMISSION SCHEMES.

THERE is no more interesting recent development of electrical engineering than the theory and practice of polyphase currents. A few years ago polyphase currents were looked upon by British engineers as something quite remote from practical work, and, although they were aware that this system was gradually coming into favour abroad, yet they were unwilling to add another to the great variety of systems in use in this country. Even now as a rule they only adopt it in a half-hearted manner. In the Central London Railway and in the Dublin Tramway system, for example, we have three phase generators, but then the three-phase currents are converted into continuous before they get to the motor terminals. Some of the London supply companies produce at their power stations two-phase currents, but then they supply their consumers with single phase currents. On the Continent and in America, however, they have recently constructed systems in which polyphase currents are used throughout both for lighting and power purposes.

The Burgdorf-Thun full-gauge railway in Switzerland is worked by three-phase currents. So also are the steep mountain railways of Engelberg, of the Gornergrat, and of the Jungfrau. In the North of Italy a full-gauge railway 110 miles long will shortly be run on the three-phase system. Converter stations will be placed at intervals of 6½ miles, and the current, which will be generated at 20,000 volts, will be converted down to 3,000 volts, and at this pressure the motors in the trains will be worked. Such examples could be multiplied indefinitely, as quite three-fourths of the new electric supply stations building outside Britain are on the polyphase system.

In a two-phase system we have four mains carrying currents which are all out of step with one another. For example, when the current in No. 1 main has its maximum positive value, the current in No. 2 main will be zero. In No. 3 main it will have its maximum negative value, and in No. 4 main it will be zero. The currents in adjacent mains are out of step by a quarter of a period. No. 1 and No. 3 main are out of step by half a period, hence if they be joined together at the far end we get a simple alternating current circuit, the current going by No. 1 and returning by No. 3 or *vice versa*. Similarly No. 2 and No. 4 would form a simple alternating current circuit. Hence if we have two alternating current circuits, the currents in which differ from one another by a quarter of a period, we get a two-phase system. If the two armatures of two alternators be rigidly connected, and have such a relative angular position to one another that when the E.M.F. between the collecting rings of one alternator is a maximum, the E.M.F. between those of the other is zero, then if we have four mains connected to the brushes pressing on the four collecting rings we obtain a two-phase system. If the pressure between No. 1 and No. 2 connected to the first alternator be V volts, then the pressure between No. 1 and No. 4 or No. 2 and No. 3 is also V. The pressures between No. 1 and No. 3 and between No. 2 and No. 4 are, however, $\sqrt{2}$ V, *i.e.*, 1·414V.

It will be obvious from the diagram we gave in Lesson 9 of the method of obtaining a rotating magnetic field by means of alternating current magnets how easy it is to obtain this kind of field when two-phase mains are available. We have simply to connect the windings of the magnets successively to the four mains, and we get a powerful rotating, or, as it is more often called, rotary field. A squirrel-cage armature placed in this field will rotate with great velocity, and the slower it goes as the load is increased the more powerful will be the torque. The maximum torque is at starting just when it is most wanted. In large motors, to prevent the great rush of current at the start, resistance is introduced into the rotor windings by having these windings connected to two slip rings, and joining these rings by the brushes pressing on them to the terminals of the required resistance.

There are two ways of connecting up the mains of a two-phase system. In fig. 1 let A,

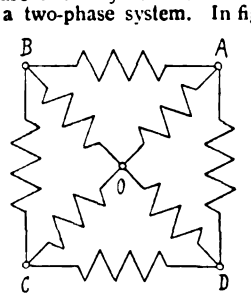

Fig. 1.

B, C, and D represent the mains. Then we can either put the lamps or the motor windings between A B, B C, C D, and D A, or we can join together the four ends of the lamp circuits or motor windings as in A O, B O, C O, and D O. The first method is called a mesh-winding, and the second a star-winding. If the volts between adjacent mains like A and B be 1,000, then between A and C they will be 1,414, and between A and O the pressure will be 707 volts. The relative advantages of star and mesh windings are about the same in practical work.

If we keep the circuits A C and B D (fig. 1) quite distinct from one another and have no mesh windings, then we can dispense with one of the mains. If we connect B and C, for example, and remove the main C, connecting, however, the main B to the third terminal of the two alternators, then the main B will carry the return current from both. As these return currents differ in phase from one another by a quarter of a period, the section of the main only needs to be increased in the ratio of 1 to $\sqrt{2}$, and not in the ratio of 1 to 2; and hence there is a substantial saving in copper in the mains, the cost of which is always a very heavy item in electric lighting or power schemes. In practice instead of having two separate alternators one is sufficient. In this case we have four slip rings on the armature spindle, and the coils connected to these rings may be wound quite distinct from one another, as in the two alternators, or may be connected up in a star or a mesh winding. In the latter cases we must, of course, have four mains. An alternating current dynamo with four terminals from which currents differing in phase by a quarter of a period can be obtained is called a two-phaser. Logically speaking, a two-phase current system ought to be called a four-phase current system, as we have four currents differing in phase from one another. A simple alternating current system is the true two-phase system, the current in one main differing in phase by half a period from the current in the other, since the two currents are always

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exactly equal but are going in opposite directions.

In a three-phase system we have three mains, each carrying an alternating electric current which is not in phase with the other two. Suppose (fig. 2) that we have a bundle of

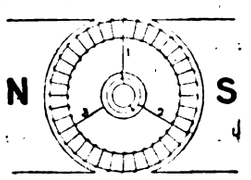

Fig. 2.

iron wires wound round with a continuous winding of insulated copper wire. Suppose, also, that this armature is placed in a magnetic field and that three points, 1, 2, and 3 on the windings, at an angular distance apart of 120 degrees, be connected to three slip rings on the spindle of the armature. Then if this armature be rotated rapidly we shall get an alternating E.M.F. between any pair of the slip rings. This machine is a very simple form of three-phaser with a mesh winding on the armature.

The mains are connected to three brushes, each pressing on a separate slip ring. If all the windings on the armature are symmetrical, then the pressure between any two mains is the same. If we use the mains for supplying power to lamp or motor circuits, then we can either connect them by a mesh or a star winding, or by both. In fig. 3 let A, B, and C be

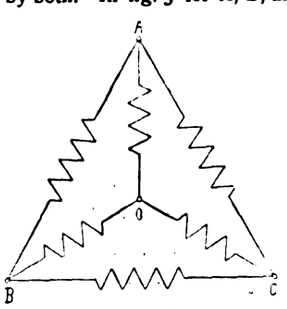

Fig. 3.

the mains, and let V be the pressure between any pair of them, then the pressure between any main and the centre, O, of the star winding will be $\frac{V}{\sqrt{3}}$, *i.e.*, 0·577 V. For example, if the pressure between A B is 1,732 volts, then the pressure between A and O or between B and O is 1,000 volts. If the resistances of the arms of the star A O, B O, and C O be all equal, then the readings of ammeters placed in these arms will all be equal. Since there can be no accumulation of electricity at O, the sum of the three currents flowing to it at any instant must be zero—that is, the sum of two of them must be equal to the third, but it must be of opposite sign. For example, we might have at a particular instant currents of 20 and 65 amperes flowing towards O from A and B respectively, and a current of 85 amperes flowing from O to C. What the ammeters measure are the effective values of these continually changing currents. The phase differences between them are a third of a period. If the shape of the current wave be a sine curve, then the magnitudes and relative phases of the three currents in the arms of a star winding are shown in fig 4. B P is the current curve in the main B.

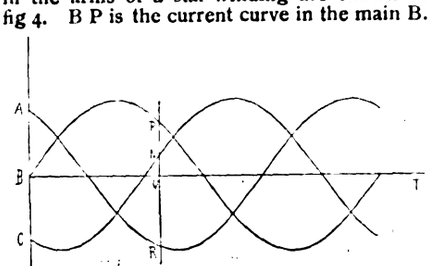

Fig. 4.

P Q is the value of the current in the main B at the time B Q. Similarly Q R and Q N are the values of the currents in the mains A and C at the time B Q. It can be shown mathematically that Q R = Q N + Q P, whatever the value of B Q; hence it is possible for the shape of the current wave in each arm of a star winding to be a sine curve. There are other mathematical curves that satisfy this condition, but in practical working the shape of each current wave is different, although we have at every instant Q R = Q N + Q P.

In order to measure the power expended in the star and mesh windings (fig. 3) we require two wattmeters. The ampere coil of one wattmeter is put in the main A, and the volt coil is connected between A and B. The ampere coil of the other is put in the main C, and the volt coil is connected between C and B. The sum of the two readings gives us the power expended. If the current (A) in each main is the same and the voltage (V) between each pair of mains is also the same, then the power being expended is $\sqrt{3}$ V A f, where f is the power factor. For example, if the current in each main is 100 amperes, the voltage between the mains is 1,000 volts, and the power factor is 0·8, then the power being expended in the circuit is $\sqrt{3}$ 1,000, 100, 0·8, *i.e.*, 138·6 kilowatts.

Three-phase currents are very suitable for transmitting power to long distances. A three-phaser is about 20 per cent. cheaper than an ordinary single-phase dynamo of equal power, and the three-phase motors are cheaper than the synchronous motors used with single-phase currents. There is also a small saving in copper in the mains with three-phase currents. Three-phase transformers and boosters are quite as efficient as single-phase transformers and boosters. It is not surprising, therefore, that three-phase currents are the most popular for power transmission schemes.

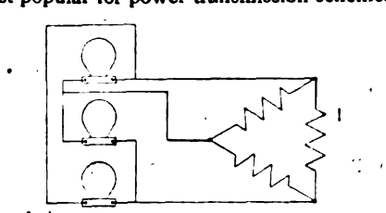

Fig. 5.

A very ingenious method has recently been suggested by Mr. C. P. Steinmetz for getting a three-phase current system from three ordinary single-phase alternators. If we connect three alternators in series (fig. 5), then it can be proved that the E.M.F.s of the three alternators will adjust themselves so that the current in the circuit of the armatures is a minimum. When this is the case the phase difference between the E.M.F.s of any two machines is a third of a period, and the powerful electrical actions and reactions between the three machines tend to keep the phase differences of their E.M.F.s all equal, just as when we have two machines in series their E.M.F.s are kept in opposition in phase. Hence, if we join three mains on to the common terminals of the three machines, we can get three-phase currents from these mains. This method of connecting up alternators is capable of extension to other cases. For example, if the three E.M.F.s of the alternators be not all equal, we get an unsymmetrical three-phase system. In the particular case when the E.M.F. of one of them is $\sqrt{2}$ times that of either of the others, then we get a two-phase system, the difference in phase of the E.M.F.s of the two smaller machines being a quarter of a period.

The largest and one of the most interesting power stations in the world is that of the Niagara Falls Power Company. The turbines in the power-house drive ten two-phase dynamos, each of 5,000 h.-p. A peculiarity of these dynamos is that the shaft is vertical, the field rotating horizontally about an internal stationary armature. This type of dynamo is sometimes called the "umbrella type," and it is now not uncommon in water-power installations. The power generated is transmitted to Buffalo, a distance of twenty-five miles, for lighting purposes and running tramways. It is also distributed to various factories that have sprung up in the neighbourhood of the Falls. It is to be noted that although the power is generated by two-phase dynamos, yet the two-phase currents are converted into three-phase by means of static transformers before they are transmitted to Buffalo. Again, although the factory of the Union Carbide Company, which takes 15,000 h.-p., is only two miles from the power-house, yet it has been found advisable to convert from two-phase to three-phase for the transmission.

A very interesting continuous-current plant for power transmission has been designed by M. Thury at Genoa. He uses direct-current dynamos in series at the power-house so as to get a pressure of 8,000 volts, care being taken to insulate the turbines from the dynamos and the dynamos from earth and from each other. At the power station in Genoa he uses insulated motors coupled in series so as to take this high electric pressure. Excellent results have been obtained by this system, and in a scheme for power transmission only, and not for power distribution, this high-pressure direct-current method has many advantages.

GENERAL BUILDING NEWS.

CLONFERT CATHEDRAL.—The rector of Clonfert is making an appeal for help to complete the restoration of Clonfert Cathedral. The Cathedral, which was founded in the year 558, is situate in County Galway. During the last six years a considerable portion of the work of restoration has been carried out in accordance with the plans of Mr. J. F. Fuller, F.S.A., architect. A sum of 2,225*l.* has been expended, and the restoration of the chancel and sacristy is now complete. The nave is partially restored. Contributions have fallen off, and the work has had to be stopped for want of funds. A sum of 2,000*l.* is still required to finish the restoration of the nave and rebuild the transepts.

CATHOLIC CHURCH FOR DUMBARTON.—On the 3rd. inst., in the Dumbarton Dean of Guild Court, plans were passed for this new church, which is to be erected on a site in Strathleven-place from designs by Messrs. Dunn & Hanson, architects, Newcastle-on-Tyne. The style of the building is to be Early English. There will be sitting accommodation for 1,000 people.

PRESBYTERIAN CHURCH, BIRKENHEAD. — This church was reopened on the 2nd inst. after being closed for renovation and decoration. The work, which has entailed an outlay of about 400*l.*, includes the introduction of the electric light both in the church and the schoolroom underneath. The seats have been repainted and recushioned, and the walls decorated. The work of renovation was carried out to the designs and under the supervision of Mr. W. Glen Doble, architect.

BOARD SCHOOL, GATESHEAD.—A new Board school in Rose-street, Gateshead, was opened on the 10th inst. The school has been erected from the design of Mr. W. H. Dunn by Mr. T. Hunter, of Washington, the sub-contractors having been Mr. Chas. Nicholson, slating; Mr. Dellow, painting; Messrs. Walker & Coxon, plumbing. Messrs. Emley & Co. supplied the hot-water apparatus. Mr. Wm. Flynn acted as clerk of works.

PRIMITIVE METHODIST CHAPEL AND SCHOOL, MATTISHALL, NORFOLK.—On the 5th inst. a new Primitive Methodist chapel and school were opened at Mattishall. The architects were Messrs. Kerridge & Sons, of Wisbech, and Mr. L. King, of Mattishall, was the contractor.

SCHOOL FOR MANUAL INSTRUCTION, ALLOA, N.B.—On the 3rd inst. Sir John Neilson Cuthbertson, Chairman of Glasgow School Board, opened a new school for manual instruction which Mr. A. P. Forrester Paton, of Inglewood, has erected at his own expense and presented to the Alloa Burgh School Board. The new building has been built on a site at the south-east corner of the Academy playground, from plans prepared by Mr. R. A. Bryden, architect, Glasgow. The workshop, which is a one-story building, contains benches for thirty pupils, along with drawing-desks. Immediately to the front of the drawing desks is a desk erected for the instructor. A working lathe is provided in the workshop, along with showcase for work done and samples. The workshop is entered by a porch, and is formed with an open roof about 20 ft. in height. The workroom is fitted with windows on both sides, and also roof light. The building is heated with hot water, and there will be a store for wood. The ventilation is on natural principles, assisted by Mucn's patent ventilators on the centre of the roof. The contractors for the different works were:—Mason work, Messrs. G. & R. Cousin; joiner, Mr. R. Cairns; plumber, Mr. J. Philp; slater, Mr. R. M'Farlane; plasterer, Mr. J. Walker, Alva.

LIBRARY AND MUSEUM, WESTON-SUPER-MARE.—Weston-super-Mare has been provided with a permanent memorial of the Queen's Diamond Jubilee in the shape of a new library and museum, in the Boulevard, which was opened on the 3rd inst. by Sir Edward Fry. The scheme has not been completed, for at some future day it is proposed to extend the building back to Baker-street, and thus to utilise the whole of the site acquired for the purpose, the total estimated cost of the whole scheme being about 6,000*l.* The building contains, on the ground floor, a reading room, lending library, reference library, and ladies' room; all these are in one apartment 20 ft. high, divided up by dwarf screens with glass panels, so that the librarian can overlook the whole. There is also a librarian's room on this floor, and a repairing room above on a mezzanine floor; there are also lavatories for ladies and gentlemen. In the entrance hall are the main stairs of the upper floor, containing two galleries

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adapted for picture gallery and museum purposes; these are lighted principally by roof lights on the north side. The whole building is warmed by low pressure hot water apparatus, and all the floors are laid with wood block flooring in concrete. The elevations are treated in a free Renaissance style, the ground floor up to the sills of bay windows being faced with local blue stone and above with red Cattybrook brick and Bath stone dressings. The front to the Boulevards is enriched with carvings, with a symbolical panel over the entrance arch, and figures representing chemistry, sculpture, engineering, literature, painting, and pottery in panels on either side. The architects are Mr. Hans F. Price and Messrs. Wilde & Fry, of Weston-super-Mare, acting as joint architects. The general contractor is Mr. Charles Addicott, of Weston-super-Mare. The sculpture of the two groups of figures on the front pilasters is by Messrs. Harry Hems & Sons, of Exeter, and the rest of the carving by Mr. Hillman, of Weston-super-Mare.

VICTORIA HALL, ELLON, ABERDEENSHIRE.—On the 1st inst. the foundation-stone was laid of the new Victoria Hall in course of erection at Ellon. The hall, which is being built to the plans of Mr. William Davidson, architect, Ellon, in conjunction with Messrs. Jenkins & Marr, Aberdeen, at an estimated cost of 2,500*l.*, occupies a site on the south side of Station-road, and is built of Peterhead granite.

BATHS, CHELTENHAM.—The new baths on the site of the old Montpelier Baths at Cheltenham were opened on the 10th inst. The external appearance of the building has undergone very little change, but internally a complete transformation has been effected. The large swimming-bath remains. The private baths are in an adjoining building. On the ground floor are some of the first-class baths, while on the floor above are two first-class baths and three second-class baths. The work was carried out from plans by Mr. Hall, the Borough Surveyor.

INSTITUTE, BARNSTABLE, DEVON.—The foundation stone was laid on the 7th inst. of the new "Alfred Miller" Institute. The building, which is in the Early English style, will be about 128 ft. long by 54 ft. wide, the top spire rising about 60 ft. from the ground level. The walls will be of Wellington red bricks, with stone dressings, and the window arches, &c., will be picked out in red brick, while the roof will be of red Bridgwater tiles. On the ground floor will be four rooms, 25 ft. by 19 ft. 7 in., which will be adapted as reading and recreation rooms for the men and women, with lavatory and cloakrooms, &c., attached. A corridor 82 ft. long extends the whole length of these rooms. French casements opening out on a verandah, 6 ft. or 7 ft. above the ground level. At one end will be the caretaker's house, also the refreshment-bar, with separate casements communicating with the corridor for the men and women. On the first floor, the large lecture hall will be 82 ft. by 25 ft. At the higher end will be a platform, 25 ft. by 20 ft., with recess for an organ, and dressing-rooms at the rear. These open into a corridor with lavatory, &c., accommodation, and provided with a separate exit. One of the features of the building will be the three-storied 60 ft. clock-tower, surmounted by a circular red roof. The tower will also form the entrance to the lecture-hall. The chief entrance on the ground floor will be on the south side, approached by steps with ornamental wings. Above the verandah the full length of the corridor, 82 ft., will be an iron balcony. The building will be heated by means of hot-water pipes. Messrs. Sanders & Karslake are the contractors, Mr. A. G. Trevena is the clerk of works, while the architect is Mr. James Crocker, F.R.I.B.A.

BUILDING IN ABERDEEN.—The new St. Ninian's Church, Midstocket-road (Mr. W. Kelly, Aberdeen, architect), was dedicated on 5th inst.——Skene-street Congregational Church has received extensive additions and redecoration (Mr. A. Marshall Mackenzie, A.R.S.A., Aberdeen, architect), and a new apse is being built at Free East Church.——At Free South Church a new organ has been introduced at a cost of 1,500*l.*, and alterations are to be made at Queen's Cross Free Church so as to allow the position of the organ there to be shifted.——It has been resolved that the walls of the new electric station at Ferryhill shall not be raised to a greater height than the width of Dee Village-road adjoining. The chimney for the new station will be 200 ft. high, octagonal in plan, and of an ornamental character. The tender for the supply of poles for the electric tramways extension for the Corporation, lodged by Messrs. Macartney & McElroy, of Glasgow, being the lowest, has been accepted. For the supply of rails that of Messrs. M'Lellan, Glasgow, representing a German firm, has been accepted.——The School Board's architect has been instructed to submit designs for remodelling and enlarging Rosemount Public School, and the plan of the new Central School, School Hill, has been approved of by the Scotch Education Department. Certain schools are to be repainted in the autumn, and a janitor's house at Kittybrewster School is to be proceeded with at once.——Ten dwelling-houses are to be erected in Ashgrove-road, and a block of houses and shops at the junction of George-street and Hutcheon-street.——The Plans Committee of Aberdeen Town Council have sanctioned the following plans:—Dwelling-house on the north side of Rubislaw Den South for Mr. W. J. Riddell, per Mr. Arthur Clyne, architect; two dwelling-houses on the north-east side of Skene-square for Mr. Archibald Robertson; dwelling-house on the west side of Clifton-road (being one of five sanctioned on April 20, 1899), for Mr. Joseph Shirras, builder; stable on the south side of Upper Denburn for Mr. William Topp, per Mr. Alexander Thomson, builder; stores on the north side of St. Clement-street, for Messrs. G. and W. Davidson, per Mr. Alex. Thomson, builder; alterations and additions in connexion with the Royal Aberdeen Hospital for Sick Children—for the directors, per Mr. A. Marshall Mackenzie, architect; seven dwelling-houses on the south side of Wallfield-place, for Messrs. Pringle & Slessor, builders, per Mr. Peter Slessor, architect; alterations in connexion with Drill-hall, Woolmanhill, for the 1st Volunteer Battalion Gordon Highlanders, per Mr. A. H. L. Mackinnon, architect; alterations and additions in connexion with the property, No. 96 Holburn-street, for Mr. James Munro, plumber. The Finance Committee have sanctioned the elevations of the following buildings on ground belonging to the Town Council—two dwelling-houses on the north side of Belgrave-terrace for Mr. William Garvie, builder, per Mr. William E. Gauld, architect; dwelling-house on the south side of Rosebank-terrace, for Mr. John Sutherland, carpenter; alterations on dwelling-house, No. 379, Union-street, for Dr. J. C. Ogilvie Will, per Mr. John Cameron, architect; alterations and additions on No. 115, Union-street, for Mr. R. K. Smith, hatter, per Mr. Robert G. Wilson, architect.

MARKET, LEICESTER.—The foundation-stone was laid on the 6th inst. of the new wholesale market in Halford-street, Leicester. The new market, when completed, will stand on an area of about 3,850 square yards, and will contain, at the Halford-street end, a building having offices set apart for the officials of the market. The building is divided on the front below the first floor by a large central archway and road for the use of vegetable carts and waggons. On either side of this archway entrance the offices have their entrances, direct from the street, while access is also obtained through doorways leading direct from the market. At each end of this building a lock-up shop is placed, and over the same, on a mezzanine floor, storerooms are provided. All the offices which will be used by the officials are situated on one side of the building, viz., on the western side of the entrance gateway. In a basement there are offices for the inspector of weights and measures and the meat inspector. On the mezzanine floor are lavatories and conveniences. The superintendent's office has a central position on the first floor at the back of the front building. There is a separate office also for clerks and collectors, while other offices are placed on this floor on both sides of the building for letting purposes. The floors are constructed of concrete supported by rolled steel joists. The whole of the other portion of the site is to be used by the wholesale vegetable and fish merchants. A roadway of 23 ft. wide will run through the market, and at the sides of this twenty-three vegetable stalls are placed with offices over, each pair being approached by one staircase. Into Yeoman-street double doors are provided, which will enable the stallholders to have goods delivered by these entrances. These stalls will be fitted with B. and S. folding collapsible gates, and are so arranged that two can be made into one large one if desired. The main walls of this market are carried on steel girders, the width between the walls inside being 50 ft. Steel lattice girders 5 ft. deep, with arched soffit, run the full distance across, and support the different spanned roofs, having steel principals varying from 32 ft. 4 in. to 57 ft. 6 in. The portions of the roof not glazed will be covered with boarding and pan tiles. Two archways are placed in Yeoman-street to be used as exits only for both markets, and opposite the one at the lower end of the street a space is left for the unloading and loading of carts and waggons using the cold storage, and these conveyances can either pass out of the exits before mentioned or use an exit provided for them in particular opening into Wigston-street. Around this portion there is a "trolley" way which gives access to the basement under the fish market. A direct-acting low-pressure hydraulic goods lift to carry 20 cwts. is so arranged that it can be used either direct from the fish market or off a lower level from the "trolley" way. The fish market entrance is from Vestry-street. It is divided into twenty-one stands, the division lines being marked by the columns supporting the girders carrying the offices over. The offices over are approached by circular iron staircases, one for each pier. The hawkers will have a fish washing-room approached from Yeoman-street near to the large exit. Between the main walls of this portion of the building, which is carried on an arcade of elliptical arches and piers, is a 51-ft. steel span roof, covered with pan tiles, and having light introduced on the north side by patent glazing. The floor of this market, which is over the basement, is constructed of concrete, with rolled steel joists and girders, supported by steel stanchions. A refreshment-room for the stallholders' use is placed on the first floor over the trolley-way, and is approached by a stone staircase. Adjoining this is a kitchen. On either side of the large exit in Yeoman-street, situated in a basement, are conveniences for buyers and stallholders. The total cubic capacity of the cold stores will be about 32,500 ft., and it will be maintained at a temperature of about 25 deg. Fahr. The engine-room is situated in the basement at the Vestry-street end. The remaining portion of the basement is given up to the cold storerooms, a trolley-way, engineer's store, &c. The market will be lighted by electricity. The whole of the front building is faced with terra-cotta, having a plinth of semi-glaze; the dressings of the other external portions of the buildings and portion of the interior are of the same material, the facings to the markets proper being Woodville sand-faced bricks. The roof to the front building is to be laid with Broseley tiles. The large archways will be fitted with B and S folding and collapsible gates. The interior facings of the markets are Whitwick white bricks with red bands, a dado being formed all along the vegetable market and around the whole of the fish market of cream-glazed bricks with coloured bands. The roadway will be formed of Val de Travers asphalt, with a Mountsorrel granite curb, and the stalls and standings will be laid with granolithic concrete. The drains are to be constructed with Syke's patent socket-jointed stoneware pipes. Mr. Walter Brand, of Leicester, is the architect, the competitive designs originally sent in by him having gained the first premium. Mr. Thomas Herbert is the contractor for the building, with Mr. William Charles Lee as clerk of the works.

THEATRE, PERTH.—The new theatre for Perth, which has been in course of erection for the past fifteen months, is now almost completed. Mr. William Alexander, City Architect, Dundee, is the architect of the building. The theatre measures 120 ft. in length from north to south and 60 ft. from east to west. The principal entrance is from High-street, leading into a corridor covered in with an ornamental iron and glass roof, and by two short flights of steps terminates in a vestibule on the box floor. From this there are entrances into the private boxes, dress circle, upper circle, orchestral pit, and stalls. The latter have an extra exit in the Cutlog Vennel. The pit is entered from the same place, and is on the same level, while the gallery is entered from off Mill-street or by the passage off Cutlog Vennel, round the front of the building and underneath the vestibule. The sitting accommodation upon the floor includes two private boxes, which are capable of holding four persons, sixty-nine orchestral stalls in four rows, and about forty-two pit stalls in two rows immediately behind the orchestral stalls, while the pit itself is seated for 338 in thirteen rows. On the dress circle level there are two other boxes, the dress circle itself being seated for seventy-eight persons. Immediately behind this is situated the upper circle, but having a separate entrance from the lobby above that of the dress circle, which has five rows of seats, accommodating 105 persons. The gallery will seat 300 people. The theatre is seated altogether for about 950. The proscenium is 20 ft. wide. The stage from the footlights to the back wall measures 34 ft., and has a width of 56 ft. In the meantime the building will be lit with gas, but provision has been made whereby the electric light may be introduced as soon as a supply of the current can be got. There will be a refreshment-room on each of the floors. The following were the contractors:—Mason and brickwork, Mr John Carnegie, Dundee; joiner work, Mr. William M'Quibban, Perth; slater work, Mr. James Buchan, Perth; plumber work and gasfittings, Messrs. Frew, Watson, & Co., Perth; steel work, Messrs. Thomas Gibson & Son, Edinburgh; glazier work, Mr. Charles Alexander, Perth; electric light apparatus, bell-hangings, &c., Messrs. A. Westwood & Son, Dundee and Perth; ornamental plaster work, decorations, and seatings, Messrs. A. & R. Dean, Limited, Birmingham; painting work, Messrs. George Muirhead & Son, Perth; clerk of works, Mr. Thomas L. Kay.

HOTEL, BLOOMSBURY.—A new temperance hotel has been erected in Hart-street, Bloomsbury, on land to the east of and adjoining St. George's Church. The Kingsley Hotel, as the new hostelry is called, has all the necessary general accommodation for a first-class hotel on the ground and basement floors, with 100 bedrooms and private sitting-rooms on the floors above. The front and part of the west elevations are in Ancaster stone, from the Lindley quarries, and Ibstock red bricks, the main entrance having Swedish dark green polished granite dressings. The part of the elevations nearest the church are faced with ivory white glazed bricks from the Farnley Company. The building throughout is of fire-resisting material. The general contractors were Messrs. Holland & Hannen, the sub-contractors being as follows, viz.:—Granite, Messrs. Whitehead & Sons; Constructional Steelwork, Messrs. Wedekind & Son; Marble, Messrs. Fenning & Co.; Heating and Hot Water, Messrs. Clement, Jeakes, & Co.; Fireproof Flooring, Messrs. James & Co.; Plumbing and Sanitary Fittings, Messrs. Doulton & Co.; Lifts, Messrs. Smith & Stevens; Stone Carving, Messrs. Butcher & Axtell, the medallion of Charles Kingsley being from a model by Mr. Henry C. Fehr; Mosaic, Rust's Vitreous Mosaic Co.; Wrought Ironwork, Mr. R. Kirsch and Messrs. Hill & Smith; Bronze Shields and Band and external Iron Lamps, Messrs. Singer & Sons; Electric Wiring, Fittings, Telephones,

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and Bells, Messrs. Sotheby & Co.; Locks, Door Furniture, &c., Messrs. C. Smith, Sons, & Co.; Parquetry Flooring, Messrs. Howard & Sons; Stoves, The Coalbrookdale Co.; Gas Cooking Apparatus, Messrs. Fletcher, Russell, & Co.; Chimney-pieces and Overdoors, Mr. W. G. Groves; Copper Rooing and Lightning Conductor, Messrs. Ewart & Son; Stained Glass, Messrs. A. L. Moore & Co; Iron Casements, Messrs. Burt & Potts. Mr. Richard Owen was clerk of the works, and Mr. Wickeson general foreman. The designs were prepared by Mr. C. Fitzroy Doll, architect, of Bloomsbury.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, TORPOINT, CORNWALL.—The water supply of Torpoint has been augmented by pumping into the reservoir water coming from springs at a lower level. A new engine, an oil engine by Crossley Brothers, of 6½ h.-p., has been installed, and a collecting tank of 350,000 gallons capacity has been constructed. The work was carried out under the supervision of Mr. W. C. Harris, Water Engineer.

STAINED GLASS AND DECORATION.

WINDOW, GIGGLESWICK, YORKS.—A stained-glass window of three lights to the memory of Annie Batten, of Stainforth, Settle, the subject being "The Good Shepherd," has just been erected in the north aisle of Giggleswick Church. The window is from the studio of Mr. T. W. Camm, of Smethwick, who has also executed the chancel and other windows in the same church.

MEMORIAL WINDOW, FREE SOUTH CHURCH, ABERDEEN.—There has just been placed in this church a stained-glass window to the memory of the late Mr. John Cook, of Ashley. The subject of the main panel is found in the words, "Suffer little children to come unto Me, and forbid them not." The artist is Mr. R. Douglas Strachan, Aberdeen.

WINDOW, RODINGTON CHURCH.—The Rector of Rodington Church, near Shrewsbury, has recently erected a window and brass to the memory of his parents, Christopher and Anne Smith, in the south aisle. The window consists of two lights and tracery, and the subject is "Christ and Peter and Anna at the Presentation in the Temple," while in the tracery is a figure of the patron saint, George. Below the window the brass bears the inscription and date. The work is from the studio of Mr. T. W. Camm, Smethwick, near Birmingham.

MISCELLANEOUS.

HOUSING OF THE WORKING CLASSES, PERTH.—The question of the housing of the working class has, says the *Dundee Advertiser*, been a burning one in Perth for a long time, many of the dwellings erected in different parts of the city being unsuitable for the wants of the class in question. Some time ago a scheme was started by the Police Commission for the erection of a number of blocks, and a piece of ground at the corner of the Old High-street and Milne-street was secured for the erection of houses for the working men. Plans were prepared by the Burgh Surveyor, and two blocks were proceeded with. The building, which is now nearing completion, comprises twenty houses in each of the two blocks. The structure is plain but substantial, the front elevation being built of red sandstone from Corncaple Quarry, Dumfriesshire. Each block is three stories high. There are three classes of houses, ranging in rental from 8*l.* 10s. to 5*l.* The houses have all two apartments—a kitchen and a parlour. In the higher-rented class the kitchen is 14 ft. in length, exclusive of a bed recess 9 ft. square. The height of the room is 9 ft. 10 in., and the length about 13 ft. There is a tiled fireplace in the rooms, while the kitchens are fitted up with ranges with self-heating ovens. The only difference between the 8*l.* 10s. and the 7*l.* 10s. houses is that there is no fireplace in the room of the latter. All the houses, of course, will be supplied with gas and water. There is wash-house accommodation, two tubs and a large boiler being connected with each wash-house. The whole of the open court is concreted. There are still another two blocks to be erected. The following were the contractors:—Mason work, Mr. Michael Kerrigan; joiner work, Mr. D. Crichton; slater work, Mr. Daniel M'Lauchlan; plumber work, Mr. A. J. Davidson; iron work, Mr. William Hume; plasterer work, Messrs. John Peebles & Sons; painter work, Mr. P. K. Donald, Blairgowrie; clerk of works, Mr. Alexander Robertson.

HOUSING OF THE WORKING CLASSES, HULL.—The Joint Committee of the Hull Progressive party, the Hull Trades and Labour Council, and the Hull Co-operative Society appointed to consider the question of the housing of the working classes in Hull have issued the following Report:—As to the question whether there is any over crowding in Hull, the Committee gives the following table showing how the different districts in Hull are populated. They are set out in registration districts:—Persons per acre: Marfleet, 0·2; Newland, 4·4; Stoneferry, 1·7; Newington, 15·3; Drypool, 20·2; Sutton, 4·76; East Sculcoates, 53·2; Myton, 64·9; West Sculcoates, 93·3; Humber, 95·8. Further, in the old city alone, that is, in the area between the old docks, there are 449 rooms let off to separate families. This is not, of course, reckoning the almshouses or caretakers of offices. In Newington, Drypool, and Sutton districts there are dozens of acres not built upon, and in the Humber district there are scores of acres of water space, and the Committee thinks the over crowding is very evident, for the number per acre rises to the fearful rate of at least 200 per acre in several areas, while in exceptional areas even up to 400 persons per acre. The average number per acre in overcrowded London is only 50. As to whether there is a dearth of suitable and healthy dwellings, the Committee say the official returns of the population of Hull and number of houses are as follow:—1897, population 225,715, houses 55,667; 1898, population 229,887, houses 56,261; 1899, population 234,270, houses 56,861. This shows that, although in two years the population had increased in round numbers 9,000, the new houses in the same period were only 1,200; whereas by the increase of population, and calculating 4¼ persons to a house, which is about the usual average, there should have been 2,200. As 1,200 houses, at 4¼ persons per house, would accommodate about 5,000, it shows that 4,000 persons were added by this means alone in the last twelve months to the already overcrowded areas in the city. The Committee holds that certain alterations in the present law of the land are necessary to meet the requirements for housing the people, and is of opinion that the following recommendations should be brought prominently before the electors at the forthcoming municipal elections:—That the City Council avail itself of the Cheap Trains Act; that workmen's cars be run at half-fares at suitable times, and that as soon as possible all tram fares in the city be reduced to ½d.; that the City Council adopt Part 3 of the Housing of the Working Classes Act, 1890, and then appoint a committee to purchase land and build houses as soon as can be done; that the Sanitary Committee's recommendations with regard to the substitution of water-closets for privies in the 36,000 houses in Hull that either have no back way, or in which the privies are within 6 ft. of the dwelling-house be carried out as soon as possible. The Committee calculates that there is a total of over 6,000 people who have to live somewhere, for whom no extra accommodation has been supplied, and conclude that there is a dearth of suitable and healthy dwellings. The Committee thinks that the municipality should be called upon to provide houses for the working classes—firstly, because the large majority of workmen's houses are grossly insanitary. There are in Hull 50,871 houses, and of these, as near as can be ascertained, 46,000 are workmen's dwellings. Of this number no less than 30,000 either have privies within 6 ft. of the doors or windows of the dwellings, or have no back ways. Secondly, private enterprise does not provide nearly enough; and thirdly, because the municipality have dishoused so many people, having taken houses away for various reasons, should provide other houses. Other reasons are to check the growing rents, and because overcrowding causes a high sick and death rate. One child out of every five in Hull dies before it reaches the age of one year.—*Eastern Morning News.*

THE HOUSING PROBLEM.—At the meeting on the 7th inst. of the Trades Union Congress at Huddersfield Mr. Bowerman moved a long resolution urging the importance of trades unions securing the adoption of Clause 3 of the Housing of the Working Classes Act by municipalities, and asking for the amendment of the Act by provisions dealing with the owners of unhealthy houses, the extension period for repayment of loans to 100 years, and the creation of fair rent courts. He said it was impossible to expect a healthy and stalwart race to grow up under the shocking conditions which existed in the slums of large towns. Mr. Walsh seconded the proposition. Mr. Steadman, M.P., said the result of cheap train fares in London had been to raise rents in the suburbs, and two or three shillings a week saved in transit had gone into the pockets of the landlords. No Government would solve the housing problem until it had the courage to tackle the land question. Mr. A. Wilkie supported the proposition, which was carried.

THE WORKMEN'S COMPENSATION ACT.—At the meeting on Thursday, last week, of the Trades Union Congress in Huddersfield the following combined resolution was submitted by a number of the trades:—"That, in the opinion of this Congress, it is desirable that many amendments to the clauses of the Workmen's Compensation Act, 1897, should be made, and that the principles of the Act should be extended to all trades and occupations both on land and sea." Mr. Richards (miner, Ebbw Vale), moved the resolution, which was seconded by Mr. Sexton (Liverpool). Several delegates intimated that they had not had an opportunity of attending the Conference which resulted in the drawing-up of the joint resolution, and the matter was again referred to the Standing Orders Committee. Mr. Ben Tillett (London) moved:—"That, in view of the increasing number of lock-outs and refusal by employers to arbitrate, we urge the Government to pass a Compulsory Conciliation and Arbitration Act, and the appointment of Judge and Court with authority to enforce awards by fines and imprisonment of persons refusing to accept the award of such Court; and that Judges have full power, as under the Company Laws, to call for the production of all records dealing with wages and working expenses of any firm or bodies of men or employers interested in a dispute." Mr. H. Orbell (London) seconded the resolution, which was opposed by Mr. J. Ward (Navvies), who contended that each dispute should be taken separately on its merits, and that the workmen should have a voice in the choosing of the arbitrator or conciliator. On a show of hands the resolution was declared to be lost, and on Mr. Tillett demanding a vote by card the result was:—For the resolution, 246,000; against, 930,000. The President therefore declared the resolution to be lost. As a result of the second Conference it was agreed to submit the following resolution on the subject of the Workmen's Compensation Act:—"That, in the opinion of this Congress, it is desirable that many amendments to the clauses of the Workmen's Compensation Act, 1897, should be made, and that the principle of the Act should be extended so as to include all accidents in all trades and occupations both on land and sea, and that the Parliamentary Committee are hereby instructed to prepare legislation in order to give effect to the above resolution." Mr. Edmund Browne (Standing Counsel to the Parliamentary Committee) explained how in the Bill which he had drawn up amending the Workmen's Compensation Act the various objections were met. The resolution was carried.

TRADE NOTES.—A gold medal has been awarded to the Campbell Gas Engine Company, Limited, for their exhibit of gas and oil engines at the Paris Exhibition, and seven members of their staff, foremen, and workmen have been awarded silver and bronze medals for the work which they have done in connexion with the exhibit.——The plastering in the sanitorium now being erected in "Pinewood," near Wokingham, is being done with Bassett's Patent Plaster.——Tondu Board Schools are being fitted with the "Small Tube" Hot-water Heating Apparatus by John King, Limited, engineers, Liverpool.——Messrs. E. H. Shorland & Brother, of Manchester, have just supplied some of their patent Manchester grates to the Dalry Episcopal Training College, Edinburgh.

CAPITAL AND LABOUR.

DUNDEE JOINERS' STRIKE.—A settlement has been arrived at in the dispute in the Dundee joiner trade. A meeting of the Dundee Master Joiners' Association was held on the 4th inst. to consider the position, which, from the employers' point of view, had been greatly weakened by the secession of one of the Associated firms who had agreed to pay the rate of wages determined on by the Operative Society—9d. per hour. The action of this firm was criticised by several of those present, but it was pointed out that their position and the matter of exacting a money penalty would be considered at a future meeting. In view of all the circumstances, the Association, after a sederunt lasting thirty-five minutes, agreed to accede to the men's demands—namely, to withdraw the notice of a reduction, and pay the wages at the former rate. The joiners will consequently resume work on an early date. The strike has lasted fully three weeks. The master joiners intimated a reduction of ½d. per hour on the operatives' wages, which the workmen resented. The employers offered a compromise to the men of ¼d. per hour, with a further reduction of ¼d. three months afterwards. This was also refused, and on August 8 the employés decided to leave their work. The operatives employed by the Associated firms—numbering twenty-five — withdrew their labour, and over 200 men were thrown idle.—*Dundee Advertiser.*

STRIKE OF STOCKTON PLUMBERS.—The operative plumbers in Stockton have come out on strike for an advance of one penny per hour in their wages. At the present time the men are receiving 8½d. per hour, and they now demand 9½d., which means an advance of 4s. 5d. per week.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

9,880.—A DREDGING APPLIANCE: *T. O. Neumann.*—On to a common shaft are pivotted two jaws, each of which consists of two parts, whereof one part is fixed to plates that are pivotted on to the other part in order to allow for small relative displacements vertically. Through slots in the jaws passes a stop-bar which is joined with pivotted rods to lugs upon the above-mentioned latter parts of the jaws, and is connected with ropes to a pull-rope, and with a shackle to a second pull-rope that is joined with other ropes to the jaws, there is also a steering machanism for the rudder; the jaws are held in a closed position as the dredge is pulled into its place, the dredge is then opened and worked with the pull-rope.

9,803.—APPARATUS FOR EXCAVATING: *T. Whitaker.*—For excavating trenches and kindred operations is devised a lattice-work jib affixed to a vertical pivot. The arm for the bucket is moved along guide-rollers with a rope passing around a

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drum, and having its free ends joined adjustably to the arm. When the bucket's position has been adjusted by the revolution of the drum, excavation is carried out by means of the crane-rope fastened to the bucket and of the working of the winch.

9,910.—WASH-OUT CLOSETS: *R. G. Howson.*—A small chamber is provided at the back of the basin, out of which the flush flows at one and the same time into the flushing-rim, and through a passage formed in one piece with the basin, into a jet turned upwards in the siphon's inlet. The passage has an air-pipe, and the starting of the flush is accelerated by forming the outlet with an oval section in two places just above its lower outlet.

9,925.—WOODEN PIT-PROPS: *W. H. Hepplewhite.* In order to prevent the props from becoming broken the inventor fashions them with their ends tapered, so that they shall give way and spread when subjected to an excessive load or pressure.

9,993.—DRAIN-TRAPS: *F. Elder.*—It is arranged that the flow and backflow of the sewage shall automatically open and close respectively the trap's valve, which is carried by a hollow stem in whose upper end is a piston that moves within a cylinder which is closed with a cap; the cylinder's lower end has a pierced diaphragm, the apertures being closed with flap-valves. Under normal conditions the valve remains shut, but as soon as waste water has entered the water flows through an opening into a tank, and the ascent of a pivotted float inside the tank opens a valve in the service pipe, whereupon water passes through a side pipe into the cylinder and lifts and opens the valve. In another form of the contrivance the backflow is similarly utilised to force water under pressure into the cylinder's upper end, and thereby to close the valve.

9,886.—CONDUITS FOR ELECTRICAL CONDUCTORS: *F. Fungbluth.*—The tubes are fashioned, by means of a roller-press, of an admixture of powdered unslaked clay lime, Valle Travers asphalt, Trinidad asphalt, coal-tar, and cement. The several ingredients are pounded together when in a heated state.

9,901.—WASH-OUT CLOSETS, FLUSHING, &c.: *G. B. Howell.*—A valve admits the flushing water into a cylinder which is held cross-wise in a web that is put between the rising and falling legs of the basin's outlet siphon; a channel turns the flush from the cylinder to the crown of the siphon, and another channel turns it to the flushing-rim, whilst at the same time a part of the flush flows directly through a passage to the outlet. In another shape the outlet's end is made vertical-wise, being joined by means of a flanged joint to a horizontal soil-pipe that may therefore be set in any desired direction, or the pipe may also be first caused to enter a small chamber whose contents will then seal the outlet as they leak into the basin.

9,993.—A LEVELLING INSTRUMENT: *G. Langer.*—A central web having around it a broad flange, which together with plates serves to carry the instrument's working parts, constitutes the casing, on to which a telescope, if needed, is secured with standards. A spindle carries a pointer that turns over a fixed scale, a spirit level, and a large wheel which gears with a pinion upon whose spindle is mounted a vernier arm for the taking of fine readings upon a scale. If the instrument is laid upon an incline the spirit-level is set horizontally by the turning of a milled button, when the gradient rate may be read off with exactness from the two scales. A pinion also is placed in gear with the large gearing-wheel, and on its spindle are four points turning over as many concentrical scales, each of which is marked with twice as many divisions as are marked upon the next scale which is nearer to the centre, the innermost scale being graduated for the angles of displacement which are needed for sighting the consecutive divisions upon a standard 100 ft. distant; from the three other scales the smaller readings for remoter points can be obtained.

10,019.—LIFT AND BALL-AND-FLOAT VALVES: *W. Bradley.*—For use with water supplied under high pressure is contrived a tubular float valve whose edge will engage with a seating which is retained in its position by means of a screw cap, and the valve is caused to slide through a cup-leather; the invention comprises a float-mechanism wherein a weighted lever is sustained with a spring catch which is moved by the float-lever's action upon a cam-shaped projection; or there may be employed a solid valve, so recessed as to fit tightly over the end projecting upwards, of the outlet nozzle which keeps the seating in its place; the valve is adapted for use with a bib-cock or with a screw-down spring-pressed stop valve.

10,045.—ROOF GLAZING: *C. Cordon.*—Side ribs are shaped upon the glass sheets so that water shall not pass by the joints, and in order that the sheets may be fitted closely together their lower overlapping corners are bevelled; for fastening the sheets on to wooden or metallic purlins or astragals are used flanged strips or roll-caps made of sheet-metal, to be secured with screws that have recessed or mushroom-shaped heads which will fit over the up turned edges of the holes in the caps; short perforated inserted or cross-tie pieces serve to strengthen the caps at the holes, and the ends are flanged or stepped so as to provide stops for the glass and roofing plates; the glass sheets may be fastened on to the caps between the purlins with intermediate T-shaped clamping screws and mushroom-headed nuts.

10,047.—TILES FOR ROOFING PURPOSES: *H. Ludeling.*—The interlocking tiles have passages through which the air may circulate so as to keep the building cool in warm weather; they have hanging nibs wherewith they are to be fastened on to the laths or battens of the roof, and are composed of Portland cement mixed with sand. At the base of one tile is a half-rounded groove which will fit over a corresponding rib upon the upper edge of the tile next below it, whilst a rounded rib beneath the tile's side will fit into a groove formed in the edge of the tile next adjacent. A narrow slit for the escape of air is supplied between the overlapping tiles by sinking or depressing each tile's upper surface, and bevelling or cutting-off the under side at its lower end; a space for the escape of water through leakage is made between the ribs and grooves, and communicates by means of slots with the drainage channel.

10,106.—DIGGING HOLES FOR POSTS: *W. Francis.*—A scoop for digging holes for posts, &c., is made of sheet-steel or other suitable material and has a space formed between its edges, the lower edge being sharpened, and the handle being weighted at either its end or a short distance lower down.

10,141.—A METHOD OF RETAINING LOCK AND LATCH BOLTS: *G. W. Allen and F. Green.*—For preserving bolts when shot or drawn back from being operated from without by the use of any other than the master-key the inventors fit upon the sliding handle of the latch a lever arm, upon which is a stud that passes through a slot cut in the case and through a slot cut in the lever beneath; the lever is pivotted in such a manner that parts of it rest near a ward-seating for the key, and in the travel of the key's bit. By moving the stud into two notches the latch becomes retained in the shot and withdrawn positions respectively, a spring retaining the lever in either position; the bolt, when it has been shot, may be liberated by turning the key into engagement with one of the parts of the lever, so that the stud is raised from the notch and into the straight portion of the notched slot in the case. The movements described are quite distinct from the ordinary mechanism of the lock.

10,156.—VALVES AND COCKS: *A. E. Markwick.*—A ball-float or other lever, which engages with spiral slots in and with projections upon the casing, operates a valve made of leather, indiarubber, or other material; the valve and lever are joined to a piston. The contrivance assumes various forms. The valve may be worked with a spring-pressed button which, under normal conditions, keeps the valve shut, and has a slot which engages with a pin that projects eccentrically from the piston, or it may be operated by a lever whose two hooks engage with the pin, or it may be moved with a lever pivotted in the casing and slotted so as to engage with the valve-lever's end.

10,196.—A LAMP FOR BURNING OFF PAINT, &C.: *F. Hussey.*—The lamp has a band tightened with a screw, and is made in one piece with a blade whose upper edge is sharpened that it may scrape the painter's knife; to the band is attached an adjustable heat-shield or wind-guard. In other forms the guard is fixed upon the lamp with clips formed upon the lamp's extended shank, or a socket upon the shield fits over a pin upon the lamp, or the band may be dispensed with, the knife being secured to the lamp without one.

10,200.—AN ODOMETER FOR USE BY LAND SURVEYORS: *F. Stadel and E. Torkos.*—The odometer records the distance along which the hand-barrow or other vehicle is wheeled. The barrow wheel's periphery is sub-divided by projections or ridges, which are placed, in preference, at the ends of the spokes. A recording disc, having a movably fixed pointer, is driven by the axle; at each completed revolution of the recording disc a three-sided projection thereon raises a hammer that strikes a bell. If the wheel's circumference is, say, two yards, fractions of a yard are to be measured by the indents which the ridges upon the wheel make in the travelled path.

10,264.—A MACHINE FOR TRIMMING THE SIDES OF ROADS, &C.: *A. and F. Macdonald.*—By this machine, adapted for horse-draught, turf is cleared away from the sides of footpaths and roads. Of the three wheels that carry the machine, the two front wheels are independently mounted upon levers that are adjusted upon and swivel with a common axis, by which means one can control the height of the machine's front, the two wheels being then fixed in place with a link and hand lever. The hand lever has a catch which engages with a toothed quadrant. The guiding wheel's adjustment is regulated with a lever that engages with a rack between the two handles. A tusk upon the shovel-blade serves for a vertical cutting knife, and a plough-board turns the cut turf over to one side.

10,278.—CALLIPER GAUGES: *H. H. P. Powles.*—In order to facilitate with one measurement calculations as to the areas of circles and squares, a wire's electrical resistance, and so forth, the callipers are set so that they will give readings of the square, or of a ratio to the square, of the linear distance between the points. To the frame that carries one jaw is pivoted a piece upon which a slide can move, which is rigidly fastened to the vernier arm that slides upon the other leg which carries the other jaw. The vernier's displacement from zero point upon the scale is in ratio to the square of the distance between the two jaws, which may be shaped as half-round pieces that turn in the ends of the callipers' legs.

MEETINGS.

MONDAY, SEPTEMBER 17.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "Mechanical Physics Laws of Motion, Hydraulics, &c." 8 p.m.

WEDNESDAY, SEPTEMBER 19.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "Natural Forces Light, Heat, Electricity, Chemistry." 8 p.m.

FRIDAY, SEPTEMBER 21.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "The Atmosphere: Pressure and Composition; Air, Combustion, and Respiration." 8 p.m.

Institute of Sanitary Engineers (Incorporated).—Examination in Practical Sanitary Science.

SATURDAY, SEPTEMBER 22.

Institute of Sanitary Engineers.—Examination in Practical Sanitary Science.

SOME RECENT SALES OF PROPERTY

ESTATE EXCHANGE REPORT.

August 31.—By FENN & Co. (at Clacton-on-Sea).
Great Clacton, Essex.—Brooker's Farm, 13 a. 3 r. 19 p., f. £1,500
September 4.—By BROWETT & TAYLOR.
Beckenham, Kent, 29, Kingshall-rd., u.t. 74 yrs., g.r. 7*l.*, r. 42*l.* 480
By WHETHERLY & HASLETT (at Masons' Hall Tavern).
Kensington.—Earl's Court-rd., the Prince of Teck, p.-h., f., with goodwill 28,700
September 5.—By SWAN WOOLCOCK (at Stratford).
Stratford.—32 to 38 (even), Blenheim-rd., f. 720
September 6.—By F. J. BISLEY & SONS.
Bermondsey.—42, Southwark Park-rd., u.t. 32½ yrs., g.r. 4*l.* 10*s.* 260
Old Kent-rd.—66 and 68, Colegrove-rd., f. 650
By BUCKLAND & SONS.
Maida Vale.—55, Lanark-villas, u.t. 50 yrs., g.r. 10*l.*, r. 52*l.* 380
By DEVERELL & HILL.
Cricklewood.—30 to 36 (even), Oak-grove, u.t. 95 yrs., g.r. 28*l.* 1,650
Hampstead.—5, Holmdale-rd., u.t. 81 yrs., g.r. 8*l.*, r. 45*l.* 500

***Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.**

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	s.	d.		
Hard Stocks	35	0	per thousand alongside, in river.	
Rough Stocks and Grizzles	31	0	,,	,,
Smooth Bright Facing Stocks..	58	0	,,	,,
Shippers	42	0	,,	,,
Flettons.....	29	6	,,	at railway depôt.
Red Wire Cuts ..	35	0	,,	,,
Best Fareham Red	71	6	,,	,,
Best Blue Pressed Staffordshire ..	87	0	,,	,,
Do., Bullnose	92	0	,,	,,
Best Stourbridge Fire Bricks	84	6	,,	,,
Best White and Ivory Glazed Stretchers.....	260	0	,,	,,
Headers	240	0	,,	,,
Quoins, Bullnose, and Flats	340	0	,,	,,
Double Stretchers	380	0	,,	,,
Double Headers..	320	0	,,	,,
Outside and two Ends	380	0	,,	,,
Two Sides and one End	400	0	,,	,,
Splays, Chamfered, Squints	400	0	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	240	0	,,	,,
Quoins, Bullnose, and Flats	280	0	,,	,,
Double Stretchers	300	0	,,	,,
Double Headers..	280	0	,,	,,
One Side and two Ends	300	0	,,	,,
Two Sides and one End	300	0	,,	,,
Splays, Chamfered, Squints	280	0	,,	,,
Seconds Quality White and Dipped Salt Glazed	40	0	per thousand less than best.	

[*See also page 243.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Isolation Hospital	Sevenoaks U.D.C.	10*l.* 10*s.*	Oct. 20
*New Municipal Buildings	South Shields Corporation		Dec. 31

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Several Cottages, Coalburns, &c.	Consett Iron Co., Ltd	C. E. Oliver, Architect, Consett, Durham	Sept. 17
Additions to Rhos Chapel, Mountain Ash		Morgan & Elfard, Architects, 1, Jeffrey-street, Mountain Ash	Sept. 18
School, Bordesley-green-road	Birmingham School Board	Martin & Martin, Architects, 106, Colmore-row, Birmingham	do.
Reservoir	Dursley (Glos.) R.D.C.	Taylor & Co., Engineers, 27, Great George-street, Westminster	do.
*Kerbing, Channelling, &c.	Tottenham U.D.C.	P. E. Murphy, Engineer, 712, High-road, Tottenham	do.
Police Station, Shotton, Flints		J. H. Davies & Sons, Architects, 24, Newgate-street, Chester	Sept. 19
Alterations, &c., to Three Shops, Blackfriars-road	Salford Corporation	Borough Engineer, Town Hall	do.
Home, House, Offices, &c., Chapel-Allerton	Leeds Guardians	P. Robinson, Architect, 72, Albion-street, Leeds	do.
Sewerage Works, Essex-road	Hoddesdon (Herts.) U.D.C.	T. Salkield, Surveyor, Lord-street, Hoddesdon	do.
*Heating and Ventilating of Board School, Halifax		C. F. L. Horsfall & Son, Architects, Halifax	do.
*Additions to Nurses' Home, &c., Tooting	Wandsworth and Clapham Union	Cecil A. Sharp, 11, Old Queen-street, S.W.	Sept. 20
Repairing Shops, &c., Broadley-street	Hull Corporation	F. J. Bancroft, Engineer, Town Hall	do.
School, Devonshire-road	Blackpool School Board	R. B. Mather, Architect, Abingdon-street, Blackpool	do.
Additions, &c., to Buildings, Wellington-road	Dewsbury Pioneers' Indus. Soc.	Holtom & Fox, Architects, Corporation-street, Dewsbury	do.
Power Station, St. Ann's Well-road	Nottingham Corporation	A. Brown, Civil Engineer, Guildhall, Nottingham	Sept. 21
*Police Cottage at Thakeham	West Sussex County Council	County Surveyor, 31, Bedford-road, Horsham	Sept. 22
Limestone, &c., 600 tons	Bedwellty (Mon.) U.D.C.	J. H. Lewis, Civil Engineer, Town Hall, Tredegar	do.
Offices, &c., Dipton	Annfield Plain Indus. Co-op. Soc.	G. T. Wilson, Architect, 121, Durham-road, Blackhill	do.
Stable and Coach House, Ponthirwen, Wales		J. P. Lloyd, Ponthirwen, Cardiganshire	do.
Stabling, &c.	Halifax Corporation	C. F. L. Horsfall & Son, Architects, Halifax	do.
Sewers, &c.	Durham U.D.C.	H. W. Taylor, C.E., St. Nicholas Chambers, Newcastle-on-Tyne	do.
Building Work at Gasworks	Blackburn Corporation	S. R. Ogden, Engineer, Municipal Offices	do.
*Brick Chimney Shaft	Tunbridge Wells Corporation	Borough Engineer, Town Hall, Tunbridge Wells	Sept. 24
Pipe Laying, &c.	Burnham (Somerset) U.D.C.	W. J. Press, Engineer, Town Hall	do.
Cottage Home, Upton-by-Chester	Chester Guardians	Lockwood & Sons, Architects, 80, Foregate-street, Chester	do.
Hospital, Newby-lane	Scarborough Town Council	H. W. Smith, Borough Engineer, Town Hall	do.
*Three Shops, Barnes	West Ham County Council	F. & W. Stocker, Architects, 90, Queen-street, E.C.	do.
*Quarter Sessions Court, &c.	do.	Borough Engineer, Town Hall, West Ham, E.	Sept. 25
*Fencing	do.	do.	do.
*Making-up Streets	H.M. Office of Works	do.	do.
*Post Office at W. Brompton, S.W.	Sheffield Corporation	Mr. Wager, Office of Works, Storey's Gate, S.W.	do.
*Bridge	do.	City Surveyor, Town Hall, Sheffield	do.
*Baths and Library	Willesden District Council	do.	do.
*Road Making and Paving Works	Sheffield Corporation	O. Claude Robson, Public Offices, Kilburn	do.
Public Baths, Duke-street Park	Heworth School Board	C. F. Wike, Civil Engineer, Town Hall	do.
Schools, Felling	Bradford Corporation	H. Miller, Civil Engineer, Felling	do.
Inn, Westgate	Epsom R.D.C.	J. H. Cox, Surveyor, Town Hall	do.
*Sewerage Works, Cheam	The Company	H. D. Searles Wood, 157, Wool Exchange, E.C.	do.
*New Roads, Muswell Hill	Hertfordshire County Council	Vigers & Co., 4, Frederick's-place, Old Jewry, E.C	Sept. 26
*Police Cottages at Hatfield	Greenwich Board of Works	County Surveyor, 41, Parliament-street, S.W.	do.
*Supply of Road Materials	Chiswick U.D.C.	The Clerk, 141, Greenwich-road, S.E.	do.
*Alterations and Additions to Free Public Library	Kensington Guardians	A. Ramsden, Surveyor, Sutton Court, Chiswick	do.
*Enlargement of Master's House at Workhouse	Messrs. W. & N. Blakeley	Ernest Flint, Architect, 80, Coleman-street, E.C.	Sept. 27
Four Houses and Shop, Wide-lane, Morley	Wirral R.D.C.	Buttery & Birds, Architects, Morley	do.
Making Quarry-road, Heswall	Messrs. J. Shearer & Son	T. Davies, Surveyor, Eastham, Cheshire	do.
Concrete Graving Dock, nr. Scotstoun Station, Glasgow	Tunbridge Wells Corporation	J. Deas, Civil Engineer, 53, Bothwell-street, Glasgow	do.
Technical Institute	Croydon Council	H. J. Hare, Architect, 13, Hart-street, London, W.C.	do.
Mission Room, Millbank, Holyhead	Glasgow Corporation	G. P. Griffith, Compton House, Holyhead	do.
Sale of Old Granite Setts	West Sussex County Council	Borough Road Surveyor, Town Hall, Croydon	Sept. 28
Cast-iron Piping, &c., Pinkston	Shifnal Guardians	J. Young, 88, Renfield-street, Glasgow	do.
*Police Station at Arundel	Mansfield School Board	County Surveyor, 51, Bedford-road, Horsham	Sept. 29
*Infirmary	Erith U.D.C.	Clerk, Guardians' Offices, Market Place, Shifnal, Salop	do.
*Schools at Pleasley Hill, near Mansfield	Shardlow R.D.C.	Vallance & Westwick, Archts., White Hart Chmbrs., Mansfield	Oct. 1
*Forty-eight Cottages, Belvedere, &c.	Carmarthenshire County Council	Council's Surveyor, High-street, Erith	do.
Sewers, &c., Normanton by Derby	Salford Corporation	T. A. Fuller, Surveyor, The College, All Saints, Derby	do.
Bridge Works over River Amman, Llandebie	Willesden Guardians	J. Jones, County Council Office, Llandovery	do.
Refuse Destructor, Carey-street	St. Albans, St. Peter's, Vicar, &c.	W. H. Hamblett, Wilburn-street Depot, Salford	Oct. 2
*New Infirmary, Acton-lane	Chaseside Building Estate, Owners	A. Saxon Snell, 22, Southampton-buildings, W.C.	Oct. 3
*Alterations to Parish Hall & Erection of New Schools	Newhaven R.D.C.	F. W. Kinneir Tarte, 12, St. Peter-street, St. Albans	Oct. 4
*Roadmaking and Sewers, &c., Enfield	Hertford Corporation	Walton & Lee, 10, Mount-street, Grosvenor-sq., W.	do.
*Laying Stoneware Pipe Sewers, &c., Rottingdean	Pembroke School Board	T. W. Franks, Engineer, Severn Buildings, Lewes	do.
Lodge, &c., at Hospital, Gallows Plain	Grammar School Governors	W. L. Grant, Architect, Town Hall	Oct. 8
Schools, Meyrick-road	.....	G. Morgan & Son, Architects, 24, King-street, Carmarthen	Oct. 9
School with Master's House, Lichfield	.....	Clerk to the Governors, Bird-street, Lichfield	Oct. 13
Offices, Museum-street, Ipswich	.....	G. W. Leighton, Architect, 6, Princes-street, Ipswich	No date
Church, &c., Ashley-road, Branksome, Dorset	.....	Rev. A. Cleaver, Warwick Lodge, Sandecoates, Parkstone	do.
Shop, &c., Scotch Quarter, Carrickfergus	.....	S. P. Close, Architect, Carrickfergus	do.
House, Haslemere	.....	A. G. Hastilow, Architect, 1, Glendarvon-street, Putney	do.
Trades' Hall, Longford-street, Heywood	.....	Openshaw & Gill, Architects, 5, Church-street, Heywood	do.
Alterations to Post Office, Ulverston	.....	Settle & Farmer, Architects, Ulverston	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Shoreditch Public Health Com.	3*l.* 3*s.* weekly	Sept. 17
*Clerk of Works	Marlborough Corporation	3*l.* 3*s.* weekly	Sept. 22
*Clerk of Works	Poplar Union	3*l.* 10*s.* per week	do.

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv, vi, viii, x, & xxi. Public Appointments, pp. xix. & xxi.

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PRICES CURRENT (*Continued*).

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	" "
Best Portland Cement	37 6	per ton "
Best Ground Blue Lias Lime	24 0	" "

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d.	per yard, delivered.
Stourbridge Fire-clay in sacks,	32s. 6d.	per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt
Bath "	1 7	" "
Beer "	1 6½	" "
Grinshill "	1 10	" "
Brown Portland in blocks	2 2	" "
Darley Dale "	2 2½	" "
Red Corsehill "	2 5	" "
Red Mansfield "	2 4½	" "
Hard York "	2 10	" "
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super. at rly. depôt.
" " 6 in. Rubbed Ditto	2 10½	" "
" " 3 in. sawn both sides slabs (random sizes)	1 3	" "
" " 3 in. self-faced Ditto	0 9	" "

SLATES.

in. in.	£ s. d.	
20 X 10 best blue Bangor	11 5 0	per 1000 of 1200 at ry. dep
" best seconds "	10 15 0	" "
16 X 8 best "	6 2 6	" "
20 X 10 best blue Portmadoc	10 18 0	" "
16 X 8 best blue Portmadoc	6 0 0	per 1000 of 1200 at ry. dep.
20 X 10 best Eureka unfading green	11 2 6	" "
16 X 8 " "	6 15 0	" "
20 X 10 Permanent green and Sedan green	10 0 0	" "
16 X 8 " "	5 18 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	41 6	per 1,000 at rly. depôt.
Hip and valley tiles	3 7	per doz. " "
Best Broseley tiles	48 6	per 1,000 " "
Hip and valley tiles	4 0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 " "
Do. ornamental Do.	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 9	" " "
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000 " "
Hip tiles	4 1	per doz. " "
Valley tiles	3 8	" " "

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "

	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
" " 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
" " 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
" " 3 in. by 9 in.	13 0 0	14 0 0
" " battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	3 6	0 4 6

PRICES CURRENT (*Continued*).

	At per standard. £ s. d.	£ s. d.
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small " "	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
¾ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders " "	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	12 0 0	- - -

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	10 0 0	10 10 0
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0
Staffordshire "Marked Bars"	13 5 0	- - -
Hoop Iron, basis price	11 5 0	11 15 0
" " galvanised (* And upwards, according to size and gauge.)	17 0 0*	- - -
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 10 0	- - -
" " to 24 g.	12 15 0	- - -
" " to 26 g.	13 15 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 15 0	- - -
" " 22 g. and 24 g.	15 5 0	- - -
" " 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 10 0	- - -
" " 22 g. and 24 g.	19 0 0	- - -
" " 26 g.	20 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 0 0	14 15 0
" " 20 g. and 24 g.	14 15 0	15 10 0
Cut nails, 3 in. to 6 in. (Under 3 in. usual trade extras.)	11 10 0	- - -
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 1	- - -
Thin "	0 1 3	- - -
Copper nails "	0 1 3	- - -
BRASS—		
Strong Sheet "	0 0 11	- - -
Thin "	0 1 1	- - -
TIN—English Ingots "	0 1 7	- - -
SOLDER—Plumbers' "	0 0 8	- - -
Tinmen's "	0 0 10	- - -
Blowpipe "	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3½d. " "
" " fourths	3d. " "
26 oz. thirds	4½d. " "
" " fourths	4d. " "
32 oz. thirds	5½d. " "
" " fourths	5d. " "
Fluted sheet, 15 oz.	3½d. " "
" " 21 "	4½d. " "
½ Hartley's Rolled Plate	3d. " "
⅝ " " "	3½d. " "
¾ " " "	4d. " "

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes	0 3 1	per gallon
" " " in barrels	0 3 2	"
Boiled " " in drums	0 3 4	"
" " " in pipes	0 3 4	"
" " " in barrels	0 3 5	"
" " " in drums	0 3 7	"
Turpentine, in barrels	0 2 5	"
" in drums	0 2 7	"
Genuine Ground English White Lead	27 10 0	per ton
Red Lead, Dry	25 0 0	"
Best Linseed Oil Putty	0 9 6	per cwt.
Stockholm Tar	1 7 0	per barrel

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish or outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 6
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

W. P.—J. C.—J. W. R. (Amounts should have been stated). W. G. S. & Co. (Below our limit). S. V. & D. Co. (Shall have attention).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BODMIN.—For the construction of cattle market and fair park, Westheath, for the Urban District Council of Bodmin. Plans and Specifications prepared by Mr. E. J. Oliver, Borough Surveyor:—

J. Hancock	£1,938	Brown & Son	£1,600
Shelley & Sons	1,705	E. Harris*	1,532
F. Ham	1,700		

[All of Bodmin.]

BOURNEMOUTH.—For alterations, for new branch of London and South-Western Bank, Bournemouth. Mr. J. F. Fogerty, architect, 2, St. Peter's-terrace, Bournemouth:—

Wm. Hoare	£2,254 0	George & Harding	£1,990 0
Jones & Son	2,128 0	Jenkins & Sons*	1,988 0
Miller & Sons	2,030 15		

BRANDON (Co. Durham).—For new stores and hall. Meadowfield, for the Co-operative Society. Mr. Wm. Perkins, architect, Bishop Auckland:—

T. & J. White, Newcastle-on-Tyne* £12,300

BRIGHTLINGSEA (Essex).—For making-up Nelson, road and several others for the Urban District Council:—

Dupont & Co.	£2,859	W. Manders	£2,534
Moran & Son	2,742	Mackenzie & Son, Clacton-on-Sea*	2,492
Burgoyne & Son	2,703		

BRIGHTON.—For the erection of a house, two cottages, walls, &c., Mile Oak pumping station, near Portslade, for the Corporation of Brighton. Mr. J. Johnston, waterworks engineer:—

C. V Smith	£3,920 0 0	S. Pearce	£2,748 0 0
Longley & Co.	3,886 0 0	Cook & Sons, Crawley*	2,515 0 0
A. E. Nunn	3,069 8 6		

BRIGHTON.—For the construction of a concrete groyne, Lewes-crescent, for the Town Council. Mr. F. J. C. May, C.E., Town Hall, Brighton:—

J. & F. Binns	£6,742 12 6	Cooke & Co., London*	£4,500 0 0
Fasey & Son	5,286 9 8		

DEVONPORT.—For the erection of workmen's dwellings, James-street, for the Town Council. Mr. John F. Burns, Borough Engineer, 30, Ker-street, Devonport:—

H. E. Skinner	£7,797 11 6	Lethbridge & Son	£6,477 0 0
Thos. May	6,769 15 0	A. N. Coles	6,400 0 0
Wakeham Bros.	6,665 0 0	W. E. Blake*	6,362 0 0
S. Roberts	6,542 10 6		

[All of Plymouth.]

DURHAM.—For the conversion of outbuildings into cottages, Sands House, Durham. Mr. H. T. Gradon, architect, Durham:—

A. Fry	£948 0 0	G. T. Manners	£899 0 0
Wm. Lodge	920 0 0	Wm. Pratt	770 17 4

DURHAM.—For rebuilding premises, No. 29, Silver street, Durham. Mr. H. T. Gradon, architect, Durham:—

Draper & Sons	£2,532 5 10	J. Shepherd	£1,868 0 0
G. T. Manners	2,085 0 0	Gradon & Son,	1,715 0 0

DURHAM.—For two houses, Nos. 4 and 5, Fieldhouse-terrace, Durham. Mr. H. T. Gradon, architect, Durham:—

Wm. Lodge	£1,750 15	Gradon & Son	£1,520 0
J. Shepherd	1,699 0	C. W. Gibson	1,500 0
G. T. Manners	1,645 0	Draper & Son	1,450 0
T. Coates	1,535 0		

EGREMONT (Cumberland).—For alterations, &c. to shop and warehouse for the Egremont Industrial Co-operative Society. Messrs. W. G. Scott & Co., architects, Victoria-buildings, Workington:—

Building.—H. Eilbick, Egremont	£228 7 1
Joinery.—G. H. Chambers, Workington	135 0 0
Slating.—J. Wilson, Egremont / *Plastering.*—J. Wilson, Egremont	110 10 0
Plumbing.—W. Strathem, Whitehaven	69 0 0
Painting and Glazing.—Armstrong & Reid, Workington	37 0 0

[*See also next page.*

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FALKIRK.—For the erection of school buildings, Camelon, for the Falkirk Parish School Board. Mr. James Strang, architect, Vicar-street, Falkirk. Quantities by Mr. Robert Sandilands, 154, West Regent-street, Glasgow :—

Masonry.—George Sanderson, Falkirk ..	£9,334
Joinery.—Wm. Walker, Polmont Station	
Slating.—Drummond Crowe, Laurieston.	
Plumbing and Gasfitting.—Wallace & Connell, Falkirk..	
Plastering.—Jas. Miller, Falkirk	
Tiling.—Haig Bros., Glasgow	
Glazing.—Dan. O'May, Falkirk	
Heating.—Combe & Son, Glasgow	
Iron Railings and Gates.—John Kidd, Camelon	
Painting.—Thos. McKenzie, Falkirk....	

FENNY STRATFORD.—For the erection of school buildings, for the School Board. Mr. John Chadwick, architect, Fenny Stratford :—

Wm. Wade	£4,788	Walter & Austin....	£4,413
Thos. Yirrill	4,697	A. Taylor, Fenny Stratford*	4,360
H. Coleman.....	4,585		
Alf. Atkins	4,497		

GARFORTH (Leeds).—For alterations, &c., to shop. Mr. W. Wrigley, architect, 6, Westgate, Wakefield :—

Tom Blakey, Leeds.....£115

HULL.—For additions, &c., to school, Wawne-street, for the Kingston-upon-Hull School Board. Mr. B. S. Jacobs, architect, Lincoln's Inn Buildings, Bowlalley-lane, Hull :—

Blackburn & Son...£5,685		W. Hodgson £5,310	
J. Houlton	5,598	Jackson & Sons	5,319
V. Knowles	5,580	Hockney & Liggins	5,298
G. Houlton	5,540	C. Greenwood	5,118
W. Sanderson	5,420	M. Harper*	5,087
T. Goates	5,354		

[All of Hull.]

LINLITHGOW.—For the erection of an academy, for the School Board. Mr. J. Graham Fairley, architect, 1, India-buildings, Edinburgh. Quantities by architect :—

Masonry.—R. & W. Philip, Linlithgow*	£2,799	8	8
Joinery.—William Walker, Pelmont*	1,402	15	4½
Slating.—D.& A.Grant, Linlithgow*	361	12	11½
Plastering.—D. Macnair, Falkirk*	175	9	1
Plumbing.—Blake & Co., Edinburgh*	390	10	0
Painting.—M. Mackinzie, Linlithgow*	49	6	2
Heating.—Cameron & Co., Govan*	211	15	9
Total	5,300	18	0

LONDON.—For the erection of a refuge dwelling, Reeve's-place, Hoxton, for the Shoreditch Vestry. Mr. J. Rush Dixon, C.E., Town Hall, Old-street, E.C. :—

Ridgway & Sons	£2,550 12	J. Ivory, Great Cambridge-st., N.E.*	£1,368 10
Wells & Co.....	2,190 0		
Elkington & Son	2,012 15		
J. Welbking	1,645 0		

LONDON.—For steam-engine and steam laundry machinery at the Fever Hospital extension, Plaistow, for the Works Department of the Corporation of West Ham. Mr. Edwin T. Hall, architect, 57, Moorgate-street, E.C. :—

The Manchester Laundry Engineering Co.*£1,053

MAESTEG (Wales).—For the erection of a hospital, with administrative block, &c. for the Hospital Committee. Mr. J. Humphreys, C.E., Town Hall-chambers, Maesteg :—

Isaac Rees	£4,486 0 0
Lewis Williams, 12, Queen-street, Maesteg*	3,625 0 0

TYLORSTOWN (Glamorgan).—For additions to Horeb Baptist Chapel, Tylorstown, for the Building Committee. Messrs. Griffiths & Jones, Tonypandy and Llandaff, architects :—

W. D. Humphreys, Pembroke House, Tylorstown, Glamorgan* £875

WEST DEEPING (Lincs).—For the erection of schoolteacher's residence, for the managers of the West Deeping Voluntary School. Mr. J. C. Traylen, architect, 15, Broad-street, Stamford. Quantities by the architect :—

Letall	£436 8	Cave.....	£376 0
Hawkins.....	425 0	Chappell	375 0
Pine & Son	415 5	R. Plowright, Langtoft Market, Deeping*	298 0
Furnis Bros.	413 0		
Gelsthorpe & Son..	381 0		

WOKING.—For alterations to No. 1, The Pavement, to convert same into banking premises, for the London and South-Western Bank, Limited. Mr. William G. Jones, architect, Woking. Quantities by Mr. John Scott, surveyor, 23, Bedford-row, London, W.C. :

Oldridge & Sons	£2,980 0	Gare & Son.....	£2,739 0
A. A. Gale	2,928 0	Wheatley	2,690 0
J. Whitburn	2,828 0	Drowley & Co...	2,657 18
Greenfield	2,770 0	Harris & Son, Woking*	2,595 0
Potterton.....	2,750 0		

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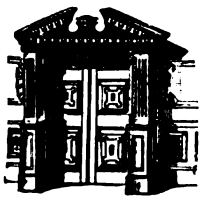

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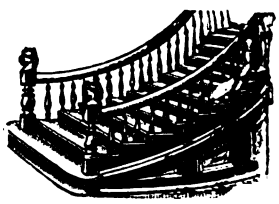

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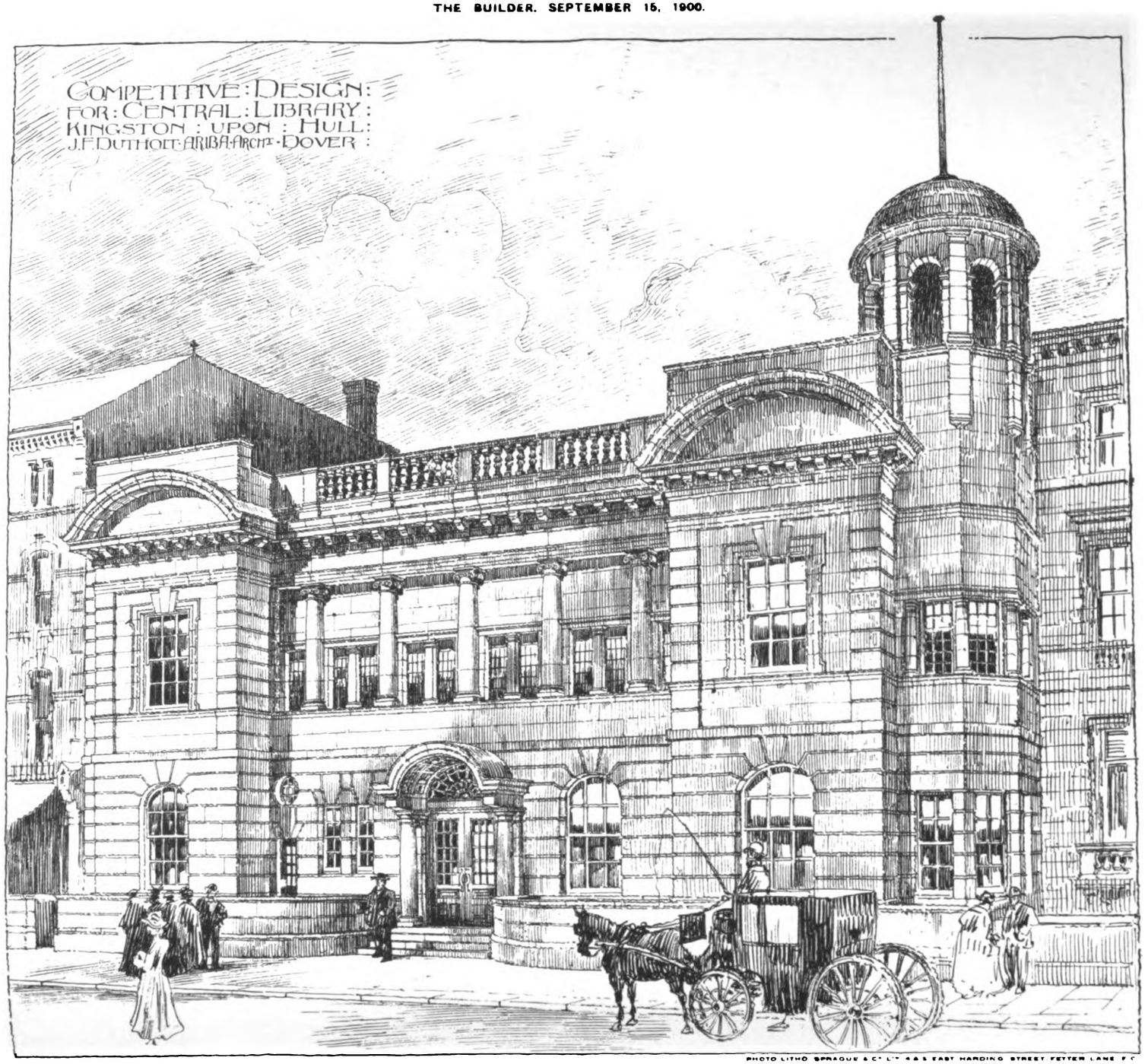

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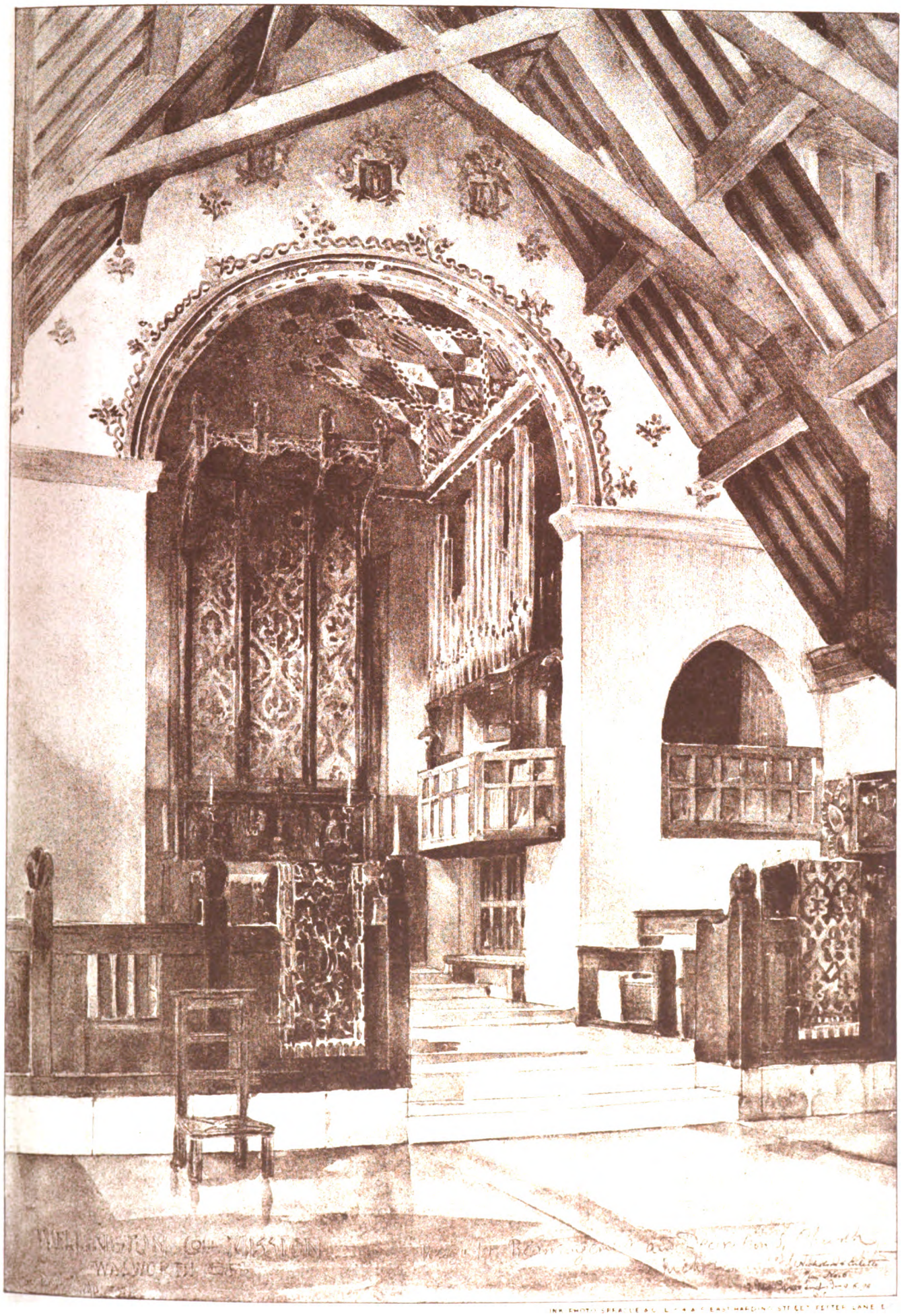

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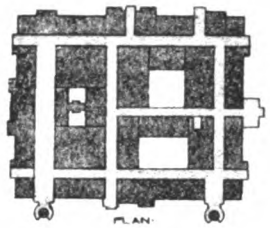

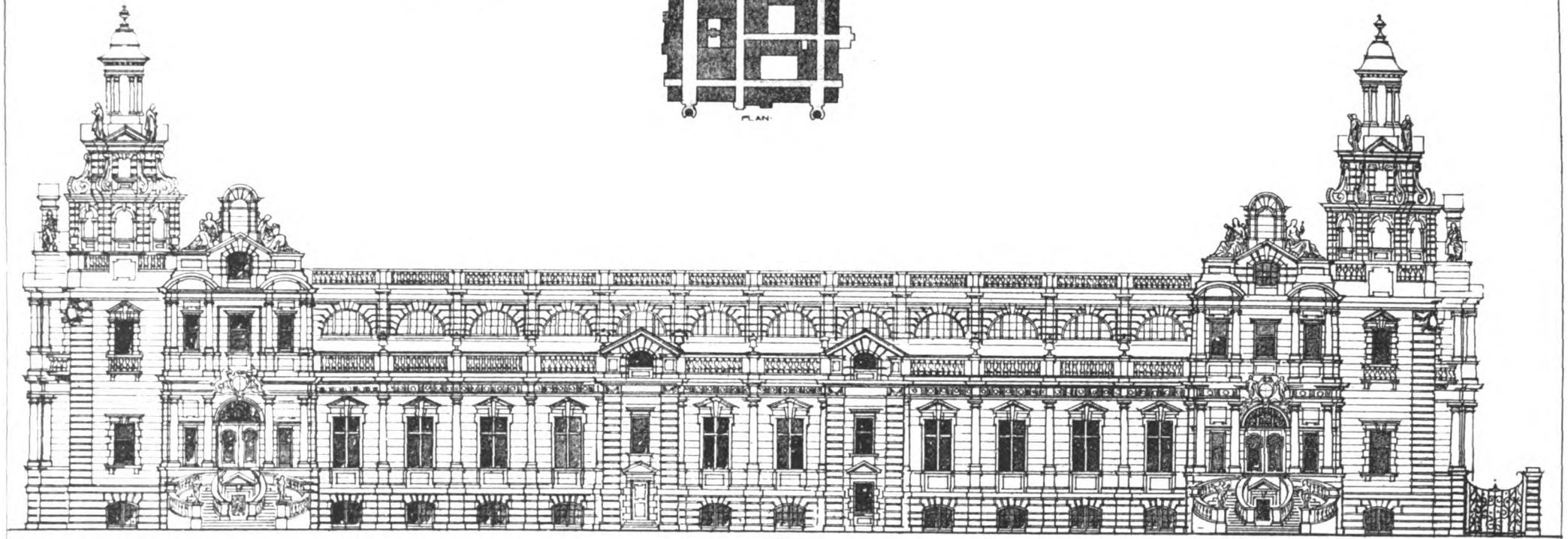

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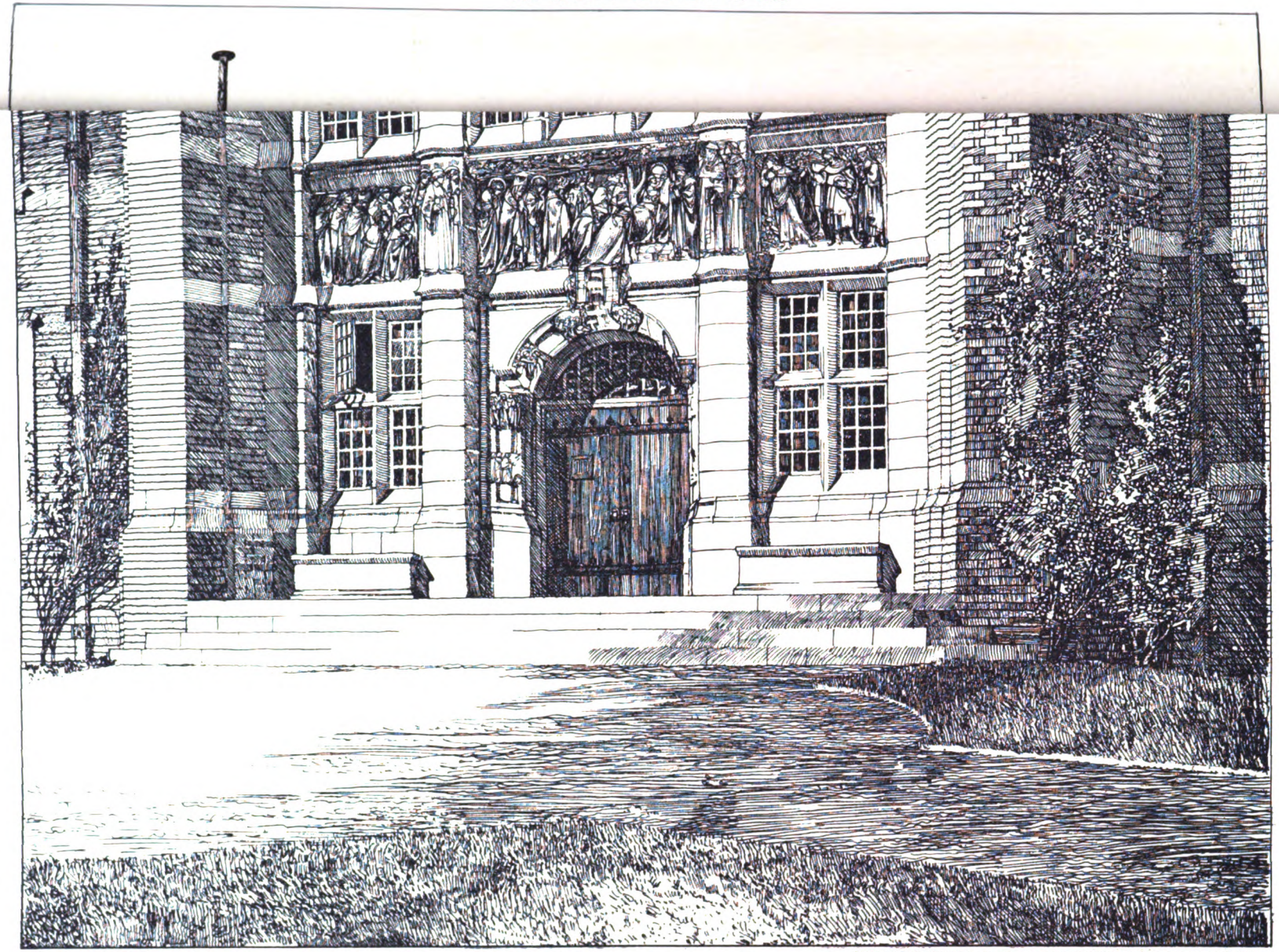

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Two Chapters in Colonial Architecture.

THE architectural efforts of a new colony have always a certain special interest. If the colonists are persons well off, well educated, and able to bring with them the materials and artificers necessary to produce something like a repetition of the architectural fashions of their native land, it becomes a curious problem how far they will actually imitate these, how far their way of designing and constructing will be modified by new conditions and new materials. This is the kind of interest presented by what is generally spoken of as the "Old Colonial" domestic architecture of certain districts of the United States. A great deal of this, especially in interior details, is the architecture of the school of the Adams, a little more naïve and simple than its original; and in external work sometimes showing the Classic order carried out in wood instead of in stone, simplified in its details and perhaps attenuated in its proportions. But there is another form of Colonial architecture, equally interesting in its way, which represents the first efforts to build for necessity only, with the materials and means at hand, and without reference to any preconceived theory of architectural style. Some years ago we published an interesting communication on this phase of building from a correspondent in Australia, accompanied by photographs showing the development from the plainest and most unpretending form of hut, called a "humpy," and made with whatever rough materials came next, to the decent-looking planked "town-hall" of a settlement which had just begun to crystallise into a "town," viz., a row of dwellings in some sort of order on each side of a laid-out street. The Australian "humpy" is perhaps the most entirely uncouth and uninteresting kind of dwelling ever put up by the hands of civilised men; as its name seems almost intended to imply, it consisted of materials heaped up rather than built, and presented nothing even of constructional interest or character. Some of the early colonists in the United States appear, however, to have started a manner of constructing houses with the skill and materials available at the moment, which, though simple enough, has a good deal of character. This is the class of early domestic buildings of the first settlers in Connecticut in the middle of the seventeenth century, of which some examples remain, and which has been made the subject of an illustrated volume by two American architects,* Mr. Isham and Mr. Brown.

The peculiarity of these early Connecticut houses is their general adherence to a normal type of plan and construction peculiar to themselves, and the manner in which this was developed by the circumstances under which they were built. Timber was plentiful, and was the most obvious material for house-building, but fireplaces were requisite, and could not be constructed in wood. Hence the method came to be to build a good solid stone chimney-stack in the centre of the site, with two back-to-back fireplaces and the stack rising above them, and then to build symmetrically round or on each side of this nucleus with a timber framing. It is rather curious that one feature of the house almost always was an upper story oversailing on one side. We have been accustomed to think that the fashion for overhanging upper stories arose in Mediæval cities from the crowded state of the town confined within the definite limits of its walls, and the necessity for keeping a sufficient width of street-way below while providing sufficient living room in the upper stories; but here was a case in which, one might suppose, ground area was practically unlimited, and nevertheless the ground story was contracted and the upper story projected out. One can only conclude that, while two rooms sufficed the early settlers for their living, they wanted more space above for division into a larger number of bedrooms, and they did not care to make the ground story any larger than was really necessary for their accommodation.

The typical Connecticut house of the period consists, therefore, of two rooms with a bulky stone (or sometimes, at rather later date, brick) chimney between them; the first floor being carried by a beam called a "summer"; evidently one-half of the word "brest-summer," the first half having been lost in crossing the Atlantic. The "summer" almost always ran parallel with the length of the house, from the chimney to the gable, each way. The entrance was opposite the chimney block, between the two main rooms into which the ground plan was divided. The outer walls were of framed timber filled in between the uprights with clay mixed with hay, boards called "clapboards" being nailed outside over the whole. "Clap-board" has had various meanings at different times and places, but here it probably means boards nailed so as to overlap, as in a clinker-built boat. The roofs were very steep; sometimes shingled and sometimes thatched. An occasional variation in the plan occurs in cases where there were two stone chimney stacks, one at each end of the house, and the rooms enclosed between them. But the plan with the central stack seems to have been the favourite or typical one.

One of the oldest of these houses examined by the authors of the book was the Whitman house at Farmington, of which we give copies of the first story plan and the exterior view (figs. 1 and 2). This is the early form of two-roomed house with the chimney stack in the centre, and the entrance opposite to it; the lines of the two "summers" are seen dotted on each side of the chimney-stack. This house, also, had an addition with a lean-to roof, which was the first manner of supplying further accommodation than the original two rooms afforded.

* "Early Connecticut Houses." An historical and architectural study. By Norman M. Isham, A.M., architect, and Albert F. Brown, architect. Providence, R.I.: The Preston and Rounds Company. 1900.

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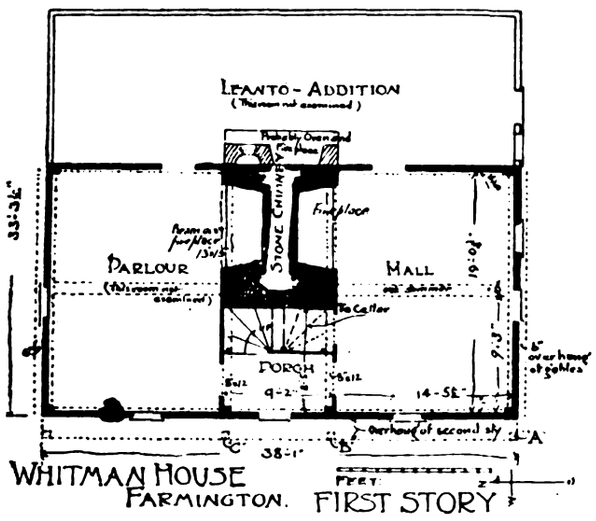

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 5.

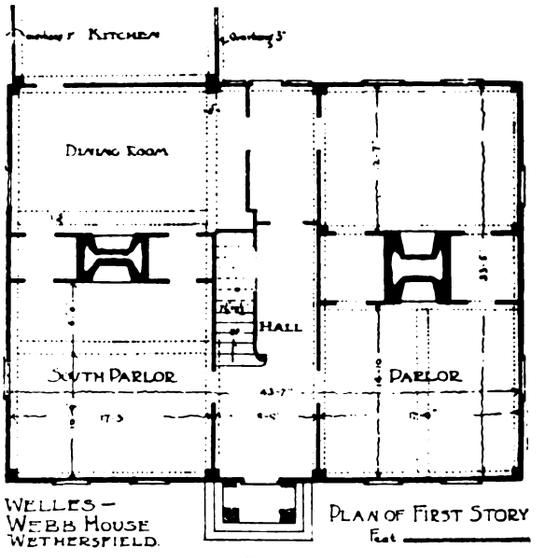

Fig. 4.

The view shows, also, the common though apparently not universal feature of the overhang of the upper story; in this case, as in some others illustrated in the book, decorated with a simple shaped pendant, which, however, appears, from the detailed illustration (fig. 3), to have been affixed as a separate piece, and not shaped out of a continuation of the upright, as would have been the more workmanlike and more architectural method. It is, however, a good bit of simple ornament.

The authors classify these old Connecticut houses under three periods, of which the Whitman house illustrates the first. We cannot follow out the details of the changes which characterise what are distinguished as the second and third periods; we must refer the reader to the book; nor can we discern sufficient difference between the houses of the first and second period, as described, to quite justify making a separate classification of them. It is noted, however, that at this period the chimney-stacks were frequently built of brick instead of stone. In the "third period" there are distinct and important changes. The old lean-to is abandoned, and the additional rooms at the back are made the same height as the rest of the house. The increased use of plaster led to the abandonment of the "summer" as a visible feature in the rooms; where used, it is kept flush with the general level of the ceiling and plastered over with the rest. The form of plan with two chimney-stacks, one at each end of the house, becomes more common, and examples of it are given. But the most interesting and characteristic development of the plan is that shown in the Webb house, at Wethersfield—a place possessing several of these old houses. This, as shown in fig. 4, is the old two-roomed house duplicated, the two blocks being turned half-round and placed transversely to the front instead of longitudinally, and the entrance, hall, and staircase arranged in a space left between them. Fig. 5 gives the exterior appearance of this house, which forms a very interesting example of the development of plan from a very simple origin. The Ebenezer Grant house, described and illustrated in a subsequent chapter, shows a further elaboration of plan in the back part of the house, the duplicated plan, like that of the Webb house, being retained in the front block; the whole plan now taking a L shape. In this plan also the chimneys are not in a line, one being nearer to the front than the other; which, as far as the general appearance of the house is concerned, is not an improvement. The front entrance door, of which the authors give a separate elevation, is a heavy and exceedingly clumsy imitation of the English Late Classic doorway, with short pilasters and an immense lumpy moulded cornice, intended to represent the Classic entablature, but in which the elements of architrave, frieze, and cornice are jumbled up into one agglomerate of clumsily designed mouldings; the whole crowned by a very steep broken pediment, a caricature of the feature familiar in English work. This doorway, however, is an indication that borrowed conventional ideas of architectural style had now begun to intrude, and that the simplicity and naïveté of the older Connecticut houses was at an end.

The book contains a great deal of very interesting information in regard to details of house furniture, finish and construction at the period represented by these old houses. In particular, an inventory of the contents of one of the later and larger houses, Governor Eaton's house at New Haven, which has now disappeared, throws a great deal of light on the home life of the period. The inventory is dated 1657. The house, of which an old view exists which the authors have reproduced, was on the E plan, and more like an English house than most of the others illustrated in the book. The authors have made an attempt to restore the plan and the arrangement of the furniture on the basis of the suggestions of the inventory.

Among other details given in regard to constructional work, it is suggested that the clap-board covering was first employed merely as a means of covering the leaks between the studs and the filling. The clap-boards were of oak until a late period. The preliminary work was done in the woods; a tree was felled and divided into the lengths usually required—either 4 ft., 5 ft., or 6 ft.; these lengths riven into "bolts" (the authors suggest that these were probably quarters of the log), and the "bolts" brought into the town to be further cut up by carpenters. "The clap-boards for the meeting-house at Windsor, or rather the bolts for them were

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'to be brought home by the latter end of the week following . . . and Samuel Grand is to cleave them when brought home; and so fit them and nail them about the meeting-house.' This work was called 'clabbing.'" The windows were very small in the early houses, and probably had often to go without glass and be fastened up when necessary by shutters. The walls were generally lined internally with wood—"wainscot," and the partitions between rooms were made of inch pine boards grooved and tongued. Paint was apparently not used till a late period in the Connecticut houses, "for there are many fine specimens of pine panelling with no finish on them. They do not need any. The wood is still sound, with perfectly sharp edges, and the colouring, partly from age and sun, partly from wood smoke, has become something very beautiful, unapproachable by any painted or varnished surface."

We have only indicated the main points of interest in this book, which is full of information on what may be called an almost unknown chapter in the history of domestic architecture. The authors say that they have personally examined every building now standing of which they give a drawing; and the book appears to be thoroughly well done and reliable in its illustrations and information.

Almost simultaneously with this work on a form of Colonial architecture in America we have received another on the characteristics of Dutch Colonial architecture at the Cape of Good Hope*, by an amateur, but accompanied by a chapter on the origin of this type of architecture by an English architect practising at the Cape, Mr. Herbert Baker. This (whatever it may be considered at the present moment) is not English Colonial architecture in respect of the old houses here described, as it all belongs to the period of Dutch occupation; but architecturally the special interest in it is just the same—it represents the form taken by architecture in a new colony, and its relation to the architecture of the mother country. Mr. Baker notes that there is little resemblance between the old homesteads of the Dutch colonists and the houses of their ancestors in the mother country. The difference however consists in the plan more especially:—

"Neither in the small low, tile-roofed sheds of the Holland marshes, nor in the many-storied, narrow-fronted houses of the cities, is there any exact prototype of the spacious colonial homestead. We find in the latter a large hall, and a broad 'stoep,' or raised platform, surrounding the house and adapted for primitive life and open hospitality. The bedrooms and kitchens lead directly off the hall, and are placed so as to be spanned by a single thatched roof."

Two plans are given as typical of the Cape House, one in the form I, with the entrance at the bottom of the upright shank; the other a square with two projecting wings on one face, leaving a gap or court between them. That people who had been in the habit of building in streets should alter their plan when they had to build in cleared country, and when they were transferred from a town life to a farm life, is what might be expected. In both the types of Cape House plan as given by Mr. Baker the central portion is a large hall with a screen across the middle. In the I plan the shank forms the hall, and the rooms in the wings right and left open one out of another; in the more convenient square plan the rooms open separately from each side of the hall. The first-named form, he tells us, is most common in the Cape Peninsula, the second beyond the peninsula. We should imagine that the second or square form was later in date, and was adopted after an experience of the inconvenience of the access to one room through another, in the I form of plan.

Having begun by mentioning how little resemblance there is between the Dutch houses at Cape Colony and in Holland, Mr. Baker, rather unexpectedly, employs the remainder of his chapter in remarking on the architectural resemblance between the gable treatments on the Colonial houses and those of Amsterdam and other Dutch or Belgian cities. The comparative examples given are interesting; but the noticeable point, to our thinking, is that the Dutch Colonial builders applied to their extended square country-houses the types of curved gable which were, in their original loca-

* "Old Colonial Houses at the Cape of Good Hope." Illustrated and described by Alys Fane Trotter. With a Chapter on the Origin of Old Cape Architecture; by Herbert Baker, A.R.I.B.A. London: B. T. Batsford. 1900.

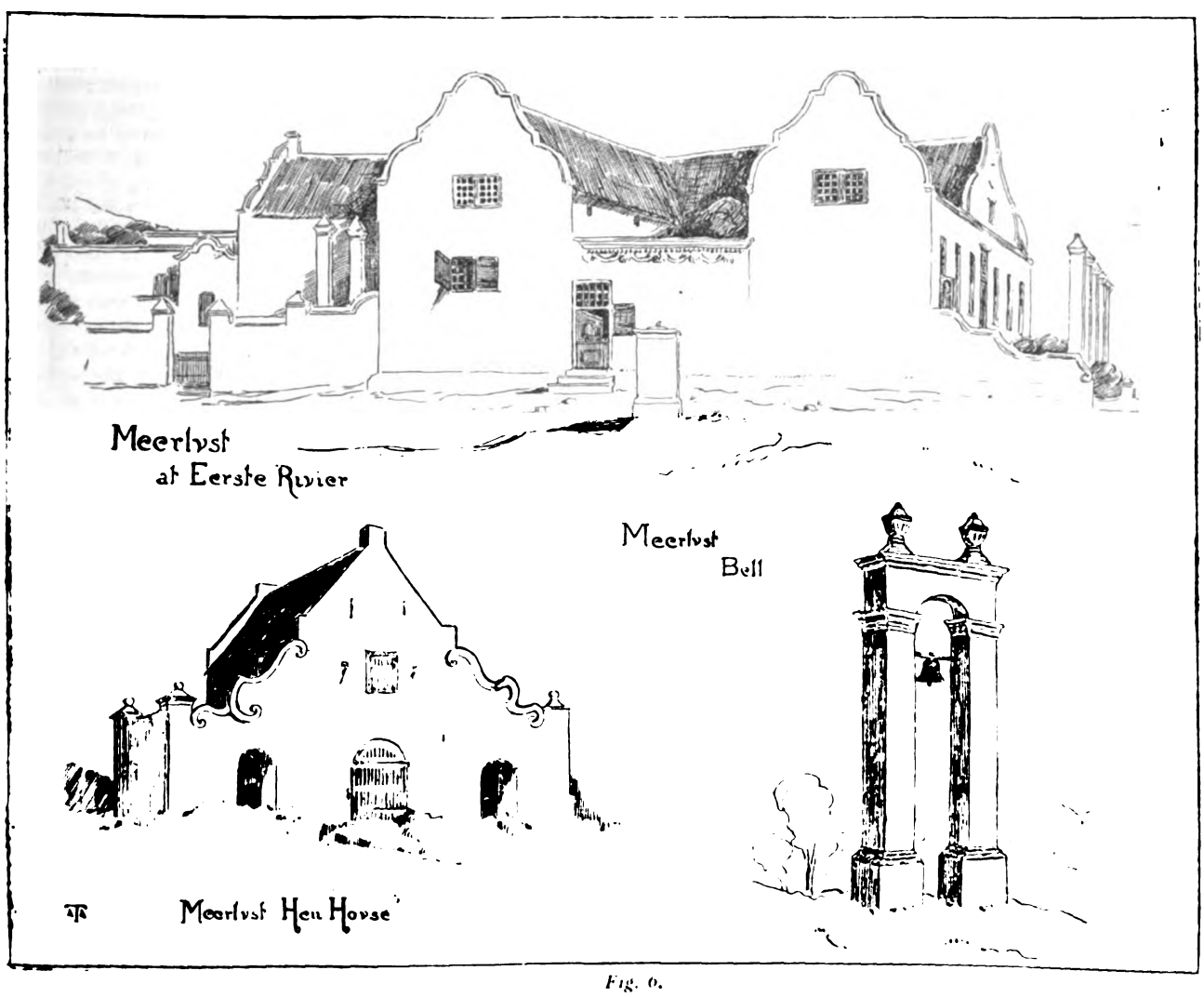

Fig. 6.

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lity, the terminations to narrow street fronts, and it is the transference of these form to a new use which gives a good deal of its peculiar character to the Dutch Colonial house. It shows the curly-lined gable applied at intervals along the extended walls of the Colonial house, instead of forming the sky-line termination of a single strip of street front. This explains the peculiar character of the architectural treatment of Mr. Rhodes's house, which was illustrated in the *Builder* of March 24; for though a new house, this is a professed reproduction of the style of the Dutch Colonial house. The same characteristic is seen in some of the old houses illustrated in the book before us.

There is, however, a great variety of picturesque treatment in the houses sketched in this collection, which ought to be particularly interesting just now, on account of the closer and we hope in time peaceful connexion which there is likely to be between Great Britain and South Africa. We can hardly doubt that the region of the Cape will furnish employment to some of the young English architects who find the field at home too crowded; and those who have any hopes or wishes in that direction will find this book useful in giving them an idea, in advance, of the local character of the older Colonial architecture, which may at all events afford them a suggestive basis to work on. And in any case the book should be of interest to architects as illustrating a very picturesque phase of domestic architecture. Mrs. Trotter's sketches, for the work of an amateur, are admirable, and call for no criticism. Some of the illustrations are from photographs, but the majority are original drawings, of which the best are those in lithographic chalk. From among the line drawings we give a reduced reproduction of the accompanying characteristic bits from Meerlust farmhouse (fig. 6), in which, as will be seen, the Amsterdam scroll type of gable has been applied to the decoration of a hen-house.

NOTES.

Architecture as a University Study.

THE President of the Institute of Architects has taken the opportunity of some correspondence in the *Times* on the University of London to make a fresh protest in favour of including the study of architecture in the curriculum of the University. As he truly observes, "When one sees what has recently been done by the Victoria University in this country and by nearly all the Universities in the United States in deciding that a systematic course of study in architecture, equally with law, medicine, and engineering, should be recognised as one of the roads towards a University degree, the lack of this recognition in the new University of London is much to be deplored." Mr. Emerson was quite right to take the opportunity of making a protest, though we sadly fear it is made in vain. There is among average Englishmen a curious combination of stolid indifference to architecture together with a persuasion that they know all about it by the light of nature, which forms a *vis inertiæ* very hard to strive against.

The Frescoes at Westminster Palace.

IT appears that Professor Church, who has been consulted as to the cleansing of the fresco paintings in the House of Lords and in the Lords' Corridor, has decided that it is not advisable to undertake any operations on them at present, as the summer is the most favourable time, and the work will be deferred, we presume, till next summer. Now that the paintings are there it is right, of course, to keep them in a state of preservation; but one almost regrets that they were executed, at a period when there was so little perception in this country in regard to the style of design and treatment suitable for decorative art and for such a method as fresco. They serve as an unfortunate monument of mistakes both in the æsthetic and the chemistry of fresco-painting; and were they obliterated, we have artists who could unquestionably produce something much better and much more suitable to their position than most, at all events, of the existing pictures. We do not actually recommend obliterating them, but we should not be very much grieved if it were done on the responsibity of some one else. We do not refer of course, to Sir E. Poynter's paintings in the octagon; that is a different matter altogether.

A Housing Reform Conference.

WHAT is called a "North of England Housing Reform Conference" is to be opened to-day (Saturday) at Newcastle-on-Tyne, with the object of discussing the subject and passing certain resolutions. The following Local Authorities will be represented (probably with the addition of others since this list reached us):—Sunderland Town Council; Darlington Town Council; Urban Councils at Alnwick, Morpeth, Weetslade, Seghill, Hexham, Blaydon, Consett, Willington, Brandon, Jarrow, &c.; Rural Councils at Hexham and Belford. The practical working of Part III. of the Housing Act of 1890 by Local Authorities will be described by Councillor Thompson, of Richmond, whose able contribution to the discussion will be remembered by those who attended the recent Conference on the same subject in London. The tenour of the resolutions to be proposed, which are too lengthy for us to give *verbatim* in this note, is (1) to urge Local Authorities to use the borrowing powers which they possess under the Act of 1890 for the purpose of acquiring land and erecting comfortable tenements thereon; (2) that Local Authorities should be empowered to compulsorily acquire land to be used under Part III. of the 1890 Act; (3) that it is desirable to promote a more thorough use of the powers of the Board of Trade to secure the provision of an adequate supply of workmen's trains; that municipal electric trams and light railways should be further developed, and a uniform system of cheap fares be enforced by law over areas surrounding large centres of population. We shall see what will be said on this head at the Conference; but we may observe that in the minds of many philanthropical people there seems to be no logical halting-place on this side of free carriage for working-men, and they will presently, perhaps, find that they have promised not only more than the community will consent to perform, but more than will be good for the working classes themselves.

Iron and Steel Institute.

AT the opening meeting of the annual autumn session of the Iron and Steel Institute in Paris, held on the 18th inst., Sir William Roberts-Austen, the President, read an interesting address on the history of the metallurgy of steel. He pointed out that a century's work had, to a great extent, revealed the way in which small quantities of added matter act, and that it has been shown that they exert profound influences even in solid metals; the fact that certain varieties of steel are "solid solutions" is now accepted, and the recognition of molecular movements in solids has become familiar. The utilisation of the waste gases of blast furnaces was dealt with in its historic aspects, commencing with the researches of Aubertot in the year 1811; the work of Sir Henry Bessemer and of Thomas and Gilchrist was passed in review, together with the principle of regeneration as applied to furnace work. Alluding to the successive production of different kinds of steel, he remarked that new properties were developed in it by the addition of certain elements such as silicon, and more especially by the rarer metals, such as manganese, chromium, tungsten, and nickel. The result was that some varieties of steel were characterised by extreme hardness, whilst others were very soft; some were magnetic, in others the magnetic permeability was low; some kinds would harden by rapid, and others by slow cooling; certain of them would even contract when heated, and expand when cooled. Speaking of the future, the President remarked that he hoped to hear much more in regard to researches on boron steel. There was one part of his address which we think might have been amplified to advantage, and that is in reference to the micro-structure of steel. The work of François, Sorby, and Osmond was alluded to, but it is very doubtful whether metallurgists as a body recognise the great value of the microscope in their researches. They seem to regard that instrument still as a kind of plaything, and hardly ever give it its true position as an aid in investigating. Only the other day at the British Association meeting a well-known experimenter, after stating some results he had arrived at chemically, said that they had been "confirmed by the microscope." If Sorby's work were more generally understood analysis by means of the microscope would certainly precede, if not succeed, many chemical and physical researches in regard to the metallurgy of steel and other similar compounds.

Riga and District Timber Trade.

THE annual Consular Report on the trade of Riga and the adjoining district has just been issued, and contains statistics of the timber exports from the south-west corner of Russia for the year 1899. The total exports from Riga were 46,700,000 cubic feet, or about 283,000 Petersburg standards, but one-third of this quantity was in the form of sleepers. Libau shipped about 100,000 standards. Windau exported 107,000 baulks and 848,000 deals, battens, and boards. No measurement is given, and no figures whatever are given for the port of Pernau, but we are told that the export of wood "showed a falling-off." The small size of the logs received at Riga during the year was more marked than ever before, very few being more than 9 in. in diameter at the top. The great majority measured only 8 in., and many only 7 in. and 6½ in. This, says the Consul, "may be regarded as a sign of the depletion of the forests from which Riga derives its supplies."

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How different this is from the Riga of fifteen years ago, when mill-owners would have nothing to do with even 9-in. logs, but specified that at least 80 per cent. of every parcel must be 11-in. or more in diameter. To-day "there is a keen competition in 9-in. logs, and a lot of 10-in. is looked upon as a rarity."

Health of Shirebrook.

SHIREBROOK is a village in the Blackwell Rural District, which has come under the notice of the Local Government Board for continued prevalence of enteric fever. Dr. Monckton Copeman, in his Report to the Board, appears to attribute this partly to defects in the milk supply, or the manner in which the milk was stored till used. But he mentions, also, the recent prevalence of many large middens for the reception of excreta, which have only recently been replaced by a pail-closet system; a system which, in its turn, is likely to give rise before long to fresh difficulties, in the way of finding places to deposit the results of the pail system. Accordingly, in the summary of the Report he recommends that the water-carriage system should be adopted in the case of all new house property, and the present pail system should be abandoned; and that the Rural District Council should make such arrangements with the Colliery Company as will permit of the sewage from the upper portion of the colliery village being diverted from its present outfall, the position of which is such as to cause liability to future contamination of the water supply.

Newcastle Town Hall Scheme.

THERE seems to be a movement on foot for a new Town Hall and other important municipal improvements at Newcastle-on-Tyne, and it is becoming a matter of interest with the inhabitants to consider how they will be carried out. A Newcastle architect, Mr. Hayler, has proposed a scheme, a rough plan of which has appeared in the *Newcastle Daily Leader*, for opening up the irregularly shaped site on which stands the old Town Hall, clearing a considerable part of the area on each side of it, leaving the centre entirely open with a garden and fountains &c. where the present Town Hall stands, and placing the new Town Hall on one of the cleared sites and the new Municipal Buildings on the other, the two main façades to face each other on each side of the central garden. It looks a good idea for a fine and striking effect towards the central space—whether it is the best that can be done we do not know, because we do not know what other sites in Newcastle are available or possible; but we may point out that, although the effect of the two fronts of the buildings may be very good in this position, the effect of each building, as a whole, would be materially injured by being so close up to the older buildings on the remaining three sides, and having such narrow streets round them; and that this would not only injure their architectural effect but their lighting. This consideration seems to have been overlooked by the architect who has proposed the scheme, and the journal which appears to support it.

Communication in Railway Carriages.

A LETTER in the *Times* of Thursday, relating to some experiences in a Scotch express, contains yet another instance of the total failure of the absurd communication-cord placed "on the right-hand side in the direction in which the train is travelling," and which was pulled by the writer of the letter till it snapped (being apparently rotten), but without attracting any attention from driver or guard. It almost looks as if railway companies wilfully put this deceptive "cord" notice up in order to look well, without any intention that it should really act. This is becoming a very serious matter, and we think that the Board of Trade ought definitely to insist on railway companies having a proper and convenient means of communication between passengers and guard or driver, and keeping it in working order; and that the apparatus should be tested from time to time by a Government inspector taking a journey for the purpose, and the company heavily fined if it did not act or was not attended to.

"Natural Ventilation."

WE quote the following sensible and forcible remarks from a paper entitled "Health in the Workshop," read in the early part of this year before the Manchester Association of Engineers by Mr. J. D. Sutcliffe, and now issued in pamphlet form:—"Let us examine the claims made on behalf of the so-called 'natural ventilation,' where the air is extracted without the use of power other than the wind or differences in the temperature. It is often supposed that by fixing a particular cowl, 'siphon,' 'air pump,' or other stupidly-named patented article on the top of a building, currents of air will be produced by the cowl itself, and therefore if enough are provided the ventilation is sure to be all right. A greater mistake could not be made, and you frequently find that out of say six cowls fixed on a building, half of them will be admitting air and the other half allowing it to escape . . . . The inventor proudly tells you, as he calls your attention to the model, that if you blow across the ventilator it plainly 'exhausts,' as it lifts a piece of cotton-wool from the bottom to the top. You have only to remove his ventilator and blow across the glass tube, when the cotton-wool comes up just the same."

Improvements in Hansom Cabs.

WE have received a description and illustration of two proposed improvements in connexion with Hansom cabs, patented by Captain Dickson. One of these consists in the addition of a small wheel at the foot of what is called the "gravel iron" under the front part of the cab, and which takes the ground in the event of the horse falling. This wheel practically lengthens the iron strut by the extent of its own diameter, and is provided with a stop stud, which allows of half a revolution, so as to ease the shock or jerk when the horse stumbles. After being locked by the stud, the portion of the wheel that touches the ground, and which is grooved, acts as a drag or skid. Provision is also made for the wheel to be raised or lowered at pleasure. This seems a useful addition, and likely to act also in checking the fall of the horse, as the cab gets a better support and in a higher position. The other improvement is a strap to be hooked across the front of the cab to prevent the occupant being pitched forward against the splashboard or into the road in the case of a horse falling. We do not think it is likely to be used except by very nervous people; any one who has his wits about him can save himself from being thrown forward when the horse falls. There are two more important improvements wanted in Hansom cabs, easily made but which no one seems to think about. One is a dirt-shield to the front of the wheels, to prevent people's clothes being soiled in getting in and out; the other is a means by which the occupant of the cab can raise or lower the glass for himself, without having to appeal to the driver. This could be so easily done, and the necessity for it is so obvious, that it is quite absurd that we should continue to have Hansom cabs built with the present clumsy and dangerous arrangement for working the glass.

A HOLIDAY IN SOUTH DERBYSHIRE

BY J. TARNEY.

THE county of Derby is particularly rich in the picturesque beauty of its natural scenery, of which Ruskin writes so lovingly:—

"In its very minuteness it is the most educational of all the districts of beautiful landscape known to me. The vast masses, the luxurious colouring, the mingled associations of great mountain scenery, amaze, excite, overwhelm, or exhaust—but too seldom teach; the mind cannot choose where to begin. But Derbyshire is a lovely child's alphabet—an alluring first lesson in all that's admirable, and powerful chiefly in the way in which it engages and fixes the attention. On its miniature cliffs a dark ivy leaf detaches itself as an object of importance; you distinguish with interest the species of mosses on the top; you count, like many falling diamonds, the magical drops of its petrifying well; the cluster of violets in the shade is an Armida's garden to you. And the grace of it all, and the suddenness of its enchanted changes and terrorless grotesque—grotesque par excellence! It was a meadow a minute ago, now it is a cliff, and in an instant is a cave—and here was a brooklet and now it is a whisper underground; turn but the corner of a path and it is a little green lake of incredible crystal; and if the trout in it lifted up their heads and talked to you, you would be no more surprised than if it were in the 'Arabian Nights.'"

As regards its architecture, though it is true that Derbyshire possesses no grand and imposing cathedral or castle of the first rank, it can boast of one or two of perhaps the finest old houses existing in England—notably, Haddon Hall—whilst the great diversity of style to be studied in its fine series of parish churches, ranging from the Saxon crypt at Repton, through the various styles of Norman, Early English, Decorated, and Perpendicular—at Melbourne, Ashbourne, Tideswell, &c.—down to the more recent work of Gibbs at All Saints' Church, Derby, make it a very desirable country for the holiday-making strolling sketcher and architectural student.

For the southern portion of the county, Derby—which is the headquarters of the Midland Railway Company—makes a good centre, its railway facilities being excellent. Here we find a town which dates far back in the annals of English history—a town which was a Royal borough in the time of Edward the Confessor, which has enjoyed Parliamentary representation since Edward I. ascended the throne, and where are still to be seen those signs of its past history; although, considering the conservative influence which is supposed to be so strong in these old-time places, Derby has a wonderfully new and fresh appearance. On the details of its architecture it is not necessary to dwell, as the town and its buildings were fully described and largely illustrated in the article in the *Builder* of July 17, 1897, forming No. VIII. of the series on "The Architecture of our Large Provincial Towns."

Our first excursion from Derby was to the pretty village of Breadsall, two miles to the north-west, where the train drops you down in sight of the red brick, tile and thatch covered cottages, which nestle in the wooded hollow, dominated by the beautiful spire of the church, which forms a conspicuous landmark. The church (fig. 1) consists of a chancel, nave with north aisle, south porch, and a tower and spire, and is of much interest. The earliest portion is the south doorway to the nave, which is of Late Norman character. The arcade, of three bays, is Early English or Transitional work, which is the date of the

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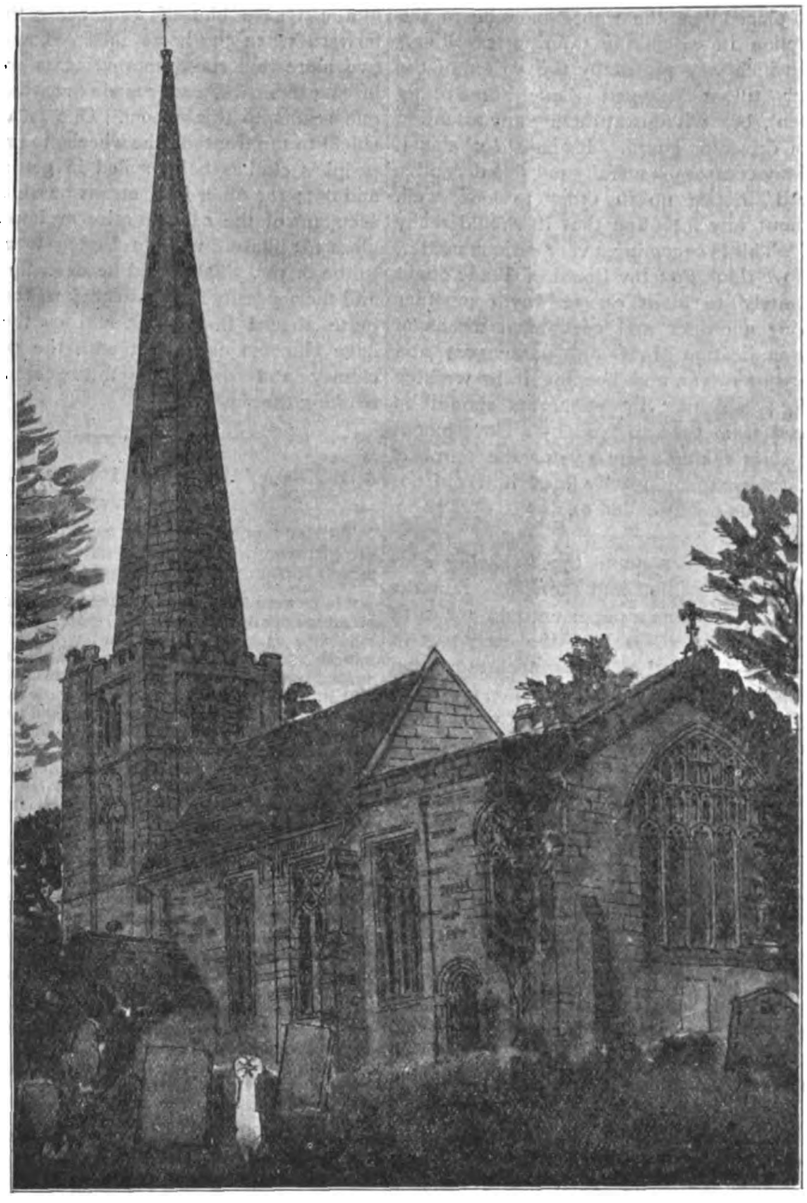

Fig. 1.—Breadsall Church. (Sketched by F. Tarney.)

church generally. At the east end of the north aisle is a "squint," from the aisle to the chancel, above which is another opening in the wall, with steps, which gave access to a rood screen, the remains of which are said to be stowed away in the tower. The lancet window on the north side of the chancel has a curious corbel feature to the inner arch. The three three-light square-headed windows on the south side have a good effect, and are very similar to the work at Tideswell and Lichfield Cathedral. They are possibly all by the same hand, and are insertions of the Decorated period. The east window is Perpendicular, and of five lights. The label termination is a moulded corbel, also found in the two-light south chancel window and in the nave clearstory at the neighbouring church at Morley. The chancel arch is modern, and of a poor type. The fine sedilia of three bays on the south side were discovered during some alterations, having been covered by plaster and whitewash for years. They have been cleaned, and are in a well-preserved state. The church has a font of the Decorated period, and some ancient bench-ends of oak.

Facing the north side of the church, on the opposite side of the road is a picturesque old building, formerly the old Hall, but now used as the village post-office (fig. 2). Standing in a sort of paddock, with its old garden in front, it makes a very delightful group with the church and surrounding trees. It appears to have been restored, and the doorway removed from the side to the end gable; probably, also, the roof was originally of thatch. The good, old-fashioned English inn was here conspicuous by its absence, and we were compelled to forage amongst the cottages for our lunch. We fared little better at the neighbouring village of Morley, where the modest inn formed a marked contrast to, say, the Peacock at Rowsley, or the Green Man, of Boswell fame, at Ashbourne. However, our visit to the charming little church fully compensated us. Here the vicar's interest is apparent in the visitors' book, an interesting volume containing signatures of visitors from all parts of the world, and also in the printed cards placed about, which give a synopsis of the history of the fabric. The surroundings of the church add greatly to its charm; the trees, roses, and masses of honeysuckle being very profuse, whilst the general picturesqueness was further added to by two peacocks, which were strutting about upon the leads of the aisle. The church probably consisted originally of the present nave, with an apsidal chancel. In the opinion of some the nave arches (Norman) were pierced through and support Saxon walls. The tower and spire and chancel are Decorated work, and were built by Goditha Stathum. The church is rich

Fig. 2.—The Post-Office, Breadsall. (Sketched by F. Tarney.)

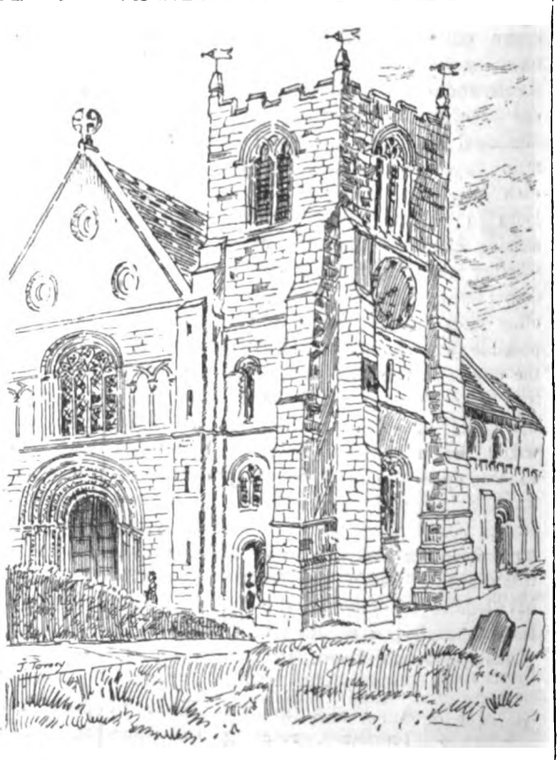

Fig. 3.—Tutbury Church.

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in monuments and brasses and old glass. There are nine brasses to the Stathum family, and from one of these it is interesting to find the date of the north aisle recorded as built by Ralph de Stathum (*temp.* Henry II.). In 1539 the windows of the refectory of the Abbey of Dale were purchased by Frances Pole, and inserted in the north aisle, which was at the same time enlarged; the nave clearstory windows were also added at this time. The aisle windows consist of a continuous row of four four-light windows divided by wide mullions and small buttresses on the outside. Two of these windows contain some very fine old glass, depicting the stories of "St. Robert of Knaresboro' and the Deer" and "The Story of the Holy Cross." In the lower portion are the arms of Dale, and the Pole, Bateman, and Sitwell families. The remaining lights are filled with modern glass following the old in style.

There is also some ancient glass in the south aisle and east end of the north aisle. In the north chapel is a stone effigy to Mrs. Babington, grandmother to Anthony Babington, executed in Elizabeth's reign, 1586. The floor of this chapel is paved with old tiles from Dale, many being of good design. There are no less than four piscinas in various parts of the church, the Decorated one in the north aisle grouping curiously with the squint which is cut through the respond into the chancel. Time did not permit of our sketching the Perpendicular arched tomb on the south side of the chancel, but we noted the chancel door, which is the smallest we have seen, being but 5 ft. 8 in. to the apex and less than 2 ft. wide—some clergy we wot of would find it rather inconvenient.

The porch door is said to have been brought from Dale Abbey, which seems to have suffered at the hands of the spoiler. Dr. Cox is of the opinion that the arch is of earlier date than the jamb, which is decorated—an opinion we shared.

Little remains of Dale Abbey except the arch of the great east window, 16 ft. wide and 40 ft. high, which was repaired some years ago out of the rates; the reason for this was the statement that the inhabitants would be exempt from the payment of tithes so long as the arch existed. The plan may be clearly traced by the remains. The style appears to have been Early Decorated throughout. There is a museum which contains some good specimens of tiles, which appear to have been made here in abundance. The church close by, principally Perpendicular in character, is of little interest.

Repton, of public school renown, situated between Derby and Burton, was the ancient capital of the kingdom of Mercia. The Black Priory was founded here in 1172 by Matilda, wife of Earl Randulph, on the site of a nunnery built before 663. There are numerous remains existing, mostly of the Decorated period, some being preserved in the buildings of the grammar school—founded in 1556 by Sir John Port—the main buildings of which were erected in 1886 from designs by Sir A. Blomfield. At the suppression of monasteries the Priory was sold to Thomas Thacker, whose son destroyed the whole of the structure except the porter's lodge, which had been converted into the family mansion. This was pulled down in the reign of William and Mary, and the hall, wherein much of the old work was incorporated, was erected on its site. The parish church, dedicated to St. Wystan, has many noteworthy features, especially the small chancel, with its peculiar crypt or under-chancel of Saxon work. This is 17 ft. square, and appears to have had its vaulted roof and shafts inserted in Norman times. The church has a beautiful and delicate spire of Early Perpendicular work. The walls were raised slightly during the Early Decorated period, when the present four-light windows were inserted, the old portions of the nave arcade being of this date. There are a number of monuments to the Thacker family, and over the porch a parvise, in which is preserved an old parish chest.

A few miles east of Repton is Melbourne, where we find the church to be like a miniature Durham, and one of the finest Norman churches in the country. Dedicated to St. Michael, it is a cruciform structure, consisting of a chancel, central tower, north and south transepts, nave with aisles, and western portico flanked by two small towers. With the exception of the upper part of the tower and the eastern half of the chancel, the whole church is, in the main, of Norman work, *circa* 1120. The nave is separated from each aisle by five stilted arches 20 ft. high, resting on circular pillars 4 ft. in diameter on square bases.

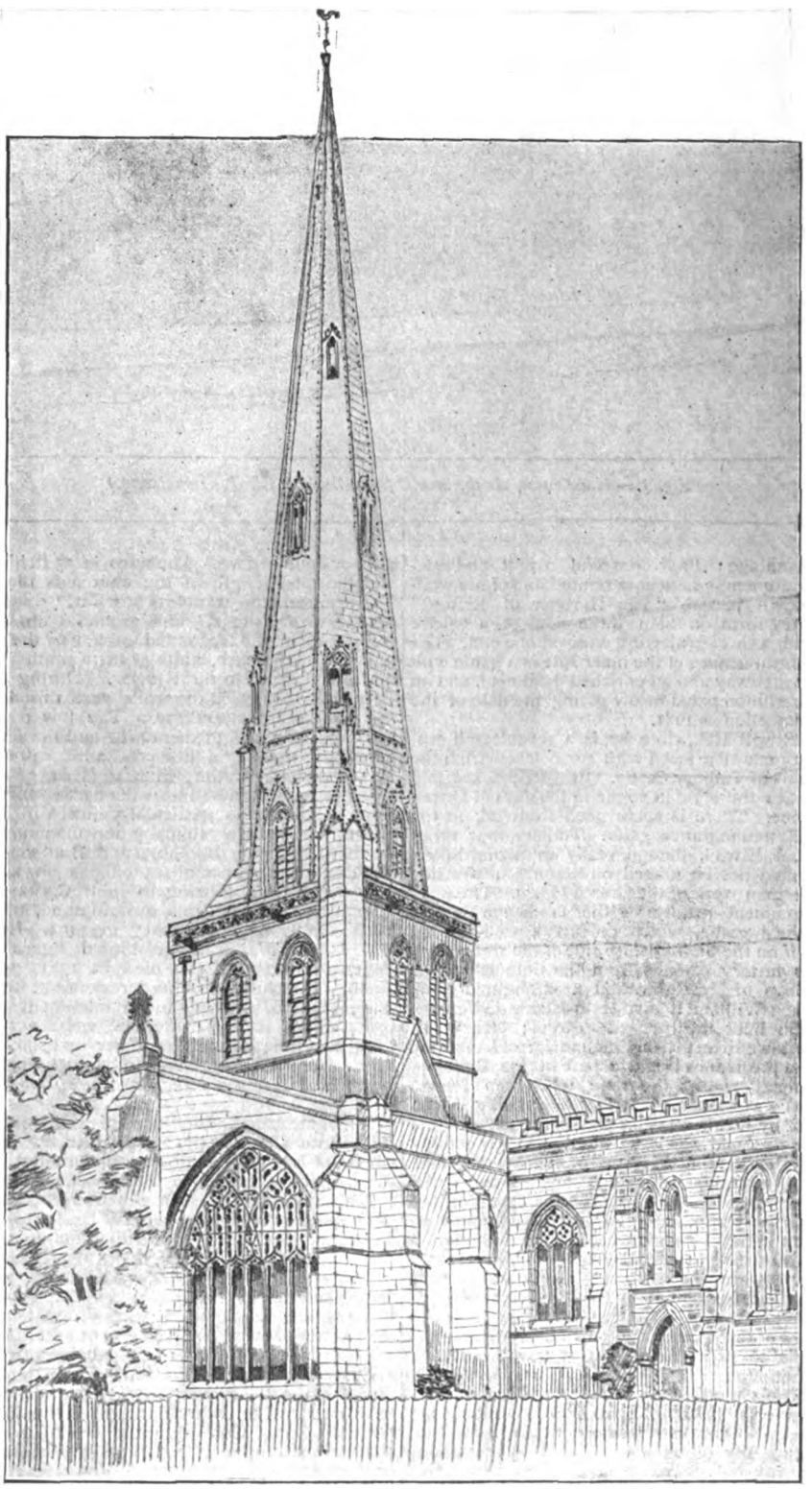

Fig. 4—Ashbourne Church. (Sketched by W. T. Armstrong)

Both transepts and the chancel once had eastern apses. There is evidence to show that over the groining of the chancel apse was an upper chamber, which it is conjectured may have been the separate chapel of a religious community, who may have had access to it through a doorway (still apparent) at the eastern end of the south wall of the south aisle, by the stairs in the south transept, and by the arcaded passages or triforium in the transept and in the south and eastern sides of the central tower. The upper portion of this tower is of later but uncertain date. There is a fine doorway at the west end of the church. The church was restored in 1862 by Sir G. Scott, at which time the small western towers received their present slated pyramidal roofs. Close by the church is a lake, twenty acres in extent, known as the Great Pool. On the opposite bank is a charming wood, from which you get a very picturesque grouping of the church and village, looking across the lake. Near this is the Hall, formerly the seat of Lord Melbourne, Prime Minister at the time of the Queen's accession. This was the Rectory at the time when the Bishops of Carlisle possessed the "living," and is additionally noteworthy as the place where Baxter wrote his "Saints' Rest." The gardens, which are trimly kept, are laid out in the Dutch style, and have a terrace of yew trees about eighty yards long.

At Etwall (on the Ashbourne line) we find a church which has some features of interest, notably the Gospel shelf on the north side of the chancel; the founder of Repton School is also buried here. Adjoining the church is a quaint group of almshouses whose mellowed brick and tile form a fit subject for the artist, and one which Walker could have utilised to

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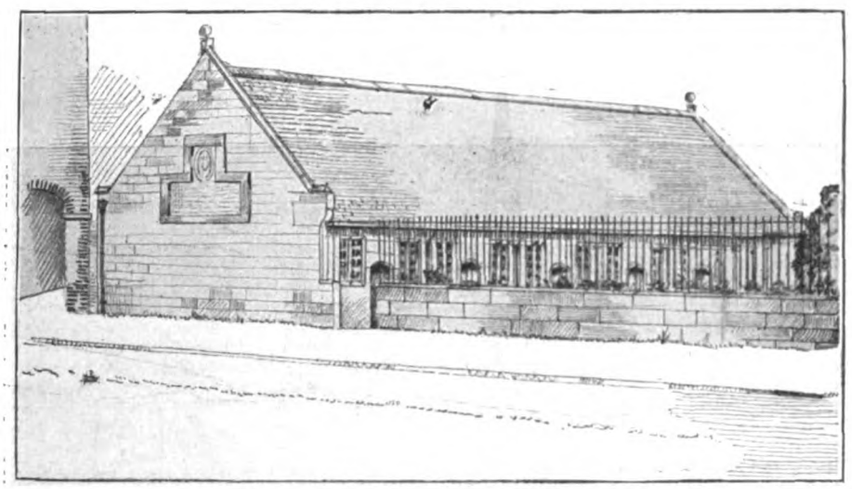

Fig. 5.—Almshouses, Ashbourne. (Sketched by W. T. Armstrong.)

advantage; their peaceful aspect and picturesqueness somehow remind one of his well-known picture "The Harbour of Refuge." They form on plan three sides of a square with a short projecting wing at one end. The central feature of the inner side is a gable with an archway and an enriched pediment, and an inscription panel below giving the date of the foundation as 1681.

Etwall Hall, close by, is a seventeenth-century mansion faced with stone taken from the ruins of Tutbury Castle. Its gardens are laid out in the style in vogue in the days of Queen Anne. There is some good ironwork in the rails and entrance gates. Tutbury, four miles from Etwall, though really in Staffordshire, should not be missed on account of the fine Norman work of the church (fig. 3). The most prominent feature of the landscape is the ruined castle, which crowns a well-wooded cliff on the Staffordshire side of the river Dove. Its history extends from the time when the Kings of Mercia erected a stronghold here. Then William I. gave it to Henry de Ferrars, who built the present fortress; Henry III. bestowed it on his son Edmund Earl of Lancaster, and the manor is still a part of the Duchy of Lancaster. At the time when the second earl was crossing the river after being driven out by Edward II., his war chest slipped into the river and was lost. Strange to say nothing was ever seen or heard of it from that time until 1831, when it was discovered during the deepening of the river's bed. Some of the coins, silver ones of the period, may now be seen in the British Museum. The chief portion now existing (it was dismantled by the Roundheads) are the gateway and part of the northern front built by John of Gaunt, wherein Mary Queen of Scots was imprisoned, the tilt-yard of three acres, and some buildings on the opposite side. A portion is now used as a farmhouse.

The church, dedicated to the Virgin Mary, was part of the Cluniac Priory built by the founder of the castle, below which it shelters. Principally Norman in style, it possesses an exceptionally fine west door of six orders, and about 20 ft. high to soffit of arch, and additions in nearly all later styles. The embattled tower of three stages is at the west end of the south aisle.

The old world town of Ashbourne, with its memories of Cotton and Izaak Walton and Johnson, is best left for a visit of two or three days, giving time for the exploration of Dovedale, a name which is synonymous for all that is lovely in English scenery. The town seems to grow inns like mushrooms, they crop up in every nook and corner, but the unrivalled advertisement given to the Green Man by Boswell, who praised the civility of its hostess, seems to have ensured it perpetual prosperity, if one may judge by the aspect of the outdoor larder (the ceiling of the gateway to the court-yard) which is pendent with game, &c., and quite reminiscent of old coaching days.

The parish church (fig. 4), locally known as the "Pride of the Peak" and dedicated to St. Oswald, occupies the site of a Norman church, is cruciform on plan, and consists of a chancel 65 ft. by 25 ft.; north and south transepts, which are double, being divided by piers and arches, 85 ft. by 40 ft.; and nave, with a south aisle or double nave. The nave is 55 ft. high, and the total length of the church is 180 ft. The chancel and transepts are Early English of date prior to 1241. The ground plan was completed in the Decorated period by the rebuilding of the nave, adding to it a south aisle and erecting the central tower. During the Perpendicular period the walls were raised by the addition of clearstories. The tower and spire rise to a height of 212 ft., and the staircase is crowned by a little crocketted spirelet. The interior of the church is lofty and spacious, and the view across the north transept from the tower is particularly fine. In the north transept aisle are many fine monuments to the Cockayne, Boothby, and Bradbourne families, mostly recumbent effigies on altar tombs, the earliest being to John Cockayne, who died in 1372, and his son Edmund, killed at the battle of Shrewsbury in 1404. Here also is Banks's, R.A., celebrated figure of Penelope Boothby, who died in 1791, aged seven. The church has been restored at three different periods, mostly in an intelligent and conservative manner; the last work undertaken was the repair of the tower and spire in 1894. The old bells are said to be the veritable peal which inspired Moore's "Those Evening Bells."

Some measured drawings of portions of Ashbourne Church, by Mr. Walter T. Armstrong, of Lancaster, will be found among the lithograph illustrations in the present number.

Lining the main street are many respectable old houses, including the house of Dr. Johnson's friend, the Rev. Dr. Taylor, with whom he was wont to stay when wearied of his favourite "walk down Fleet-street." There are also some plain almshouses (fig. 5), and the gabled front of the old Grammar School. A lesson may here be learned on "how not to do it" by a look at a certain modern chapel opposite.

There is a very interesting church and a manor house at Norbury, five miles south of Ashbourne. The latter belonged to the Fitzherberts (Lords Norbury) from the thirteenth century until recently, but there is not much of interest, the only ancient parts remaining being the south and east sides of the inner court, the latter part comprising the great hall. The church, dedicated to St. Mary, is of Late Decorated date, with some singular details, and is specially noteworthy for the number and beauty of its old monuments and early stained glass. Of the latter Dr. Cox remarks:—"There are not six parish churches in the kingdom that have so fine and extensive a display." On plan it consists of chancel, nave, north aisle, and tower, the latter being curiously placed between two chapels on the south side of the nave. The chancel, like those at Dronfield, Tideswell, and St. Peter's, Derby, is unusually large in proportion to the rest of the building, the nave being 49 ft. 3 in. long and the chancel 46 ft. 6 in. Among the unique features of its architecture may be instanced the capping to the buttresses, the wavy outline of the parapet, and the double flower of twelve petals which forms a boss at the intersection of the tracery of the windows, both inside and out. The interior of the north and south walls below the window string is occupied by a series of cinquefoil-headed arches or arcading, one of which, in south wall, forms a piscina. The church at Longford shows remains of the original Norman church, which were added to and altered in the fourteenth century. There are also some good monuments.

The new line from Buxton to Ashbourne, recently opened, may be utilised for visiting many pretty little villages in the vicinity. Thorpe, a charmingly seated little place with its houses clustered around the old church (dating from 1150); Fenny Bentley, where are the ruins of an old castle, now a farmhouse and a church, with screen and monuments; Tissington, a quiet village, with its old trees and wells, the latter of which are famous for their never-failing supply, which has given rise to the custom of "dressing" the wells with flowers on Ascension-day (this has been done ever since the time when these wells constituted the sole supply of the district during a long and trying drought). There is an old Hall belonging to the Fitzherberts, which was garrisoned for Charles during the Civil War, and contains some old panelling and a collection of fine pictures. Like many of the old Derbyshire halls, it does not offer much detail, but it is picturesque with its mullioned windows and gateway with broad steps. We suppose no rambling sketcher ever came into Derbyshire without visiting grand old Haddon, whose beauties are so well known, that it is needless to enlarge upon them afresh. Bakewell, whose church contains many monuments to the Vernon family, may be visited at the same time, being but some two miles away, and the charming meadow walk by the banks of the Wye may be taken to Rowsley, where the best of country inns, the Peacock, offers you a welcome, and is interesting enough in itself to find a place in your sketch-book. J. T.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A HOME Counties district meeting of the members of the Association of Municipal and County Engineers was held at Tonbridge on Friday, September 14, and at Deal on the following day. The members attending the meeting assembled in the Council Chamber at Tonbridge Castle on Friday morning, where they were received and welcomed by Mr. W. Baldwin, Chairman, and members of the Urban District Council. Mr. W. Weaver, Kensington, Vice-President, presided in the absence of the President, and there were present:—Messrs. J. P. Barber, Islington; W. H. Savage, East Ham; J. C. Radford, Putney; J. P. Norrington, London; A. H. Campbell, East Ham; W. Harpur, Cardiff; A. D. Greatorex, West Bromwich; C. H. Cooper, Wimbledon; Cameron, Exeter; C. Smith, Sutton; W. Jones, Colwyn Bay; R. J. Thomas, Aylesbury; E. P. Hooley, Nottingham; W. Nisbet Blair, St. Pancras; H. Frost, Gosport; C. G. Lawson, Southgate; W. H. Leete, Bedford; O. E. Winter, Poplar; A. M. Fowler, Westminster; E. Willis, Willesden; J. Parker, Nottingham; and others.

Mr. J. R. Thomas, Aylesbury, County Surveyor of Buckingham, was re-elected Honorary District Secretary.

Mr. W. Laurence Bradley, C.E., Engineer and Surveyor to the Urban District Council, read a paper on "Municipal Work in Tonbridge." He said one of the most important and costly works undertaken by the Council was the High-street improvement, which had been carried out in pursuance of two provisional orders dated 1893 and 1895. The conversion of this wretched street as it existed previous to 1895 to its present condition had tended considerably towards the increased prosperity of the town. The street had been widened from a width in some places of only 28 ft. to an average width of 50 ft., and up to the present time a length of about 800 ft. had been completed, and the work of continuing the scheme was still in hand. As far as the road had been widened, the sum paid for the purchase of properties amounted to 25,482*l.* 2s. 11d., and a sum of 8,156*l.* 10s. 5d. had been received for the sale of surplus land, making the net cost of the improvement for the purchase of the land 17,325*l.* 12s. 6d. The old property pulled down had a rateable value of 533*l.* The new property erected to the new building line had a rateable value of 1,944*l.*, showing an increase of rateable value owing to this scheme alone of 1,411*l.*, working out at 3s. 4d. in the pound at 235*l.* 3s. 4d., which deducted from

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690*l.* 14s. 4d. representing the repayment of principal and interest left a sum of 455*l.* 11s. as the net annual loss to the town, and which was only equal to a penny rate each half-year.

The main roads up to last year had been repaired with Penlee stone, but numerous complaints having been received as to the dangerous and slippery state of the roads in the winter time, the Council had commenced a trial of Quenast granite, and although its durability was hardly equal to the Penlee stone, he was of opinion that it was less slippery. For many years past patent Victoria stone had been used for paving the footpaths in the High-street, and as the improvements were carried out new 6 in. by 12 in. Norway granite kerb and solid granite slab channelling 18 in. wide was being laid. The sewerage of the town was carried out entirely on the separate system. The road and surface water was discharged into the river Medway, and the sewage was conveyed by two outfalls and discharged into receiving tanks at the farm, which was situated about half a mile east of the town. Sewer ventilation was originally obtained by means of surface gratings, but as complaints were continually being made of the smells arising therefrom they had been abolished, and 6-in. iron shafts fixed to convenient adjacent houses had been substituted with good results. The sewage was treated by three methods—precipitation, bacteria tanks, and land treatment. The experimental bacteria bed was constructed in 1898 by utilising a portion of the old storm bed adjoining the precipitation tanks. The sewage was first roughly screened and passed rapidly through one of the precipitating tanks after a very slight admixture of alumino-ferric. The sewage was then received on to the bacteria bed, allowed to remain for two hours, emptied, and the filter left to aerate for two hours before refilling; thus three charges could be dealt with during the day and the bed left to aerate during the night, as no sewage-pumping whatever was done at the works between 5.30 p.m. and 7 a.m. The results had been very satisfactory, the effect being a better effluent than what was obtained from the land, and he had been instructed to prepare a second bed. The farm comprised 34 acres, the under portion being a stiff loam and the low-land alluvium on stiff clay. The expenditure on the farm this year was 371*l.* and the receipts 468*l.*, before making allowance for repayment of loan. A destructor scheme had been prepared, but it had been decided to leave it alone for the present. The refuse was now ridged and burnt in the open air. There was no difficulty in keeping the refuse burning all the year round, thus showing that there was a decided calorific value in it, and there was a great demand for clinker at 2s. 6d. per load. In 1897 the Council purchased Tonbridge Castle and grounds at 9,727*l.* as a Jubilee memorial. This year the Council commenced the use of the buildings as offices, Council-chamber, &c., the north-west portion of the grounds had been set aside for fire brigade station, electric-light works, depot, &c., and the remainder of the grounds were used as a public park or pleasure-ground. Tonbridge was one of the first of the smaller towns to adopt the Public Libraries Act, and at present a new free library and technical institute was in course of erection from the designs of Mr. J. H. Phillips, of Cardiff. The total cost with furnishing would be a little over 7,000*l.*

The Chairman in moving a vote of thanks to Mr. Bradley, said that a long experience of refuse collecting by the Council's own staff and by direct labour had convinced him that if the Council did the work they did it a great deal better, but that it cost more money. He could not help thinking that the system pursued of burning refuse in the open air was likely to cause complaint.

Mr. Knight, Mile End, who seconded, said that his experience of dust collection coincided with that of Mr. Weaver. There was a time when it was done in his district for 600*l.*, now it cost 4,000*l.* The quantity had largely increased and the quantity of useful dust had decreased. Some 12,000 tons a year he sifted and sent to the brickfields. That paid very well when he received 4s. 6d. a ton for it; now it was down to 2s. per ton. Forty loads a day he burnt in cells he had constructed himself on the principle of Siemens' regenerative furnace. He burnt that for 0d. per load. He started burning his refuse in the open air, as did Mr. Barber, of Islington, but they were stopped, although the nearest house was a quarter of a mile away. It was astonishing what a stench it created. As a road material he had found Guernsey one-third better than Quenast granite.

Mr. Brooks, Strood Rural, said he had no complaints respecting Penlee stone when well scavenged; if not well scavenged it became greasy.

Mr. J. Manley, Wokingham, expressed his surprise that alumino-ferric should be put in the tanks to encourage bacterial action. It seemed to him like opposing forces being set to work.

Mr. J. P. Barber, Islington, said it was always encouraging to see the work of a municipal engineer carried out in the thorough manner it was in Tonbridge. It was not the magnitude of work they wanted to see so much as character.

Mr. A. M. Fowler, Westminster, and the Chairman having spoken, the vote of thanks was accorded and acknowledged by Mr. Bradley, who briefly replied to the points raised in the discussion.

Mr. Horace Boot, Tunbridge Wells, contributed an interesting paper on "Electricity Supply for Lighting Tramways, with special reference to Small Towns." He said it might be taken as a general rule that it was much easier to supply large towns in a successful manner than small ones. At the present time a number of small towns were hesitating as to whether it would pay them to undertake the work themselves or to allow a company to commence operations. For large towns it was almost always advisable that the Local Authority should start their own undertaking both for lighting and traction purposes. The vexed question of a combination of power stations capable of supplying electric energy for tramways, motors, lighting, heating, and other industrial purposes had been discussed very frequently for the past two or three years. There was no doubt whatever that wherever it was possible there should be one power station to supply the whole area, and the policy of multiplying these power stations was incorrect from an economical as well as a practical point of view. An important point to bear in mind was the question of nuisances, as works of any magnitude could not be run without creating a certain amount of nuisance, such as smoke, vibration, and noise. There were, of course, conditions which arose in towns necessitating the adoption of more than one power house; but he was of opinion that the future would see the development of large areas in preference to little stations supplying power stations supplying large local areas. The advantages of such would be facilities for obtaining fuel, all nuisances localised to one spot, the advantage of water carriage with an adequate supply of water for condensing purposes, the small amount of labour required for one works to work successfully as compared with a number of small works, the advantage gained by having the staff in one place. The only objection that could be urged to it was the question of fire or total disablement of the works causing a complete stoppage of the supply. The employment of experts to advise was rather a vexed question, but for towns to commence operations without having the advantage of expert advice was suicidal, as a mistake made in the selection of a site would prove fatal to the undertaking. Many towns had started dust destructor works in combination with electricity works, and there was no doubt from the figures recently obtained from the various works throughout the country, a considerable saving in fuel, was effected by burning refuse; and it had been found that in the latest type of destructors, 1 lb. of refuse would evaporate 79 lb. of water at 212 deg. F. With reference to outlay on works the following gives a rough idea of the amount of capital required:—2,000 8-candle power lamps or their equivalent, 8,000*l.*; 5,000 8-candle power lamps, 12,000*l.*; 10,000 lamps, 20,000*l.*; 20,000 lamps, 35,000*l.*; 40,000 lamps, 60,000*l.*; and 100,000 lamps, 170,000*l.* At Tunbridge Wells the price charged was based on the maximum demand system. For the first hour's supply the price was 0d. For units composed over and above this, the price was 3d. The relative prices obtained at Tunbridge Wells on this system from various classes of consumers was, public-houses and hotels, 3·0d. per unit; shops, 4·8d.; private houses, 4·89d.; offices, 6d.; and churches, 0d. per unit.

On the proposition of the Chairman, seconded by Mr. A. D. Greatorex, West Bromwich, a vote of thanks was accorded to Mr. Boot for his paper.

Mr. F. W. Ruck, County Surveyor of Kent, read a paper on the "Main Roads of Kent, their Maintenance and Repair." He said the efficient upkeep of the highways, and particularly of the main roads of a county, was of the greatest importance to the whole community. This was proved by the greater amount of traffic thrown upon the roads than formerly, which before they were properly maintained was carried by the various railway systems. The County Council of Kent, after full consideration, decided upon the system of open contracts for road maintenance with private firms and highway authorities. No alteration of system was made until 1893 when several members of the Council expressed a strong feeling that a portion, if not the whole, of the main roads within the county should be maintained under the direct control system. After due consideration, it was decided in that year to adopt it in the eastern portion of the county lying beyond Canterbury and comprising 136 miles of main road, where the rural authorities had not submitted tenders to the extent to which it was hoped they would do.

This system was continued until the close of the year 1898-9, during which period it worked well, but did not show any marked advantage as compared with that of open contracts, which was then reverted to. There was in 1898 an endeavour upon the part of a section of the Council to place the maintenance and repair of the roads in the hands of the various District Councils, but under his supervision, when a Sub-Committee of the Council was appointed to take what action and obtain what information it thought necessary or desirable to enable it to report. Upon the report being presented, it was resolved to continue the contract system, which had in the past worked well. He was in favour of triennial contracts, which he has no doubt would be adopted shortly. It will be gathered that various opinions have from time to time been expressed on the question of the best system to be adopted in the county, and the systems had been thoroughly discussed, with the result that the system now obtaining had stood the test of the last ten years.

The county was originally divided into five divisions with an assistant-surveyor supplied to each, but these had now been reduced to four, with an average of about 150 miles in each, which were subdivided into fourteen sections. One of the principal features of the system was that of tendering for specified quantities of material which were clearly stated upon schedules giving the subsections upon which they would be required and the method of delivery.

The form of tender for each section was practically a schedule of prices giving the number of yards of each description of material to be delivered into depot on each sub-section, the material for footpaths, the carting from depot on to the road, and the rolling-in per cube yard, including watering and the supply of water. The whole of the manual labour, including the spreading of the material, was stated at a fixed sum for each sub-section. The specification required, in addition to the ordinary work of maintenance, that all the roads and footpaths through hamlets, villages, and towns should be swept every Saturday or at least once a week, thus securing a tidy appearance in populous districts. When any material was left in depot, the value of the labour in connexion with it that had been saved was deducted from the contract amount, and the contractor for the following year's contract was paid the usual rates for carting out and rolling, including 3d. per yard for spreading. The contractor had to provide, not a horse, but a water-cart for watering when and where required for consolidating the road surface in dry weather The road ditches were cleaned out annually, the roads sided in the autumn and spring, and the weeds, long grass, &c., brushed from the sides of the margins and wastes before seeding. Any labour needed in excess of the permanent men was paid for as an extra. The materials used were Kentish rag, surface and grit flints, Sevenoaks (Chert) stone, gravel, and Cherbourg quartzite. Cherbourg quartzite was more largely used than any other material, particularly where the traffic was heavy, or where there was an absence of local material, it being more economical to use the more durable material and thus save haulage as far as possible. The Council had from the first, very wisely rolled the whole of the

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material spread upon the roads. As the heavy repairs were completed during the five winter months, it necessitated the employment of between thirty and forty rollers at the same time. The advent of the road scarifier at a very opportune period had proved a great boon to the roadmaker. In his opinion the simplest and most handy form of the scarifier was that attached to the steam-roller. The proper use of the scarifier rendered it possible to economise the material, a much smaller quantity being required to reline the surface than under the old system. The work had hitherto been paid for by the yard superficial, which had cost about 1d. The following sums had been expended under the various heads during the last six years:—Footpaths, 11,639*l.*; improvements, 4,795*l.*; depots, 726*l.*; drains, 4,937*l.*; fences, &c., 1,071*l.*; milemarks, &c., 384*l.*; giving an average annual expenditure of 3,923*l.* It was generally known that the Kent roads cost considerably more than those in other counties, which was not surprising when all the facts were taken into consideration. In Kent there was an immense traction-engine traffic, there being no less than 122 licensed engines and 314 registered agricultural engines, all of the former being constantly upon the roads, the majority hauling heavy weights, and some employed in conveying road material into the adjoining counties. The great cost of the stone, nearly half the total quantity being procured from France, and the high rate of wages ruling throughout the county and particularly near the Metropolitan area, were also facts which should be borne in mind when considering the matter.

The Chairman moved a vote of thanks to Mr. Ruck for the paper, which he said would be of great value to County Surveyors in comparing the work in different counties as to its cost and method of execution.

Mr. Knight, Mile End, who seconded, said the paper was one which he had been looking forward to for years, in giving the cost of maintaining roads in rural districts. His experience had been exclusively Metropolitan, and the figures given had completely upset all his ideas as to cost.

Mr. Brooks, Strood Rural, said that while he found the contract system could provide the labour cheaper he found that with his own system of direct labour he was on the best side. His Council objected to the employment of good gangers, and consequently Mr. Ruck had a better system of supervision than they had with merely road foremen.

Mr. W. Blair, St. Pancras, thought the attaching of a road scarifier to a steam-roller was likely to have a serious effect on the life of the roller.

Mr. R. J. Thomas, County Surveyor of Buckingham, said that Kent had a unique system of advertising and letting the road work by public contract. There was no other county which had this system.

Mr. Leet, County Surveyor of Bedford, said his experience of a scarifier attached to a 10 ton roller was that it materially shook the engine, loosened the bolts, and upset the bearings. He would strongly advise any one purchasing a roller for scarifying purposes not to purchase one of less than 15 tons.

Mr. Carr, Lewes, said he was the first to use quartzite in Sussex, and it far exceeded his expectations. As an all-round metal he considered it the best they could get in Sussex.

Mr. Ruck, in replying, said that the Kent roads cost a lot of money, but it must be borne in mind that they had a very heavy traffic. The number of traction engines using the roads was three times greater than any adjacent counties. With reference to the attaching of the scarifier to the roller, he put the question very straight to Messrs. Aveling & Porter, and they said there was not the slightest chance of damage resulting. The cost per mile for the roads of the whole county in 1897-8 was 111*l.* They hoped they would not increase their past expenditure, though their traffic was increasing year by year. With reference to road material he considered that quartzite would give a dryer surface and last as long as Guernsey.

On the proposition of the Chairman a vote of thanks was accorded to the Tonbridge Council for the use of the council chamber for the meeting.

The afternoon was devoted to visits to the Shone ejector stations, the sewage works, Southborough Isolation Hospital, Capel Isolation Hospital, and a drive through the hop gardens. On returning to Tonbridge tea was served on the Castle lawn, and in the evening the members dined together at the Rose and Crown Hotel.

On Saturday, September 15, the members visited Deal, where they were received and welcomed at the Town Hall by the Mayor and members of the Corporation. Mr. W. Weaver, Kensington, Vice-President, presided at the business meeting.

Mr. T. C. Golder, Borough Surveyor, read a paper on "Some Municipal Works in Deal." With reference to the sewerage system, he said that at present the two outfalls, being very low, were tide-locked at high water, and consequently, when heavy rains had fallen at high tide, the low-lying parts of the town had been flooded. With a view of doing away with this flooding, Mr. Baldwin Latham was carrying out new drainage works, which would probably be completed early next year. At the completion of the new works the sewerage of the borough would still be on the combined system, and the sewage would be conveyed by a new main sewer from the old outfalls northward to a pumping station, and be lifted into the covered tidal storage reservoir, from whence it would be conveyed after screening through the new outfall into the sea. The discharge of the sewage was arranged to commence at high water, just as the sea begins to recede, when the flood tide was at its strongest in a north-easterly direction, and it was estimated that the whole of the sewage would be discharged within two hours of high water. The total cost of the works would be about 43,000*l.* The sea defence works proposed by the late Mr. E. Case, comprised two sections of groynes numbering fourteen each, the first being 400 ft. long and 200 ft. apart, the second varying from 200 ft. to 300 ft. in length and spaced 300 ft. apart. The total length of these groynes was 5,600 ft., and a length of over 4,000 lineal feet had been erected up to the present. The principle under which these groynes were employed was the building up of the shore to the natural angle of repose, which took the form of a quarter of an ellipse, the actual form of the shore after a scouring tide. The groynes were low and of slight timber, generally not more than 2 ft. above the shore at their highest point. The object of their being low and away from a sea-wall was to prevent scouring by obstruction at high water. It was claimed that since August, 1898, a total of 58,678 tons of material had been accumulated by the groynes, and that low-water mark of ordinary spring tides had receded an average distance of 50 ft.

The Chairman moved a vote of thanks to Mr. Golder for his paper. He said that if the groyne work carried out at Deal would only stand, there was not the slightest doubt that it was a very economical way of dealing with the beach difficulty, and it prevented any disfigurement of the beach.

Mr. Nicholls, Folkestone, seconded the vote of thanks, which, after remarks by Mr. Jones, Colwyn Bay; Mr. Blair, St. Pancras; Mr. Knight, Mile End; and Mr. Campbell, East Ham, was carried.

The members were entertained to luncheon by the Mayor and Corporation, and visits were made to the Case groynes, the sewerage works, which are in course of construction, and the waterworks.

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—On the 15th inst. the Sketching Club of the Architectural Association of Ireland visited, by permission of the architect, Mr. A. Young, the new Presbyterian Church at Howth, recently opened for service. The party, numbering twenty, were conducted over the church by Mr. Small, the contractor. The interior decoration is of a simple and effective character. The walls are of granite roughly dressed, the dressings being of Bath stone. The treatment of the design has the merit of novelty for county Dublin, the church, with the adjoining manse, being most picturesquely grouped as seen from the Howth road. The members next proceeded to Howth Castle, thrown open for their inspection by the Earl of Howth. Much time was spent in examining the dining-room and hall, in the latter of which are many relics of the ancient abbey. The grounds were afterwards explored, a notable feature in which is the closely-cut beech hedge, of great height, so arranged in long avenues as to give charming glimpses of the surrounding scenery.

Illustrations.

CAPITAL FROM LIEGE CATHEDRAL.

THIS capital dates probably from about the end of the fifteenth century, and is one of a pair surmounting twisted columns of marble, which now support the jubé and organ.

The capitals are of exquisite craftsmanship. They are deeply undercut, with parts in full relief. Amidst the wreathed foliage are placed curiously conceived animal forms of various kinds.

It is said locally that they were made at Cologne and came from Notre Dame aux Fonts, and that, amongst other fragments of churches demolished during the Revolution, these columns were preserved and ultimately re-used in their present positions.

H. HILLIER.

LLOYD'S REGISTRY.

THIS building is being erected in Fenchurch-street, with a frontage of 144 ft. to Lloyd's-avenue, a new street leading from Fenchurch-street to Crutched Friars, and is to accommodate the large staff of "Lloyd's Register of British and Foreign Shipping," the well-known association of shipowners, underwriters, and others who undertake the surveying and classifying of nearly the whole of the mercantile shipping throughout the world.

The accommodation includes general offices for the secretary and his staff, surveyor's, engineer's, and draughtsman's rooms, committee-room, boardroom, and luncheon-room. There is also provided an ample library and a museum.

Portland stone is being used for the whole of the frontages. The staircase and entrance hall will be lined with Devonshire marble, and some of the rooms will be panelled in English oak or African mahogany.

Messrs. Mowlem & Co. are the general contractors, and Mr. T. E. Collcutt the architect.

MEASURED DETAILS FROM ASHBOURNE CHURCH.

THESE details of this well-known Derbyshire church were measured and drawn by Mr. Walter T. Armstrong, of Lancaster, and are lent to us for publication as a part illustration of Mr. J. Tarney's paper on "A Holiday in South Derbyshire," printed on another page, in the course of which Ashbourne Church is referred to and described.

BOOKS RECEIVED.

THE ROYAL TOMBS OF THE FIRST DYNASTY. Part I. By W. Flinders Petrie. (Kegan Paul & Co., and the Egypt Exploration Fund.)

ARCHÆOLOGICAL SURVEY OF EGYPT: SEVENTH MEMOIR. Beni Hassan; Part IV. (Kegan Paul & Co., and the Egypt Exploration Fund.)

GAS, OIL, AND AIR ENGINES. By Bryan Donkin. (C. Griffin & Co.)

Correspondence.

To the Editor of THE BUILDER.

TEAK.

SIR,—In a recent book on specifications, published in England, the author, in speaking of teak, says:—"Teak from Moulmein is most suitable for joinery work, and from Johore for constructional work."

This is scarcely correct, as Johore does not produce teak; in fact, I think I am correct in saying that the only teak trees in the Malay Peninsula are a few that were planted some years ago on the hills in Perak, and these do not appear to do well.

The author does not mention the two principal ports exporting teak—Rangoon and Bangkok—both of which ship very much more than Moulmein.

From experience I should say, use Bangkok for constructional work, and Rangoon for joinery. Both are beautiful woods.

ARCHITECT.

Singapore, August 9.

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The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

II. CABLES. KELVIN'S LAW. DROP IN VOLTS. INSULATION. SYSTEMS OF DISTRIBUTION. POTENTIALS OF THE MAINS.

IN order to convey the electric power generated at the central station to the lamps or motors where it will be employed as light or power some form of conduit is necessary. Hydraulic power can be conveyed by water under high pressure in iron pipes, and mechanical power can be transmitted by an endless belt or chain. In like manner electric power can be conveyed by metal rods provided that means be adopted to prevent the electric current from escaping from them. To transmit electric power, therefore, we must provide a metal path for the current, and insulate this path so as to constrain the current to go in the required direction and pass through the necessary appliances.

Hitherto copper is the metal that has been most commonly employed as the conductor. In early telegraphic days it could not be obtained pure, and its conductivity was only about 30 per cent. of that of pure copper. Its breaking strength also was only about 50 per cent. of modern hard drawn copper. Hence there were numerous attempts made to increase its strength by having copper wires with iron cores, and to increase its conductivity by adding a silver core. Copper can now be obtained, by means of electrolytic methods, almost entirely free from any trace of alloy, and its conductivity is very little less than that of silver.

Recently, however, aluminium has become a rival to copper, and its smaller specific gravity makes it preferable for aërial conductors. Copper is 3·33 times as heavy as aluminium, and its conductivity is about one and a-half times greater. Therefore, for carrying a given current for a given loss in the wires aluminium will effect a saving of 50 per cent. in weight as compared to copper. The tensile strength of aluminium is about 87 per cent. of that of copper, but as it only has to support half the weight it has really the larger margin of safety, notwithstanding that its increased bulk makes it more exposed to wind pressure. If aluminium be only twice as dear as copper, then for electrical purposes there is little to choose between them. Copper at 90*l.* a ton or 10d. a pound is the equivalent of aluminium at 180*l.* a ton or 1s. 8d. a pound. In several large installations in America aluminium mains have been laid, and the refined metal employed stands exposure in a a damp atmosphere remarkably well, the oxide of aluminium, which forms a coating round the wire in these circumstances, being a harmless salt.

Electric lighting conductors may be either solid or stranded. In England the usual custom is to use no solid wire larger than No. 14 S.W.G. (0·080 in. in diameter) as cables consisting of thick wires are clumsy to handle. Most electricians would prefer to use a cable made up of seven strands of No. 23 wire to a cable consisting of one strand of No. 14 wire which would contain nearly the same amount of copper and carry approximately the same current. Such a cable is called a 7/23 cable. A 37/16 cable is a cable containing thirty-seven strands of No. 16 wire. It is puzzling at first to find that the number of strands in a cable is always one or other of the following numbers :—

$$1, 3, 7, 19, 37, 61, 91, \ldots\ldots 3n^2+3n+1,$$

where n is the number of layers. With the exception of the three-strand cable the diameter of any cable is $2n+1$ times that of a single wire. A little consideration will show that these numbers are determined by symmetrical reasons. If we place a shilling on a table we can place round it six other shillings all touching the original shilling and the two adjacent ones. This is the section of a seven-strand cable. Arranging twelve more shillings round these seven we find that they all fit in neatly, and we get the section of a nineteen-strand cable. To surround the nineteen we require eighteen more, and so on.

A No. 20 wire will carry sufficient current for three 16 candle-power lamps at 200 volts. Therefore, a 7/20 cable will carry enough current for twenty-one 16 candle-power lamps, and a 19/20 cable will carry the current required by fifty-seven 16 candle-power lamps. It is found that stranded conductors have a slightly greater resistance than solid conductors which can carry the same current owing to the "lay" the manufacturers give to stranded cables. A lay of twenty times the pitch diameter is that most usually adopted. If very great flexibility is required a great many very small wires are used, sometimes even as many as three hundred. In concentric mains we have two co-axial cylinders of copper insulated from one another, the inner one being usually kept at the higher voltage as it can be better insulated from the earth and is better protected mechanically. Sometimes the mains consist merely of strips of copper laid in earthenware conduits. In this case special precautions have to be taken against water collecting in them.

Owing to the high price of copper and the great quantity of it required for the mains, it is a question of great importance to decide the proper weight to use. If the mains are too small in section for the current they have to carry then a large percentage of the total energy generated will be wasted in forcing the current through them, and the cost of generating the energy expended in heating the mains will be a large item in the annual coal bill. On the other hand, if the mains are too large then the annual cost of the energy wasted will be very small, but the interest to be paid on the initial cost of the mains added to the annual sum put aside for depreciation will be large. There is a certain size of main that will make the sum of the cost of the energy wasted per annum and the interest and depreciation on the initial cost a minimum. This is obviously the most economical conductor to use. Lord Kelvin solved this problem in a paper on "The Economy of Metal Conductors of Electricity" read to the British Association in 1881. He showed that the most economical conductor is that for which the interest and depreciation on the prime cost equals the annual cost of the energy wasted.

In practice the Kelvin law is complicated by the Board of Trade rule fixing the greatest permissible loss of volts in the mains as 4 per cent. of the volts at the station. In this case if Kelvin's solution gives a drop of ten volts, then the most economical system is the one giving the lowest permissible drop, *i.e.*, four volts.

The following example illustrates Kelvin's law. Suppose that the weight of copper in a "feeder" main in a power transmission scheme is ten tons, and suppose that 2,120,000 B.T. units are expended in it per annum, then, to find out whether the most economical amount of copper has been used in the main, we must know the price of copper per ton, the amount to be allowed for interest on the money expended and the amount necessary to save in order to allow for the depreciation of the main. In addition, we must know the cost of generating a B.T. unit at the power station. Let copper cost 80*l.* a ton, interest and depreciation together be 10 per cent., and the price of generating a unit be a penny. In the case considered—

Interest + depreciation = 80*l.*
Cost of energy wasted = 8,833*l.*
Therefore total annual cost = 8,913*l.*

If there had been x tons of copper, then—
Interest + depreciation = $8x$ pounds.
And the cost of the energy wasted

$$= \frac{21,200,000}{240x} \text{pounds.}$$

Now, by Kelvin's law, the most economical weight is got by equating these quantities, hence—

$$x^2 = \frac{21,200,000}{8 \times 240}$$

$$\therefore x = 105 \text{ tons.}$$

In this case interest + depreciation = 840*l.*,
And the cost of the energy wasted = 840*l.*
therefore the total annual cost would be only 1,680*l.* Hence by using 105 tons instead of 10 tons of copper an annual saving of 7,233*l.* would be effected. If we use more than 105 tons then the interest and depreciation item increases rapidly, and the total annual cost is more than 1,680*l.*

To calculate the loss in the electric pressure due to the resistance of the mains is simple. For example, suppose we have two conductors—one for the outgoing and the other for the return current—and suppose that they supply current to 800 lamps rated as 100 volt, 60 watt lamps, and that they are each 220 yards long and have a resistance of 0·0001 ohm per yard. The current each lamp takes is 0·6 of an ampere, and therefore the current in the mains is 480 amperes. The combined resistance of the mains is 0·044 of an ohm, and hence by Ohm's law the "drop in volts" is $480 \times 0{\cdot}044$, *i.e.*, 42·24 volts.

A useful fact to remember is that the resistance of a copper main one square inch in section and one mile long is 0·0455 ohm at 80 deg. Fahr. As an example we will find the "drop in volts" along a main 0·3 square inch in section and $2\frac{1}{8}$ miles long which carries 200 amperes. The resistance of this main is

$0{\cdot}0455 \times \frac{2\frac{1}{8}}{0{\cdot}3}$, *i.e.*, 0·334, and hence the drop in volts = $0{\cdot}334 \times 200 = 66{\cdot}8$.

In order to prevent the current taking a short cut back to the generating apparatus before it goes through the receiving apparatus we must insulate the mains. If we are using high pressures it is also necessary to insulate the mains so as to prevent the possibility of an accidental shock. With very high pressures also we must insulate in order to prevent a disruptive discharge taking place. For example, if two bare wires at a pressure of 10,000 volts be brought within one millimetre of one another, then an arc will start between the two. Cables are insulated either by a material like india-rubber, which does not absorb moisture readily, or by a fibrous material protected by a water-tight envelope.

Sir William Preece gives the following table of the relative insulating powers of various materials :—

Air	Infinite.
Paraffin	38
Ebonite	28
Glass	20
India-rubber	10·9
Shellac	9
Gutta-percha	0·45
Mica	0·084
Ordinary paper	0·005
Siemens' high insulation rubber	16·17
Fowler-Waring dielectric	7·33

The numbers after the various substances give the resistance in megohms of a cube of the substance whose edge equals in length a quarter of the circumference of the earth. It is necessary to take this enormous cube in order to get small numbers. Sir William Preece calls this resistance the "specific insulation" of the material and denotes it by σ. In this country the insulation resistance of the dielectric round the main is given in megohms per statute mile. In order to find the specific insulation of the dielectric the following formula is used :—

$$\sigma \log \frac{r_1}{r_2} = R \times 4{\cdot}39 \times 10^{-4}$$

where R is the resistance in megohms of a mile of the main, and r_1 and r_2 the outer and inner radii of the insulating covering.

We find from a maker's catalogue that the insulation resistance of a mile of cable is 1,000 megohms, and the radius of the copper is 0·4 in., and of the insulating covering 0·97 in. Applying the above formula, we find that σ is 1·14. The above formula also applies to concentric mains. For example, the insulation resistance between the outer and inner conductor of a Ferranti concentric main is 720 megohms per mile. The outer radius of the inner conductor is 0·406 in., and the inner radius of the outer conductor is 0·922 in. Substituting in the formula we find that σ is 0·8876. The insulating material consists of compressed brown paper and black wax, which has therefore double the insulating power of gutta-percha.

In order to test the insulation resistance of a coil of cable it is placed in a tub of water, and the flow of current through the dielectric when the copper is kept at a high potential is measured by a sensitive mirror galvanometer. This flow, however, is not constant, but varies with the time. As a rule, the longer the pressure has been applied the less the flow. For this reason it is a recognised convention that the resistance to flow is to be measured one minute after the electric pressure has been applied. The resistance also varies with the pressure applied. The apparent resistance is better the higher the pressure. For example, the resistance of a cable after one minute's electrification in a tub containing water at 60 deg. Fahr. was 104 megohms when the testing pressure was 15 volts, but it was 174 megohms when the pressure was 600 volts. If the pressure that the cable will have to withstand in practice be V volts, then it is

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customary to use 1·5 V volts as the testing pressure.

The methods of distributing electric energy from central stations may be divided into four groups :—

1. Distribution by continuous currents.
2. Distribution by alternating currents.
3. Distribution by polyphase currents.
4. Distribution by a combination of alternating and direct currents.

The simplest method of distributing by continuous currents is to use only two wires for the mains, and to keep the electric pressure between these two wires constant by means of a dynamo, whatever the number of lamps connected between them may be. Since power is the product of current and pressure, it is obvious that the higher the pressure the less the current, and, therefore, the smaller the mains required to distribute a given amount of power. If we double the pressure we halve the current, and therefore halve the amount of copper required. For this reason using high pressure diminishes the first cost.

As a rule in a two-wire system the mains, the dynamo, and the lamp circuits are all insulated from earth. The potential between the mains and earth is therefore determined by the insulation resistance of each main. If the difference of pressure between the mains be 200 volts, then if the positive main be connected to earth directly so that its insulation resistance is zero the potential of the positive main will be zero, and of the negative main −200. In this case we should get a severe shock if we touched the negative main, and a gas or water-pipe at the same time. If we earthed the negative main then the potentials would be +200 and 0 respectively. In this case the positive main would give a shock. If neither is earthed then the one with the highest insulation will have the highest numerical potential.

If f_1 and f_2 be the insulation resistances of the positive and negative mains and if x and $x-V$ be their potentials so that V is the difference of potential between them, then since the current leaking from one main to earth must equal the current flowing from the earth to the other main, we have by Ohm's law.

$$\frac{x}{f_1} = \frac{V-x}{f_2}$$

$$\therefore \quad \frac{x}{f_1} + \frac{x-V}{f_2} = 0 \ldots\ldots\ldots\ldots (1)$$

This determines x the potential of the positive main, and the potential of the other will be $x-V$. Now, it follows by a well-known theorem in mathematics, that (1) is the condition that $\frac{x^2}{f_1} + \frac{(x-V)^2}{f_2}$ should have its minimum value. Hence, if the insulation resistances of the mains vary, the pressures of the mains from earth so adjust themselves, that the energy expended in leakage currents is a minimum.

An easy graphical construction follows from this which enables us to find readily the pressures of the mains from earth.

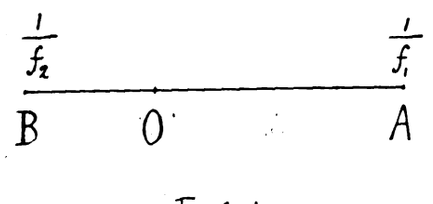

Fig 1

Find the centre of gravity O of masses $\frac{1}{f_1}$ and $\frac{1}{f_2}$ placed at a distance V apart (A B in figure), then O A is the potential of the positive main, and O B is the potential of the negative main.

In a three-wire direct current system we have two dynamos connected in series. The middle main is connected to their common terminal, and the outer mains to their other terminals. If each dynamo is giving 200 volts, then the pressure between either of the outer mains and the middle one is 200 volts and the pressure between the outers is 400. It is easy to see that if lamps be connected between the outers and the middle main, then the current in the middle main is only the difference between the currents in the two outers. If the loads on each side of the middle main be equal then there is no current in it, and we are virtually supplying at 400 volts, the lamps being in series with one another. In practice, the loads are so arranged that they are fairly well balanced on each side of the middle wire, and so it does not need to contain as much copper as either of the outers. A considerable saving in the initial expense of the mains can thus be secured by using a three-wire system.

In a five-wire direct current system we have four dynamos in series and five mains. In this country Manchester is the only town that uses this system, but it is a favourite one abroad. As the Board of Trade rules fix the pressures between the outers at 500 volts, and as 250-volt lamps can now be had, it seems probable that a three-wire system will always be the most economical. If we used a five-wire system, the pressure between adjacent mains would not exceed 125 volts.

It is important in five-wire systems to be able to see how the pressures of the mains from earth vary with their insulation resistances. An extension of the rule given above can be applied to this case. Place masses f_1, f_2, f_3, f_4, and f_5 at five equidistant points A B C D E. Find O the centre of gravity of these masses. Then O A, O B, O C, &c., will be the potentials of the mains if A B = B C = &c., represent the voltage between them. For example, let $f_1 = 100$ ohms, $f_2 = 50$, $f_3 = 100$, $f_4 = 12$, and $f_5 = 60$, and let 110 be the pressure between adjacent mains.

Let x be the potential of the positive outer which is represented by O A in figure 2.

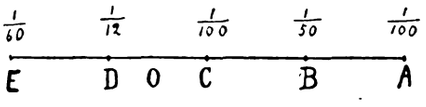

Fig 2

Taking moments about A, we have

$$\left(\frac{1}{100}+\frac{1}{50}+\frac{1}{100}+\frac{1}{12}+\frac{1}{60}\right)x = \frac{110}{50}+\frac{220}{100}+\frac{330}{12}+\frac{440}{60}$$

$$\therefore x = 280$$

Hence the potentials of the mains are +280, +170, +60 - 50 and −160 respectively.

The second method of distributing electric energy is by alternating currents. The current is transformed up to a high pressure by means of transformers and transmitted to sub-stations where the pressure is reduced by transformers which feed two or three-wire networks in the immediate neighbourhood. Distribution by polyphase currents is effected in a similar manner. A good example of the fourth method of distribution, that is, by a combination of direct and alternating, is afforded by the operation of the electric tramways at Buffalo. The motors in the cars get direct current at 500 volts from the trolley wire. The trolley wire gets its current from a rotary converter, which converts two-phase alternating. The two-phase alternating comes from a two to three-phase transformer, the pressure on the three-phase side being 11,000 volts. Following the three-phase mains to Niagara, we come across another three-phase to two-phase transformer before we finally arrive at the dynamos in the power house at the Falls. This is, of course, an extreme case of a combined system. At Croydon there is an interesting example of how the storage properties of accumulators can be utilised at an alternating current station. A synchronous alternating current motor drives a dynamo during the evening, which charges a battery of accumulators. From midnight and during the time of light load the reverse action takes place, the accumulators driving the dynamo as a motor, and the synchronous motor acting as an ordinary alternating current dynamo supplying the light load. Hence the necessity of keeping an engine running on a light, and therefore uneconomical, load during the greater part of the day and night is avoided.

FREE LIBRARY AND TECHNICAL SCHOOL, COLNE.—On the 10th inst. the ceremony of laying the memorial-stone of the new public library, assembly hall, and technical school for the borough of Colne took place. The building, with its appointments, is expected to cost about 10,000*l*. The engineers for the works are Messrs. Saunders & Taylor, of Manchester. The architects are Messrs. Woodhouse & Willoughby, of the same city.

OBITUARY.

MR. J. WOODLEY.—We have to record the death, on the 15th inst., at Stratford (London), of Mr. J. Woodley, clerk of works, in his eightieth year. Mr. Woodley was for nearly thirty years in the service of the late Mr. E. C. Robins, during which time he superintended works of some magnitude, including Congregational colleges at Milton, Norwood, Caterham, &c. Previous to this he was general foreman in the firms of the late George Myers, John Kirk, and J. T. Chapel. He took an active part in the formation of the Clerk of Works' Association, and was considered by its members an authority upon brickwork. Owing to failing health he had to retire from his duties six years ago.

GENERAL BUILDING NEWS.

NEW CHURCH, WESTON-SUPER-MARE.—A new Wesleyan church was opened on Thursday, September 13, at Weston-super-Mare. There is accommodation on ground and gallery floors for about 900 persons. The style of architecture is Decorated Gothic, with tracery windows of Bath stone filled with leaded lights. At the north-west corner is placed a tower, with spire rising to a height of 120 ft. The building consists of nave, transepts, chancel, minister's vestry, and organ chamber on the ground floor, and a gallery on three sides of the church. The interior woodwork of pews, gallery, and roof, which is waggon-headed, is pitch-pine varnished. The total cost of the building was about 5,000*l*. The architect is Mr. W. J. Morley, of Bradford, and the whole of the building works have been carried out by Mr. W. Gibson, of Exeter. The heating has been done by Messrs. Weech & Sons, of Bristol, and the stained glass by Mr. W. Lazenby, of Bradford.

WESLEYAN CHURCH, CROYDON.—A new Wesleyan church in the London-road, Croydon, was opened recently. The building will accommodate 1,000 persons. Messrs. Gordon, Lowther, & Gunton were the architects, and Mr. E. J. Saunders, of Croydon, was the builder.

UNITED METHODIST CHURCH, REDDITCH.—A church and Sunday school for the United Methodists have just been erected in Mount Pleasant, Redditch, at a cost of 2,700*l*. The church is of red brick with Bath stone dressings, and accommodates 500 persons. The building is lit by electricity. Mr. H. R. Lloyd, of Birmingham, was the architect, and Messrs. C. G. Huins & Sons, of Redditch, the contractors.

PRESBYTERIAN CHURCH, REDLAND, BRISTOL.—A Presbyterian church is to be erected on a site adjoining Cranbrook-road, Redland. The building will be of red Pennant stone with Bath stone dressings. Messrs. P. Munro & Son, of Bristol, are the architects.

PRIMITIVE METHODIST CHAPEL, KEMBLE, WILTSHIRE.—Memorial stones were laid recently of a Primitive Methodist chapel at Kemble, near Cirencester. Mr. Raymond Compton, of Ewen, is the builder, and Messrs. G. F. & E. Newcombe, of Cirencester, are the architects.

FREE CHURCH, BANK, AYRSHIRE.—A Free church has been built at Bank from plans by Mr. Hunter, of Ayr.

WESLEYAN CHURCH, NORTH BIDDICK, GATESHEAD.—A new Wesleyan Methodist Church at North Biddick, Gateshead, was opened on the 15th inst. It provides seating accommodation for 280 persons, is a brick-built structure in the Early English style, faced with Blyths red bricks, and having stone dressings throughout. At the north-west corner there is an octagonal tower with a turret on the top, covered with green Westmoreland slates. The interior shows an open timbered roof, with substantial principal trusses, and purlins of pitchpine, the ceiling being plastered in panels between. The floor is constructed with a fall of 18 in. towards the rostrum; and seating of framed pitch-pine is arranged on each side of a central aisle. At the rear of the church there is a schoolroom, to accommodate about 200 persons, as well as a vestry and conveniences. The total cost of the buildings amounts to about 2,000*l*. The contract has been carried out by Mr. Thos. Robinson, builder, Washington, from designs by Messrs. J. G. & R. G. Cowe, architects, Chester-le-street.

SANATORIUM FOR CONSUMPTIVES, DUNDEE.—A sanatorium for consumptives is to be erected on a site on Greenford Muir, at the foot of Auchterhouse Hill, Dundee. The plans have been prepared by Mr. William Alexander, Dundee's City Architect. The cost will be about 15,000*l*.

REBUILDING PUBLIC HALL, EAST GRINSTEAD.—The old public hall, East Grinstead, has been purchased for business premises, and altered and partially rebuilt, with a new frontage, for that purpose. Local red bricks have been used for facings, and Crowborough and Hackenden stone for dressings, cornice, &c. The external woodwork is of oak. The paving to the entrance is in two shades of green Irish marble. The whole of the ground-floor area is used for setting out furniture in suites, storage being provided in the basement. The galleries forming the first floor are also used for furniture. The walls are panelled up to the gallery ceiling, and painted above; the ceiling is formed with asbestos canvas in panels, woodwork and

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ceilings are painted white, and walls a very light green. A feature in the front is the sign, designed and made in the studio of Messrs. Ramsden & Carr, of London; the signboard is of dark oxydised beaten brass on a frame of wrought iron, the letters being of aluminium; with four panels of enamel work varying in tone from green to silver blue. The supporting bracket and ornaments are in dark solid hammered brass. The gates at the entrance and the lettering over the shop front were carried out by the same firm. Mr. John Laxford, of Forest-row, was the builder, and Mr. Stainton (London) carried out the heating arrangements. The architect is Mr. F. Turner Powell, of London.

EXTENSION OF ABERDEEN ART GALLERY.—In order to give room for the Kepplestone Art Collection presented to the institution by the late Mr. A. Macdonald, granite merchant, Aberdeen, the Art Gallery, Schoolhill, is to be extended westwards so as to permit of the whole collection being placed in the enlarged upper west gallery. Mr. A. Marshall Mackenzie, Aberdeen, has been appointed architect. There will be an arched gateway under the extended gallery, and the total cost will be 2,000*l.*

VILLAGE HALL, KNIGHTON.—A new village hall has recently been opened at this place. It is built of brick with stone dressings, is about 50 ft. by 26 ft., and will seat 250 persons. At one end is a raised stage, on the sides of which are a kitchen and a committee-room, both being easy of access from the stage or main hall, and in cases of emergency both rooms can be utilised for extra exits. The hall is heated by means of a hot-water apparatus, with four radiators. The architect is Mr. G. A. Craig, of Market Drayton, and the builder Mr. Joseph Ellams, of Silverdale. The furniture of the hall and stage fittings were made and fixed by Messrs. Geo. Fleet & Sons, of Stoke-on-Trent.

NEW MISSION HALL, BINGLEY, YORKS.—On Saturday, the 8th inst., a new mission-room was opened in the Dubb, Bingley. The building is of stone, and is intended to furnish accommodation for about 200 persons. The architect is Mr. H. Foulds, of Bingley.

PRIMITIVE METHODIST CHURCH AND SCHOOLS, HARROGATE.—This church, which was opened on Tuesday, September 18, consists of nave, transepts, and organ recess, with vestries attached, and is built in the Decorated style of Gothic architecture, with a tower and spire at the corner, rising to a height of 100 ft. Accommodation is provided on the ground floor and end gallery for about 550 persons. The roof is an open one of pitch-pine. The pews and other woodwork are of pitch-pine. Adjoining the church is a schoolroom, 47 ft. by 29 ft., with an end gallery, a lecture-room, 20 ft. by 20 ft., and seven classrooms. A caretaker's house is also attached to the buildings. The architect is Mr. W. J. Morley, of Harrogate and Bradford. The various contractors are:—Mason, Mr. H. Abbott; joiner, Mr. J. W. Rudd; plasterer, Mr. T. Laycock; slater, Mr. J. S. Shepherd—all of Harrogate; plumber, Mr. J. Lindley, Leeds; painters, Messrs. Varley & Roebuck, of Thornton. The leaded lights have been executed by Mr. W. Lazenby, of Bradford, and the heating has been carried out by Messrs. England, Robinson, & Co., of Harrogate.

TECHNICAL SCHOOL, BLAYDON, DURHAM.—A technical school in Shibdon-road, Blaydon, was opened on the 12th inst. The building is of red bricks with stone dressings, and has three stories. The original plans were drawn by the late Mr. T. Nicholson, and Mr. E. Bowman, but the work has been completed by the latter gentleman, Messrs. Davidson & Bolem, of Blaydon and Birtley, having been the contractors. The ground floor has been fitted out as offices for the use of the Urban District Council. The cost has been about 4,000*l.*

HOME FOR IMBECILE CHILDREN, WOODILEE ASYLUM, DUMBARTONSHIRE.—On the 13th inst. the home for imbecile children at Woodilee Asylum, which has been erected by the Glasgow District Lunacy Board, was opened. The building is of freestone, and is detached from the main asylum building. It consists of three stories; the ground flat consists of store accommodation for the asylum. The first floor contains a hall and corridor, a dining hall, day rooms, play room, lavatory accommodation, and a small hospital for six patients. The second floor contains dormitories, lavatories, and nurses' rooms. There is accommodation for thirty-five children. Mr. R. A Bryden, of Glasgow, is the architect.

CHURCH INSTITUTE, &C., WEST HARTLEPOOL.—A building comprising a Sunday school, a parish hall and a church institute has been erected at West Hartlepool. Mr. J. H. Morton, of South Shields, was the architect.

NEW NAVE, CHRIST CHURCH, STONE, STAFFORDSHIRE.—On the 13th inst. the new nave of Christ Church, Stone, was dedicated. The nave was designed by Mr. C. Lynam, of Stoke-on-Trent. Mr. T. R. Yoxall, of Stoke-on-Trent, was the contractor.

ST. PAUL'S FREE CHURCH, PERTH.—This building is being erected on the site occupied by the old church, with a slight extension of frontage towards the north, and is designed in the Early Decorated style. In the front elevation, the principal feature is the end gable, with two four-light windows with cusped and panelled heads in the lower stage, and a large five-light window with rich traceried head and deeply moulded jambs lighting the gallery. The gable flanks are enriched with panelling, and the apex has an arcading of cusped panels with a central niche, over which a floriated cross forms the terminal feature. To the left of the main gable is a projecting stone porch, with wide moulded archway forming the principal entrance, and to the right another doorway serves as exit from the gallery. The ladies'-room and session-room form a two-story block to the left of the main entrance. The side elevations are simply treated with two tiers of triplet windows, the upper ones having trefoil cusped heads under an arch. Internally the church is divided into nave and side aisles by moulded columns and arches of wide span. The nave ceiling is semi-octagonal in form, divided into bays by arched timber ribs. Over the side aisles the main couples are also shown and filled with ornamental timber cusping. The church is planned with side and end galleries, but the side galleries are narrow, and recessed at the columns, which are thus shown unbroken from the floor to the ceiling arches. The total number of sittings provided will be 800, and the estimated cost is within 4,000*l.* The architect is Mr. John B. Wilson, of Glasgow, and the works are being carried out by the following contractors:—Mason, Mr. A. Beveridge; wright, Mr. William M'Quibban; slater, Mr. D. M'Lauchlan; plumber, Mr. James M'Leish; plasterer, Mr. John Peebles; glazier, Mr. C. Alexander—all of Perth. Mr. Thomas L. Kay is clerk of works.

BUSINESS PREMISES, NEWTON, N.B.—New stores buildings, erected by the Newton Co-operative Society, Limited, were opened on the 8th inst. The buildings consist of two stories, the lower being intended for shops and the upper for dwelling purposes. The cost is estimated at 2,500*l.* Messrs. Wright & Adam are the builders, and the architect is Mr. W. Ferguson of Glasgow and Cambuslang.

MUNICIPAL DEPÔT, CAMBERWELL.—The foundation-stone was laid recently of a municipal depôt for Camberwell, at Grove-vale, East Dulwich. The site is on the north side of Grove-vale, and is about 1¾ acres in extent. The buildings are being erected in blocks. One block will contain stabling for eighty-eight horses, with a veterinary surgeon's room. Other blocks will contain the smith's, farrier's, and wheelwright's shops, while there will be sheds for some eighty-four carts. There will be a steam-roller shed and a yard for storing materials. On the south side of the site a committee-room and general offices are to be erected. The building is being erected of stock bricks with blue Staffordshire brick plinths, but some cottages, which will be erected at the main entrance to accommodate the superintendent and horse-keepers, will be faced with red Fareham bricks, with stone dressings. The plans were prepared by Mr. W. Oxtoby, the Surveyor to the Vestry. Mr. H. L. Holloway, of Deptford, is the contractor, and the estimated cost is over 28,000*l.* Mr. H. Castle is the clerk of works.

MISSION CHURCH, GUARDBRIDGE, FIFE.—A church for the Scottish Episcopal Mission is to be erected in Guardbridge. Mr. C. F. Anderson, St. Andrews, is the architect, and the contractors for the work are—mason, Mr. William Ness, St. Andrews; joiner, Mr. Andrew Thom, Strathkinness; plumber, Mr. J. M. Morris, St. Andrews; plasterer, Mr. A. R. M'Pherson, St. Andrews; and slater work, Mr. William Greig, St. Andrews.

REOPENING OF METROPOLITAN TABERNACLE, NEWINGTON BUTTS.—The Metropolitan Tabernacle was opened on the 19th inst. after reconstruction. The front portico and main walls were all that remained after the fire in 1898, and these have been worked into the new building. The chief alteration in plan is in the length of the auditorium, which has been decreased about 13 ft., the space thus obtained being added to the vestry building in the rear. The new galleries, of which there are two, are constructed on plate steel girders, and each gallery has four stone staircases. The roof is constructed of steel-framed ribs braced with steel lattice girders, and is covered with slates. The seating accommodation is less than in the old building, being for just over 2,700 persons. The building is lit by electricity and heated by hot-water radiators. Messrs. Higgs & Hill were the builders, and Messrs. Searle & Hayes the architects. The cost of re-building was about 40,000*l.*

LIBRARY, WESTON-SUPER-MARE.—With reference to our observations (p. 238 *ante*) on the erection of this building, we are requested to state that the pitch-pine and birchwood block flooring in connexion with the building was laid by Mr. Roger L. Lowe, of Farnworth, near Bolton.

SANITARY AND ENGINEERING NEWS.

DUBLIN MAIN DRAINAGE.—The foundation-stone of the new outfall works for the Dublin main drainage was laid a short time since. The scheme was originally planned so as to include the districts of Clontarf, Drumcondra, Grangegorman, and Kilmainham, which have since under the Boundaries Act been included in the city, so that no alteration was needed in the scheme owing to this new legislation. The site for the outfall works as originally planned in 1801 by Mr. G. Chatterton, M. Inst.C.E., was the Whitebank, a narrow sand-dune, lying close to the Poolbeg Wall, and about halfway between the Lighthouse and the Pigeon-house Fort. At this time the War Department was in possession of the latter, and utilised it chiefly as a depot, and in the summer as quarters for recruits. The total extent of the property acquired by the Corporation covers about sixty acres. The buildings themselves are very extensive. The largest block, lately used as the officers' quarters, was the old Pigeon-house or Pigeon-house Hotel, built in the year 1790, for the accommodation of passengers between Ireland and England. As soon as the Corporation became possessed of the property, the scheme was slightly modified to suit the present site, viz., the existing harbour of the fort. This contains about ten acres, of which some eight are to be reclaimed by a sea-wall, and two at the east end to be retained for the berthage of vessels used in connexion with the scheme. On the area reclaimed eighteen precipitation tanks are to be constructed, with various culverts, channels, and tanks in connexion therewith. Almost all the work is below the level of high water mark of ordinary spring tides, and a very large proportion of it is below low water mark of same, and consequently the operations are of no light character. Messrs. S. Pearson & Son have undertaken the contract for 94,000*l.* The walls, tanks, and other permanent works are to be constructed entirely of Portland cement concrete, and some 50,000 cubic yards of this material will be required. The iron work portion of the contract, comprising the pumping machinery, and valves of special designs, has been placed by Messrs. Pearson & Son in the hands of Messrs. Glenfield & Kennedy, who have for many years carried out similar work for the Corporation.

THEATRE ROYAL, MANCHESTER.—This theatre has recently been warmed and ventilated by the Sutcliffe Ventilating and Drying Company, on the Plenum system. In designing this warming and ventilating installation, the following points were kept in view:—1. To make use of every then existing air shaft that could in any way be adapted for the purpose. 2. To cut the building about as little as possible. 3. To create a slight Plenum or pressure inside the theatre so that the air had a tendency to pass through the crevices of doors, &c., from the inside of the building to the outside, instead of from the outside to the inside, which would have been the case if an "extracting" instead of a "Plenum" system had been adopted. 4. To leave no room for complaint by the fire insurance authorities. In regard to the first point the firm only required two additional ducts, and they run only from pit floor to pit ceiling, and then across the back wall of the circle, where they join two old ducts. The new boiler occupies the position of the old warm air furnace, and the work here has mainly been the building up and making good of old passages.

Method of Warming.—A sectional steam boiler with fire-grate, 36 in. by 24 in., is fixed in the basement behind the pit bar. This boiler works at 1-lb. to 5-lb. pressure, and will effectually heat 1,200 square feet of piping or other radiating surface. It is fitted with steam gauge, safety valve, damper, and automatic boiler feeder, and is covered with asbestos. There are two main steam pipes, one of them running under the floor at the back of the pit, whilst the other is taken down the centre of the pit to the orchestra. From these main steam arteries, branches are taken to radiators under the pit floor and to radiators in all the entrances. Each one can be disconnected in a moment from the main steam supply pipe, and one, two, or any number up to the full fourteen may be used, thus bringing the temperature under absolute control. There are no radiators, pipes, or valves in the theatre proper, with the exception of two small pipes in the orchestra, and these with their controlling valve are in charge of the conductor.

Method of Ventilating.—The ventilation is combined with the warming. That is to say, a 30-in. Sutcliffe fan driven by an electric motor forces fresh air over the radiators previously described, and this fresh air is warmed to any desired temperature before it enters the theatre. The air is drawn from Peter-street, but before it is warmed it has to pass through a filter screen of coke which effectually removes the dust and dirt. The cubical contents of the theatre are in round figures 180,000 ft., and as the fan at a moderate speed moves 10,000 cubic feet of air per minute, it moves sufficient air to change the whole of the air in the theatre every eighteen minutes. If the fan is driven at its full speed, say for summer ventilation, it will move 15,000 cubic feet of air per minute, sufficient to change the air in the theatre every twelve minutes.

WATER SUPPLY, STEETON, NEAR KEIGHLEY.—The Keighley Rural District Council have decided to apply to the Local Government Board for powers to borrow money to carry out the scheme of their Engineer, Mr. R. B. Broster, for providing a new water supply for Steeton.

WATER SUPPLY, MERTHYR.—Arrangements are being made by the Merthyr Urban District Council for the completion of a scheme of water supply from the Upper Neuad reservoir to Dowlais and Gelligaer. Mr. Deacon has been appointed engineer.

SEWAGE SCHEME, HEDDON-ON-THE-WALL.—The Castle Ward Rural District Council have approved of and accepted the scheme of sewage disposal for Heddon-on-the-Wall, prepared by Mr. Harry W. Taylor, of Newcastle and Birmingham, and application to the Local Government Board to borrow 1,250*l.* for carrying it out will be made at once.

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The sewage will be discharged into the tidal river Tyne. The Council have also given Mr. Taylor instructions to prepare a scheme of sewerage and sewage disposal for Dinnington Colliery.

FOOT BRIDGE, AYR.—A new foot bridge over the river Ayr, on the site of the Ducat stream, was opened on the 12th inst. The bridge is of steel and is 6 ft. wide. It has five arches, each of 60 ft. span, resting on piers of Ballochmyle stone. The footway is paved with tar macadam, and the bridge is lit by electricity. The cost was aboat 2,500*l*. Messrs. John & H. V. Eaglesham, of Ayr, were the engineers, and Mr. Wm. Clarke, of Ayr, was the contractor.

ELECTRIC LIGHTING NEWS.

ELECTRICITY WORKS, GLASGOW.—The inauguration of the new electricity works at Port-Dundas and Pollokshaws-road, Glasgow, was celebrated on the 13th inst. The Port-Dundas works will supply current for the north side of the river. The area of the ground which the Corporation has purchased is about 4½ acres. The buildings were designed by Mr. Andrew Myles, C.E., and erected by Messrs. John Porter & Sons. Only the central portion has been built as yet. From the central entrance under the tower there is ingress to the two accumulator rooms, each of which contains 167 accumulator cells supplied by the Tudor Accumulator Company, which are mounted on steel stands, with lead covers, supported on insulators. The floor is of rough asphalt, so as to be as far as possible acid proof. These accumulators are capable of supplying approximately 615 lamps of 16 candle-power for seven hours, or a greater number of lamps for a corresponding shorter time. The regulating switch, made by Mr. James White, of Glasgow, is controlled from the engine-room, so that the number of cells connected to the mains can be varied as necessity arises. From these rooms access is gained through a lobby to the staff rooms, which are fitted up with lavatory accommodation and bath-room. One of these rooms is intended for the use of the electrical staff, and the other for the enginemen. The switchboard gallery runs the whole length of the engine room, and from it can be obtained a complete view of the engine room plant, and also of the switching and recording arrangements for the distribution of electric energy to the various parts of the city. The equipment of the engine room is, however, not yet completed. The new works for the south side of the city—to be known as the St. Andrew's Cross Electricity Works—are situated in Pollokshaws-road, in close proximity to the junction of Eglinton-street and Maxwell-road. They occupy about two acres of ground, and the buildings have been designed by Mr. Andrew Myles, C.E. Built by Messrs. John Green & Co., they are constructed mostly of red brick, and are nearly approaching completion. The engine and boiler rooms will accommodate 15,000 horse-power of boilers, engines, and dynamos.

ELECTRICITY WORKS, EAST HAM.—The foundation stone was laid recently of the electricity works which the East Ham Council are erecting on a site facing Nelson-street, off the Barking-road. The building will cost 20,000*l*., and is being erected by the Council's own workmen. The works will supply electricity for lighting and for working various tramways. Messrs. W. H. Savage and A. H. Campbell are the engineers, the electrical engineer being Mr. W. C. Ullmann.

FOREIGN.

FRANCE.—The monument raised by subscription to the memory of Chopin is to be inaugurated shortly in the Luxembourg Gardens, not far from the Rue de Fleurus. This is the monument originally intended for the Parc Monceau, of which M. Dubois is the sculptor. For the bust he has depended chiefly on a portrait by Delacroix. The bust will be placed on a stele decorated with a female figure symbolising the Muse of Chopin.——The bas-reliefs and friezes in ceramic ware, modelled by M. Gustav Michel, which decorated the Palais des Beaux-Arts and Des Arts Libéraux in the 1889 Exhibition, are to be placed in the Square Monge, under the direction of M. Formigé as Architecte des Promenades.——M. Pascal, architect, and MM. Thomas and Germain, sculptors, are at work on the monument to Charles Garnier which is to be erected in the Rue Auber, in front of the Opera House. The monument, which is 8 mètres high, will be terminated by the bust of Garnier by Carpeaux. Two consoles attached to the pedestal will carry figures symbolising Study and Fame. The figures and ornaments, in gilt bronze, will be relieved against a pedestal of red granite, which will bear, instead of the usual inscriptions, the plan of the Opera House engraved on a bronze tablet.——M. Scellier de Gisors has in hand important operations of repair and restoration in the Luxembourg, where the Salle des Fêtes and the "Galerie des Bustes" are to be restored to their original condition.——At the Palais Royal the foundations have been commenced for the pedestal to the statue of Balzac by Falguiere, the model of which had been completed before the death of the sculptor.——A monument commemorative of the battle of Waterloo is to be erected on a site acquired by M. Osiris. The monument, designed by M. Gérôme, will consist of a column surmounted by an eagle bearing in its talons the French standard, and endeavouring to spread its wings which have been maimed by shot.——M. Redon, the architect to the Louvre, is occupied in arranging, in the former "Salles des Dessin," the best examples of furniture and tapestries from the "Garde-Meuble National," as well as a certain number of rare objects scattered about the museum. The 40,000 drawings by old masters will be rearranged in the rooms on the first and second floors surrounding the Cour du Louvre.—It is announced that the Hôtel de Luynes, in the Boulevard St. Germain, is to be pulled down, having been compulsorily purchased for a street improvement. The fine paintings by De Troy, in the building, will probably go to the Carnavalet Museum.——A new church of St. Joseph is to be built at Nancy.——The death is announced, at the age of seventy-five, of the painter Charles Monginot. He was a pupil of Couture, and received medals in the Salons of 1854 and 1869, as well as at the 1889 exhibition. His special talent lay in pictures of flowers, fruit, and still life. The Luxembourg and the museums of Troyes, Chartres, and Pau possess examples of the work of this conscientious artist, whose pictures were at one time in great request.

INDIA.—The Secretary of State for India has sanctioned the construction of the Pamban branch of the South Indian Railway.——The East Indian Railway authorities contemplate remodelling Howrah station to meet increased requirements of traffic, and it is probable that the stations at Hooghly and Kalka will also be rebuilt.——Orders are about to be issued by the Government assigning about ten lakhs of rupees for the construction of the Barun-Daltonganj section of the East Indian Railway. Mr. Cockshott is the engineer in charge.——Observatory buildings are about to be constructed on the Dodabetta Peak, in the Nilgiris district; the Chief Engineer of the Public Works Department suggests that perforated zinc ventilators, closed with batten doors, are more suitable for such buildings than glazed ventilators which were proposed to be used.——The general results of the examination of the Bombay water supply show that the advent of the rains has improved the Vehar and Tansa waters, and no pathogenic bacteria have been found in them; on the other hand, the Tulsi water contains a large amount of free ammonia and nitrites, and though no pathogenic bacteria have been found, the water in its present state is not considered wholesome. The health of Bombay is still very bad.

UNITED STATES.—The Secretary of the Treasury has divided his invitations to submit designs for the Government building at Indianapolis equally between local architects and the profession in America at large—a method which seems to have given general satisfaction.——The death is announced of a well-known American sculptor, Mr. Carl Rohl-Smith. His principal works were the statue of Franklin, in Lincoln Park, Chicago; a figure of the "Defender of the Alamo," for the Alamo monument at Austin, Texas; and a statue of Judge Reid, of the Kentucky Superior Court.——The Art Students' League of New York is endeavouring to make the instruction it gives in sculpture of more immediate and practical value to the student, and the members of the National Sculpture Society are encouraging the movement. The students are to be more particularly directed towards the consideration of architectural and industrial modelling, a field which is now mainly cultivated by German and Italian artisans.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Ransome & Co., Limited, engineers and ironfounders, of Newark-on-Trent and London, have removed their works from London to Newark-on-Trent. The firm is temporarily retaining its Chelsea works as its London office and showrooms.

INSTITUTE OF SANITARY ENGINEERS.—At a meeting of the Election Committee, held on the 12th inst., the following gentlemen were elected members:—A. Hale, Simla, India; F. D. Stuart, Lincoln; A. Styles, New Cross; associate, F. E. Wintle, Berealstone.

LONDON COUNTY COUNCIL SCHOOL OF ARTS AND CRAFTS.—The London County Council Central School will re-open for the fifth session on Monday next, September 24. The classes, which are all held in the evening, at nominal fees, are intended for the benefit of workers in the artistic crafts, and comprise architecture, silversmiths' work, chasing and engraving, enamelling, stained glass, bookbinding, illumination, embroidery, &c. New classes are being formed in cabinet work and inlay, also repairing of books and MSS. The school has gained the distinction of a Grand Prix at the Paris Exhibition. Prospectus and all information can be obtained of the curator, 316, Regent-street, W.; or of the Secretary, Technical Education Board, 116, St. Martin's-lane, W.C.

ROMAN VILLA, BRISLINGTON, NEAR BRISTOL.—These Roman remains are situated just within the boundary of the enlarged city of Bristol, the field in which the work of investigation has been carried on being the extreme south-east corner of the municipal area. In the first instance some members of the Clifton Antiquarian Club, acting as a small committee, took the work in hand, and subsequently the Bristol Museum authorities undertook the responsibility of carrying through the exploration. The directors of the company to whom the land belongs generously gave the Museum Committee permission to carry on a complete investigation of the site, and also placed at their disposal for exhibition in the Museum whatever relics might be found. It became necessary to proceed at once with the removal of the remains of the pavement in the roadway, and although nothing could be more unfavourable than the state of the ground and of the weather at the time, this was successfully accomplished, and there are now at the Museum a large number of square blocks of mosaic which have been bedded on cement and can be put together at any time. The pattern of this floor is geometrical, of a somewhat plain character, the different ornaments being repeated at intervals throughout. Under more favourable circumstances the removal of the remains of a second pavement, adjoining the first, was effected. In this case the pattern is much more elaborate and striking than in the other, especially as regards the centre, which is formed of a large and elegantly-designed urn, with ornamental border. At present there is no space in the Museum for the proper display of these valuable relics. There can be no doubt that other pavements at one time existed, as in various positions small patches of mosaic flooring were found, also quantities of loose tesseræ, and portions of the beds of concrete on which the floors at one time rested, but they were entirely destroyed, either when the villa was burned down or at some other time. The tracing of the foundation walls has revealed the arrangement of the different apartments, although in consequence of a road which was under construction cutting the villa in two, a complete view of the ground-plan could not be obtained. A very noticeable feature of the exterior is the existence, *in situ*, of a large part of the solid watercourse for conducting the rain-water, which followed the line of the frontage, and which shows the marks of considerable wear and tear in the passing to and fro of the inhabitants. The position of the villa facing the south-west was, no doubt, purposely chosen, as the spot selected must have been then, as indeed it is now, an exposed one. In two of the chambers in the rear, the hypocausts when uncovered were found to be in an unusual state of preservation. Many of the small pillars on which the floors rested, and around which the hot air circulated, remained in their original positions, as did also part of the concrete flooring itself. The massively-constructed flue which connected these two apartments also remained intact. In regard to miscellaneous objects discovered, the upper stone of a quern of unusual type and in perfect condition is notable; also portions of mortaria large and small. Other fragments of pottery, plain and ornamental, belong to vessels of all sizes, and comprise specimens in great variety of the Upchurch, Salopian, and Castor kinds. There were no examples of true Samian. The specimens of glass in various colours are also numerous, many of them being beautifully iridescent. Some small objects such as a fibula and other bronze articles, glass beads, and several things of the kind have also been discovered. The iron work found consists chiefly of articles used in the construction of the villa, such as the nails for fastening the roof tiles. There are also various tools, and the remains of an iron-bound box. Perfect specimens of the roofing tiles are preserved. The bones and teeth of various animals are present, Only a few coins have been found, but several of them are in fine preservation. They range from Victorinus, A.D. 265-267, to Constantius, A.D. 350-361.—*Bristol Times and Mirror.*

LABOUR IN THE BUILDING TRADES DURING AUGUST.—According to the *Labour Gazette*, employment in the building trades remained good during August. The percentage of unemployed union members among carpenters and plumbers at the end of the month was 1·8, the same percentage as in July. The percentage for August last year was 1·2. Two disputes commenced during the month; one at Dundee, where over 200 carpenters and joiners "struck work" because of a proposed reduction in wages, and one at Greenock, where a few carpenters and joiners came out on strike because of a refusal of their employer to allow machines in shops to be worked by joiners only. The Dundee dispute has been settled by the men resuming work at the old rates of wages. At Greenock the machines are now worked by joiners pending a decision by the employers' and workmen's associations.

PARIS EXHIBITION AWARDS.—To the list of English firms which obtained awards at the Paris Exhibition (given in our issue of the 1st inst.) we have to add the following: The Atmospheric Steam Heating Company, a Gold Medal in the American section under the heading of "Warren Webster & Co.," whose rights in Great Britain they hold; and Messrs. Arthur Lee & Bros., Silver Medal for marble tile pavement placed by them in the entrance hall of the British Royal Pavilion.

WINDOW, LANGTON-ON-SWALE CHURCH, NORTHALLERTON.—Stained glass has just been placed in the west window of this church. The design illus-

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trates the Annunciation and the Nativity, the window consisting of two lights, with tracery above. Messrs. Powell Brothers, of Leeds, are the artists.

CAPITAL AND LABOUR.

DISPUTE AS TO FIXING TERRA-COTTA, BARROW.—After being locked-out for about a week, the bricklayers and stonemasons employed in Barrow agreed to submit the disputed matter to arbitration. The dispute is as to which of these branches of industry is entitled to set the terra-cotta facings at the new technical schools. The work was being done by the stonemasons, but to this the bricklayers objected.—*Yorkshire Post.*

LEGAL.

IMPORTANT BUILDING DISPUTE.

THE case of Gibb *v.* Steanes came before Mr. Justice Buckley, in the Vacation Court, on the 19th inst., on a motion by the plaintiff, a builder, for an injunction to restrain the defendant until the trial from interfering with a building which he was erecting.

Counsel, in support of the application, said that Mr. Steanes had a motion in the list for an injunction to restrain Mr. Gibb until the trial from so erecting his building as to interfere with the light and air coming to his (Mr. Steanes') building, and suggested that both motions should be taken together.

There being no opposition, his Lordship said he would take both motions together.

Counsel for Mr. Gibb stated that his client was erecting a house adjacent to some engineering works belonging to Mr. Steanes, and this gentleman alleged that one of the rooms in Mr. Gibb's building interfered with the light and air coming to his engineering shop, and on three separate occasions when Mr. Gibb had put the roof on his building Mr. Steanes had pulled it off. That being so, Mr. Gibb had no other course open to him but to apply for an *interim* order. Substantially the real question raised by the motion and cross-motion was whether Mr. Gibb was entitled to put the roof on his building or not. The learned Counsel said it was not a case which could be properly tried on motion, and suggested that both motions should stand till the trial and that the trial should be expedited.

After some discussion it was arranged that both motions should stand till the trial, Mr. Gibb undertaking not to proceed further with his building in the meantime, and Mr. Steanes undertaking not to interfere further with Mr. Gibb's building. Liberty to either party to apply to expedite the trial as soon as they were ready, and pleadings to be delivered in the Long Vacation.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

10,330.—RADIATORS FOR WARMING AND COOLING ROOMS: *R. Crittall.*—The sections of the radiator consist of metal tubes joined together, one of them is perforated, has screw-threaded ends, and is inserted through the section-bosses, and tightened with nuts. The sections are closed with caps made of stamped metal, the ends of which are turned or beaded, and are strengthened with internal abutment pieces or stays.

10,338.—A DRESSING FOR WOODEN PAVING-BLOCKS: *H. Dunlop.*—The dressing is composed of an admixture of 3 cwt. of resin and ½ cwt. of caustic soda, boiled and then cooled, and 1 cwt. of Portland cement, 2 cwt. of calcined clay, and 2 cwt. of screenings of basalt or other igneous rock. When the compound is set a coating is added of a hot mixture of 2 cwt. of bitumen, 1 cwt. of resin, 2½ gallons of boiled linseed oil, and 12 gallons of Stockholm tar, boiled to a liquid condition. Then are added sand, 2 cwt. of calcined clay, and 2 cwt. of basaltic screenings. When the second mixture has become cool it is rolled and sanded many times.

10,347.—A BALL AND FLOAT VALVE: *H. von Hostrup.*—The motion upwards of the float lever's shorter arm is utilised for raising a diaphragm valve from above the end of the nozzle's extension; when the head of the spindle has been lifted from its seating upon a metal disc water escapes from within the cap through an extended tube beneath, whereupon the valve is raised by means of a looped piece. With the specification should be read No. 8,814 of 1899.

10,372.—A RACK-PULLEY FOR WINDOW BLINDS: *T. D. Green.*—The pulley is caused to run upon a pin that is set in turned-over lugs upon the upper end of the sliding plate, the edges of which are turned upwards, and has slots or stamped-up teeth. A turned-over bearing upon the gravity-catch (which is bent from sheet-metal) operates upon another pin, and also upon a weighted lower part, and a bent-up tooth or catch which wipes over the projections when the sliding-plate is pressed down. The latter pin bears in the turned-up side pieces of a fixing-bracket made out of a cross-shaped blank of sheet metal.

10,386.—PURIFICATION OF SEWAGE AND FOUL WATERS: *W. M. Ducat.*—An aerobic filter bed, after the kind specified in No. 654 of 1897, and provided with perforated walls and inclined discharging-culverts, is enclosed within double walls, and a roof, made of some non-conducting material, whose trusses carry an inner roof—the space between the two roofs being rendered as air-tight as it can be; pipes, culverts, and side-passages admit air to the filter-bed, the air becomes warm through its contact with the outflowing sewage, and is then carried away through shafts.

10,423.—LAVATORY FITTINGS: *J. F. Houston.*—A box-frame which, when not being used, can be turned upon trunnions into a vertical casing, holds the basin. When the basin is tilted the discharge passes from a container at the basin's back into a chamber formed within a fixed tubular trunnion, and so through a port into the waste-pipe. A port within the trunnion serves for the incoming water, which flows thence through a passage into the basin's front. The end sections of the joint turn together with the box-frame, and are affixed to it.

10,434.—AN APPLIANCE FOR USE IN DEEP BORING: *A. Raky.*—In order to provide an adjustable counterpoise for the weight of rotatory boring rods and tools, the inventor causes the rods, or their frame, to be carried by a rope that is wound upon a drum geared by means of a multiple-gearing to another drum, which, with the descent of the rods, winds up a balance weight by means of a rope that extends over guide pulleys to a third drum; the third drum is to be turned with worm-gearing when it is required to pay out the rope for lowering the weight again. In another form the rope is made an endless one, so that it needs not to be wound backwards and forwards with the weight's rise and fall, or the frame of the boring rods may be fitted with racks for driving a pulley over which the endless rope is passed; the second drum described above is joined with belting to a hand wheel, which will turn in either direction and so increase or lessen the pressure exerted by the counterpoise weight.

10,474.—KILNS FOR DRYING AND BURNING BRICKS, TILES, LIME, &C.: *W. Tarrant.*—The continuous kilns are arranged so that waste heat given out in cooling the charge in some of the chambers shall serve for drying green goods or material in other chambers. A double wall, set lengthwise, contains the main smoke and waste-heat flues; on its opposite sides are arranged two rows of transverse arched chambers which communicate with one another by means of openings made in their dividing walls, and similarly with the two flues, dampers being provided for closing the openings as may be desired; passages from the waste-heat flue are made so as to open into each of the chambers through the face of a bag or screen, which is placed across the entire chamber. As the burning proceeds, fuel having been poured in through holes in the roof, the flames and gases pass from one chamber to another and so to the smoke-flue, whilst heated air, passing from the chambers in which the charge is being cooled, finds its way to the waste-heat flue and thence to the chambers in which the fresh charge has been laid.

10,497.—AN ALARUM CLOCK: *F. Brück.*—Under normal conditions a hooked detent upon a pivot holds back a contact-arm, which is pulled by a spring from its fellow contact. When, however, the alarum has run down, the detent is disengaged by means of a winding wing-nut, and the circuit of an electrical lamp is thereby rendered complete; a slide enables a tripping of the detent at any time.

10,503.—PLUG COCKS: *H. W. Joyce.*—A locking-tap, as specified in Nos. 21,352 of 1896 and 6,517 of 1898, has its flanged body fastened with an outside-screwed ring to its bush, or an inside-screwed ring is held with lugs inside the bush; a turning of the ring presses the valve's screwed flange against the bush's inner side.

10,509.—DRAWING COMPASSES: *J. von Pallich and F. Knaus.*—Adjustable holders and clamps that hold brushes with which circles and lines of various overlapping colours can be described are mounted upon a bar the limb of which slides into a socket in a leg of the compass, and an adjustable compass point is also attached to the bar; otherwise the bar can be fixed at a right angle to the handle to enable the brushes to slide to any part of it, and overlapping circles may be described with two compass points.

10,510.—A FIRE ALARM: *H. C. Bacr.*—Smoke or gas which do not support combustion are used to start an electrical or other kind of alarm; a thermostat is heated by a gas flame that burns continuously and prevents contact of two points which will become closed upon extinction of the flame and completion of an electrical alarm's circuit; a perforated inner casing and an outer casing enclose the flame, whose combustion is maintained by air admitted in quantity just enough for that purpose, through regulated openings cut in the outer casing, the flame becomes extinguished and an alarm sounds upon the entry of smoke or non-combustible gases within the two casings. With this contrivance a mechanical alarm can be employed, or the thermostat may be joined to the valve of an automatical sprinkler, which it will open if the flame becomes extinguished.

10,518.—A TRAVELLING CRANE FOR USE IN WORKSHOPS: *F. W. Jannett-Walker.*—At the ends of the shop are placed vertical rams which operate pulleys for the ropes which move lengthwise along the shop the carriages and transverse girders that carry a crab; other vertical rams work the ropes which at the same time move the carriage of a lifting cylinder, the crab, and the monkey to one end whereof the lifting rope is secured; all those movements are effected by plain directly-acting rams, but in one other form of the mechanism worm gear upon the crane that is driven by either a rope or a square shaft worked by a separate engine is adopted for lifting purposes; a power shaft, controlled by a lever near the traversing levers, drives the rope.

10,531.—A COMBINED TOOL FOR MORTISING WOOD: *J. D. Wood.*—The tool consists of reciprocating chisels combined with an auger, to be driven by an ordinary brace or by machinery; as the auger is rotated with bevel gearing and a crank handle an inclined disc upon its axis moves the chisels up and down, whilst a screw and a hinged nut give the tool a slow feed downwards, the nut becomes disengaged when the tool is lifted up, a quick return motion being effected by means of a rack and pinion, a ring that lies upon the wood guides the lower ends of the chisels. The mechanism comprises an adjustable clamp which fixes the wood upon the frame, and there are pivots for turning the frame in order that the tool may be used angle-wise.

10,559.—A RECORDING WEIGHING MACHINE: *W. E. Hipkins.*—The inventor has devised an apparatus for recording weights to be attached to steel-yard weighing machines used with weigh-bridges, on platforms, and so on, the steel-yard having two notches graduated according to the English and metrical systems. An adjustable catch carried upon the main poise engages with the one or the other set of notches, underneath the steel-yard and the two subsidiary poises are printing figures that correspond with the two systems, and tickets that correspond with the figures are inserted into slots made in the main poise. Handles are provided for impressing the tickets. For machines of the smaller kind the printing figures can be set upon discs in the pillar, and be joined to the poises with a rack and pinion gearing.

10,599.—A BRICK-MOULDING MACHINE: *A. Adams, W. Neale, and L. Simpson.*—A pipe that slides through a cylinder's stuffing-box and is joined to the plunger or cross-head with a tubular junction, a bracket and a bent tube, supplies steam to the plungers—which are hollow—or to the other moving portions of the machine, and a steam supply pipe, having a stop-cock, communicates with the cylinder's lower end. Exhaust steam is caused to pass to the waste pipe by similar means. In some instances elbow or ball-and-socket joints may be fitted upon the pipes so as to meet the movements of the parts. Steam at a high pressure is employed, whilst the use of rubber tubing is discarded.

10,640.—AN APPLIANCE FOR VENTILATORS: *A. M. Baily and W. Caldwell.*—The appliance is adapted for opening and closing the "butterfly openers" of malting-kilns, and provides means for moving the two-hinged doors at one and the same time by joining them with links on to a sliding rod which is worked by a rope that passes around pulleys.

10,656.—A WORKMAN'S CLAMP: *W. Goebel and G. Gockel.*—The arm, which slides upon the clamp's stem, is fixed to the stem with a wedge so arranged that it shall force the arm into engagement with teeth upon the stem, a screw whose nut is split and which has a side-screw which will compensate for wear, imparts a final holding grip to the article which is to be clamped.

10,664.—METAL LATHING: *M. Hilton.*—The lathing is made out of perforated metal sheets or strips, such as the waste or scrap left from the making of chain links, washers, &c., which are to be secured with staples or T-headed nails on to joists, partition standards, and so on. The strips are described as being applicable for wall-ties or plates, also for the construction of fire-proof floors and other parts of buildings.

10,669.—FIRE-ALARMS AND HYDRANTS: *W. Jones.*—The alarms and hydrants are intended for use upon lamp-posts for electrical and other lighting purposes, near the base of the lamp-post and in the ground are sunk the main and by-pass cocks of the hydrants; a hydrant for watering roads may have a tap fitted upon one of its nozzles.

MEETINGS.

FRIDAY, SEPTEMBER 21.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "The Atmosphere: Pressure and Composition; Air, Combustion, and Respiration." 8 p.m.

Institute of Sanitary Engineers (Incorporated).—Examination in Practical Sanitary Science.

SATURDAY, SEPTEMBER 22.

Institute of Sanitary Engineers.—Examination in Practical Sanitary Science.

Northern Architectural Association.—Excursion meeting visits to County Hotel and Newcastle Fireworks' new works, Haymarket, Newcastle. 3 p.m.

MONDAY, SEPTEMBER 24.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "Ventilation, Warming, and Lighting." 8 p.m.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Working Class Dwellings	Lichfield Corporation	10*l.* 10*s.* and 5*l.* 5*s.*	Oct. 10
Branch Police Station and Library	Leeds Corporation	25*l.*; 15*l.*; 10*l.*	Nov. 20

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Police Cottage at Thakeham	West Sussex County Council	County Surveyor, 31, Bedford-road, Horsham	Sept. 22
*Bridge	Sheffield Corporation	City Surveyor, Town Hall, Sheffield	Sept. 25
*Baths and Library	do.	do.	do.
*Road Making and Paving Works	Willesden District Council	O. Claude Robson, Public Offices, Kilburn	do.
*Broken Granite	Edmonton U.D.C.	Engineer, Town Hall, Edmonton	do.
*Portland Cement	do.	do.	do.
House, Buckie, N.B.	.....	Sutherland & Jamieson, Architects, Elgin	do.
House, &c., St. John's-avenue, Bridlington Quay	Mr. A. Jennison	J. Earnshaw, Architect, Wellington-road, Bridlington Quay	do.
Schools, Holland-street	Hull School Board	Botterill & Co., Architects, 23, Parliament-street, Hull	do.
Electric Lighting Plant	Walthamstow U.D.C.	J. Ewright, 47, Victoria-street, S.W.	do.
Making-up Meads-lane	Ilford U.D.C.	H. Shaw, Civil Engineer, 7, Cranbrook-road, Ilford	do.
Sewers, &c., Lancaster-road	Salford Corporation	L. C. Evans, Town Hall	do.
Sewerage Works, Goosemoor-lane	Erdington U.D.C.	H. H. Humphries, Engineer, Public Hall	do.
Road Works, Linacre-road, &c.	Litherland (Lancs.) U.D.C.	W. B. Garton, Surveyor, 25, Sefton-road, Litherland	Sept. 26
Flagging, &c., Several Streets	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall	do.
Schools, Tunstead	Bacup School Board	Smith & Cross, Architects, Rochdale	do.
*Alterations and Additions to Free Public Library	Chiswick U.D.C.	A. Ramsden, Surveyor, Sutton Court, Chiswick	do.
*Enlargement of Master's House at Workhouse	Kensington Guardians	Ernest Flint, Architect, 80, Coleman-street, E.C.	Sept. 27
Fencing Work, &c.	Moss Side (Lancs.) U.D.C.	H. B. Longley, Engineer, Council Offices	do.
*New Outfall Sewer, St. Peter's	Tunbridge Wells Corporation	Borough Engineer, Town Hall, Tunbridge Wells	Sept. 28
Chapel Buildings, Mandeville-street, Sheffield	Trustees of Darnall Wesleyan C.	W. T. Campsall, Architect, 19, Figtree-lane, Sheffield	do.
Pair Villas, South Parade, Pudsey, Yorks.	.....	Farrar & Woodhouse, Architects, 38, The Grove, Ilkley	do.
Additions to Schools	Annan (N.B.) School Board	H. E. Clifford, Architect, 178, Vincent-street, Glasgow	do.
Additions to Schools	Oxspring (Yorks.) School Board	Senior & Clegg, Architects, 16, Regent-street, Barnsley	do.
Quartzite (400 tons)	Walmer (Kent) U.D.C.	R. A. Wilson, Surveyor, Council Offices	Sept. 29
Vicarage, Wales, near Sheffield	.....	Boreham & Morton, Surveyor, 24, John-street, Sunderland	do.
Culverts, Shooters' Brook, &c.	Manchester Corporation	Borough Surveyor, Town Hall	do.
Additions to Hotel, Falcarragh, co. Donegal	Miss M. M'Ginley	D. Conroy, Architect, 2, Bishop-street, Londonderry	do.
Alterations to Schools, East End	Redruth School Board	S. Hill, Architect, Green-lane, Redruth	do.
Twenty Cottages, Pantygraigwen, Pontypridd	Great Western Colliery Co., Ltd.	A. O. Evans, Architect, Pontypridd	do.
Pavilion and Shelter, Lichfield-street	Walsall Corporation	H. E. Lavender, Architect, Bridge-street, Walsall	do.
Rebuilding Store Premises	Alcester Co-op. Indus. Soc. Ltd.	J. W. Adams, Architect, Hay Mills, Birmingham	Sept. 30
Abattoirs	Bury (Lancs.) Corporation	A. Neill, Architect, 18, Cookridge-street, Leeds	Oct. 1
Sewers, Aughton, Lancs.	West Lancs. R.D.C.	C. Law-Green, Civil Engineer, 50, Hampton-road, Southport	do.
Additions to Ashfield House, Liversedge	Mr. C. W. Clarkson	Marriott & Co., Civil Engineers, West Park-street, Dewsbury	do.
*Forty-eight Cottages, Belvedere, &c.	Erith U.D.C.	Council's Surveyor, High-street, Erith	do.
*Terrace of Houses, Chingford	.....	W. J. Chambeas, Architect, Savoy House, W.C.	do.
Additions to Orchard House, Workington	Mr. J. L. Yeowart	W. G. Scott & Co., Architects, Workington	do.
Three Bridges, Victoria Wharf, &c.	Belfast Harbour Commissioners	G. F. L. Giles, Engineer, Harbour Offices	do.
*Road-making, &c., Works, Montague-av., Brockley	Lewisham Board of Works	Surveyor, Town Hall, Catford, S.E.	Oct. 2
*Road-making, &c., Works, Crofton Park-rd., Brockley	do.	do	do.
Steel Girders, &c.	G. W. Railway Company	G. K. Mills, Paddington Station, W.	do.
Station Buildings, Blaenavon	do.	do.	do.
Warehouse, Bridge-street, Bradford	L. and Y. Railway Company	Engineer, Hunt's Bank, Manchester	do.
Additions to Schools, near Needham Market	Battisford School Board	H. G. Bishop, Architect, Cheapside, Stowmarket	Oct. 3
Additions to School, Porth	Ystradyfodwg School Board	J. Rees, Architect, Hillside Cottage, Pentre, Glam.	do.
*New Infirmary, Acton-lane	Willesden Guardians	A. Saxon Snell, 22, Southampton-buildings, W.C.	do.
*Alterations to Parish Hall & Erection of New Schools	Vicar, St. Peter's, St. Albans, &c.	F. W. Kinneir Tarte, 12, St. Peter-street, St. Albans	Oct. 4
*Roadmaking and Sewers, &c., Enfield	Chaseside Building Estate Owners	Walton & Lee, 10, Mount-street, Grosvenor-sq., W.	do.
*Laying Stoneware Pipe Sewers, &c., Rottingdean	Newhaven R.D.C.	T. W. Franks, Engineer, Sevenig Buildings, Lewes	do.
Five Shops, Victoria-square, Bradford	.....	T. C. Hope & Sons, Architects, 23, Bank-street, Bradford	do.
Electric Generating Station	Limerick Town Council	J. J. Peacocke, Engineer, Town Hall	do.
*Wrought Iron Hurdles	London County Council	Park's Department, 11, Regent-street, S.W.	Oct. 5
Institute and Hall, Nantymoel, Wales	.....	J. Rees, Architect, Pentre, Glam.	do.
*Additions, &c., to Municipal Technical School	Gravesend Town Council	E. J. Bennett, Architect, 13, Gray's Inn-square, W.C.	Oct. 8
Wall at Workhouse	Newhaven Guardians	W. Gates, 86, High-street, Lewes	do.
New County Court, Middlesbrough	Commissioners of H.M. Works, &c.	H. Gritten & Son, 8, Prince's-street, S.W.	do.
*Strengthening Pier Head and Erection of Pavilion	Dover Pier Company, Limited	Engineer's Offices, 11, Dartmouth-street, Westminster	Oct. 9
Sewers, &c.	Lynington Town Council	I. Pym-Jones, Engineer, 14, High-street, Lynington	do.
Town Hall and Market Hall	Pwllheli (Wales) Town Council	E. R. Davies, 6, Church-place, Pwllheli	do.
*Unclimable Iron Fencing, Shooter's Hill	Woolwich Union	J. C. Cook, Eleanor-road, Woolwich	Oct. 10
*Buildings for Electricity Supply Works	Horsham U.D.C.	Gordon & Gunton, Architects, Finsbury House, E.C.	Oct. 11
Electricity Station	Middleton (Lancs.) Corporation	Stones & Stones, Architects, 10, Richmond-terrace, Blackburn	do.
Six Houses, Lockhurst-lane, Coventry	.....	G. & I. Steane, Architects, Coventry	No date
Additions to Alexandra Hotel, Harrogate	.....	A. A. Gibson, Architect, Harrogate	do.
Additions to Wesleyan Chapel, Kettleshulme	.....	Garlick & Flint, Architects, 5, Terrace-road, Buxton	do.
Flints, &c.	Leatherhead U.D.C.	J. R. Harding, Civil Engineer, High-street, Leatherhead	do.
Making New Streets, North-road, Burslem	Mr. W. Heath	W. H. Whalley, Architect, Queen-street, Burslem	do.
Two Houses, Elliotstown, Tredegar	.....	T. Lewis, The Emporium, Sirhowy, Tredegar	do.
Pupil Teachers' Centre, Wheatley-street	Coventry School Board	G. & I. Steane, Architects, Coventry	do.
Bakery, Stables, &c., Ulverston, Lancs.	Swarthmoor, &c., Co-op. Soc., Ltd.	J. Casson, Architect, Brogden-street, Ulverston	do.
National Schools, Winslow	Managers	Beazley & Burrows, Architects, 17, Victoria-street, S.W.	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Working Superintendent of Inmate Labour	Lambeth Guardians	2*l.* 5*s.* per week	Sept. 29
*Manual Training Instructors & Assistant Instructors	School Board for London	Instructors (minimum) 100*l.*; Assistant Instructors (min.) 80*l.*	do.
*Assistant Surveyor of Roads	Gold Coast Colony (P. W. Dept.)	300*l.*	No date
*Assistant Superintendent of Buildings	British Central Africa (P.W. Dept.)	200*l.*	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv. vi. viii. x. & xx. *Public Appointments, pp.* xvii. & xx.

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WEDNESDAY, SEPTEMBER 26.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "Meteorology." 8 p.m.

Builders' Foremen and Clerks of Works Institution.—Quarterly meeting of the Directors. 8 p.m.

FRIDAY, SEPTEMBER 28.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., &c., on Sanitary Law: Introductory remarks, Public Health Acts—English, Scotch, Irish; other Statutes relating to Public Health; By-laws (models, &c.), Regulations, Orders, Memoranda, &c. 8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 3.—By STEPHENSON & ALEXANDER (at Llantwit Major).

Llantwit Major, Glamorgan.—Downcross Farm, 108 a. 0 r. 32 p., C (in lots) £5,585

September 6.—By STEPHENSON & ALEXANDER (at Minehead).

Minehead, Somerset.—Martlet-rd., &c., 25 freehold building sites (in lots)..... 327

September 7.—By G. B. HILLIARD & SON (at Chelmsford).

Little Baddow, Essex.—The Rodney p.-h., f..... 800

September 11.—By E. SIMPSON.

Lewisham.—96 and 98, Hither Green-lane, f., r. 52*l.* 650

By T. WALKER & SON (at York).

Cornbrough, Yorks.—Freehold farmhouse and 136 a. 2 r. 20 p. 3,830

September 12.—By HEAPS, SON, & REEVE.

Maidenhead, Berks.—Queen-st., The Pilot Works, f. 2,250

By E. W. RICHARDSON & SON.

Finsbury Park.—12, Blackstock-rd., u.t. 62 yrs., g.r. 6*l.* 6*s.*, r. 50*l.* 590

By DOUGLAS YOUNG & Co.

Pimlico.—One-sixteenth share of 15, 16, 17, and 17*a*, Allington-st.; 1, Brewer-st.; and 1 to 5, Allington-pl., u.t. 21½ yrs., g.r. 62*l.* 235

Brixton.—4, Medwin-st., u.t. 74½ yrs., g.r. 6*l.* 10*s.* 290

September 13.—By C. C. & T. MOORE.

St. George's East.—148, St. George-st., area 2,750 ft., c., e.r. 85*l.* 1,100

Bow.—27, Alfred-st., u.t. 46 yrs., g.r. 12*l.* 10*s.*, r. 34*l.* 250

Spitalfields.—13, Fournier-st., and 1, Wilkes-st., f. 1,630

Bromley-by-Bow.—234, St. Leonard's-rd., u.t. 65 yrs., g.r. 5*l.* 235

By NOTT, CARTWRIGHT, & ETCHES.

Tooting.—13, Manor-villas, u.t. 90 yrs., g.r. 6*l.*, e.r. 34*l.* 310

Balham.—71, Elmfield-rd., u.t. 89 yrs., g.r. 8*l.* 10*s.*, e.r. 48*l.* 495

150, Bedford-hill, u.t. 75 yrs., g.r. 10*l.*, e.r. 70*l.* 730

September 14.—By MONTAGUE HIBBARD & Co.

Holloway.—20, 22, and 28, Monnery-rd., u.t. 66¼ yrs., g.r. 22*l.* 12*s.*, r. 132*l.* 1,455

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 15 0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 11 0	,,	,, ,,
Smooth Bright Facing Stocks..	2 18 0	,,	,, ,,
Shippers	2 2 0	,,	,, ,,
Flettons.....	1 9 6	,,	at railway depôt.
Red Wire Cuts ..	1 15 0	,,	,, ,,
Best Fareham Red	3 11 6	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,, ,,
Do., Bullnose	4 12 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 6	,,	,, ,,
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,

PRICES CURRENT (*Continued*).

	£ s. d.		
Seconds Quality White and Dipped			
Salt Glazed	2 0 0	per 1,000	less than best.
	s. d.		
Thames and Pit Sand	8 0	per yard,	delivered.
Thames Ballast	6 9	,,	,,
Best Portland Cement	37	per ton	,,
Best Ground Blue Lias Lime..	24 0	,,	,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12*s.* 6*d.* per yard, delivered.

Stourbridge Fire-clay in sacks, 32*s.* 6*d.* per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube,	deld. rly. depôt
Bath ,, ...	1 7	,,	,,
Beer ,, ...	1 6½	,,	,,
Grinshill ,, ...	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale ,,	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York ,,	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super.	at rly. depôt.
,, ,, 6 in. Rubbed Ditto..	2 10½	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 3 in. self-faced Ditto	0 9	,,	,,

SLATES.

in. in.	£ s. d.		
20×10 best blue Bangor..	11 5 0	per 1000 of 1200	at rly. dep.
,, best seconds ,,	10 15 0	,,	,,
16× 8 best ,,	6 2 6	,,	,,
20×10 best blue Portmadoc	10 18 0	,,	,,
16× 8 best blue Portmadoc	6 0 0	per 1000 of 1200	at rly. dep.
20×10 best Eureka unfading green.....	11 2 6	,,	,,
16× 8 ,, ,,	6 15 0	,,	,,
20×10 Permanent green and Sedan green	10 0 0	,,	,,
16× 8 ,, ,,	5 12 6	,,	,,

TILES.

	s. d.		
Best plain red roofing tiles..	41 6	per 1,000	at rly. depôt.
Hip and valley tiles....	3 7	per doz.	,, ,,
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles....	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles.....	4 0	per doz.	,, ,,
Valley tiles.....	3 9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes).	50 9	per 1,000	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles.....	3 8	,,	,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	£ s. d.	£ s. d.	At per standard.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0	
Deals: best 3 by 9	14 10 0	15 10 0	
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0	
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.	
Deals: seconds	1 0 0	less than best	
Battens: seconds.....	0 10 0	,, ,, ,,	

	£ s. d.	£ s. d.	At per load of 50 ft.
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0	
Seconds	4 5 0	4 10 0	
Small timber (8 in. to 10 in.)	3 12 6	3 15 0	
Swedish balks.....	2 15 0	3 0 0	
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0	

JOINERS' WOOD.

	£ s. d.	£ s. d.	At per standard.
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0	
3 in. by 9 in.	24 0 0	25 0 0	
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0	
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0	
,, ,, 3 in. by 9 in.	20 0 0	21 0 0	
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0	
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0	
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0	
Petersburg: first yellow deals, 3 in. by 11 in.....	25 0 0	26 0 0	
Do. 3 in. by 9 in.	22 0 0	23 0 0	
Battens.....	16 10 0	17 10 0	
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0	
Do. 3 in. by 9 in.	17 0 0	18 0 0	
Battens.....	14 0 0	14 10 0	
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0	
Do. 3 in. by 9 in.	14 0 0	14 10 0	
Battens.....	12 10 0	13 10 0	
White Sea and Petersburg:—			
First white deals, 3 in. by 11 in..	15 10 0	16 10 0	
,, ,, ,, 3 in. by 9 in. ..	14 0 0	15 0 0	
Battens.....	12 10 0	13 10 0	
Second white deals 3 in. by 11 in.	14 0 0	15 0 0	
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0	
,, ,, battens	11 0 0	12 0 0	
Pitch pine: deals	16 0 0	18 0 0	
Under 2 in. thick extra	0 10 0	1 0 0	
Yellow Pine—			
First, regular sizes	30 0 0	33 0 0	
Broads (12 in. and up)	2 0 0	more.	
Oddments	22 0 0	24 0 0	
Seconds, regular sizes	24 10 0	26 10 0	
Oddments	20 0 0	22 0 0	
Kauri Pine—			
Planks, per ft. cube	0 3 6	0 4 6	

PRICES CURRENT (*Continued*).

	£ s. d.	£ s. d.	At per standard.
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 2 6	0 2 8	
Small ,, ,, ...	0 2 4	0 2 7	
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6	
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9	
¾ in. do. do.	0 0 7	- - -	
Dry Mahogany—			
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11	
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0	
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0	
Teak, per load	16 0 0	20 0 0	
American Whitewood Planks—			
Per ft. cube.....	0 2 3	0 3 0	

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton.		
	£ s. d.	£ s. d.	
Rolled Steel Joists, ordinary sections	9 7 6	- - -	
Compound Girders ,, ,,	13 10 0	- - -	
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0	
Flitch Plates	12 0 0	- - -	

METALS.

	Per ton, in London.		
IRON.—	£ s. d.	£ s. d.	
Common Bars.....	10 0 0	10 12 6	
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0	
Staffordshire "Marked Bars" ..	13 5 0	- - -	
Hoop Iron, basis price.....	11 5 0	11 15 0	
,, ,, galvanised	17 0 0*	- - -	
(* And upwards, according to size and gauge.)			
Sheet Iron, Black.—			
Ordinary sizes to 20 g.....	11 10 0	- - -	
,, ,, to 24 g.....	12 15 0	- - -	
,, ,, to 26 g.....	13 15 0	- - -	
Sheet Iron, Galvanised, flat, ordinary quality.—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14 15 0	- - -	
,, ,, 22 g. and 24 g.	15 5 0	- - -	
,, ,, 26 g.....	16 15 0	- - -	
Sheet Iron, galvanised, flat, best quality.—			
Ordinary sizes to 20 g.....	18 10 0	- - -	
,, ,, 22 g. and 24 g.	19 0 0	- - -	
,, ,, 26 g.....	20 10 0	- - -	
Galvanised Corrugated Sheets.—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 0 0	14 15 0	
,, ,, 20 g. and 24 g.	14 15 0	15 10 0	
Cut nails, 3 in. to 6 in.....	11 10 0	- - -	
(Under 3 in. usual trade extras.)			
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -	
Pipe in coils	20 17 6	- - -	
ZINC—Sheet—			
Vieille Montagne ..... ton	28 0 0	- - -	
Silesian.....	27 10 0	- - -	
COPPER—			
Strong Sheet..... per lb.	0 1 1	- - -	
Thin ..... ,,	0 1 3	- - -	
Copper nails ..... ,,	0 1 3	- - -	
BRASS—			
Strong Sheet..... ,,	0 0 11	- - -	
Thin ,, ... ,,	0 1 1	- - -	
TIN—English Ingots ..... ,,	0 1 7	- - -	
SOLDER—Plumbers' ..... ,,	0 0 8	- - -	
Tinmen's ..... ,,	0 0 10	- - -	
Blowpipe ..... ,,	0 1 0	- - -	

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft. delivered.
,, fourths	2¾d.	,, ,,
21 oz. thirds	3½d.	,, ,,
,, ,, fourths.....	3d.	,, ,,
26 oz. thirds	4¼d.	,, ,,
,, ,, fourths	4d.	,, ,,
32 oz. thirds	5¼d.	,, ,,
,, ,, fourths	5d.	,, ,,
Fluted sheet, 15 oz.	3½d.	,, ,,
,, ,, 21 ,, ...	4¾d.	,, ,,
½ Hartley's Rolled Plate.....	3d.	,, ,,
⅝ ,, ,, ,, ...	3½d.	,, ,,
¾ ,, ,, ,, ...	4d.	,, ,,

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes..... per gallon	0 3 1	
,, ,, ,, in barrels ..... ,,	0 3 2	
,, ,, ,, in drums ..... ,,	0 3 4	
Boiled ,, ,, in pipes..... ,,	0 3 4	
,, ,, ,, in barrels ..... ,,	0 3 5	
,, ,, ,, in drums ..... ,,	0 3 7	
Turpentine, in barrels ..... ,,	0 2 5	
,, in drums..... ,,	0 2 7	
Genuine Ground English White Lead ...per ton	27 10 0	
Red Lead, Dry..... ,,	25 0 0	
Best Linseed Oil Putty.....per cwt.	0 9 6	
Stockholm Tar ..... per barrel	1 7 0	

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish or outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

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TO CORRESPONDENTS.

J. D.—(Amounts should have been stated.)
F. S. W.—H. W. D. (Next week).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

AYLESBURY.—For the execution of paving works, Market-square, for the Urban District Council. Mr. J. H. Bradford, surveyor, Corn Exchange, Aylesbury:—

Tree & Son	£445 3 4	Ward & Cannon	£347 11 8
Burnham	384 0 0	Wadey, Stoke	
Bristow Bros.	365 10 0	Newington†	302 6 8

[Recommended for acceptance.]

BASFORD (Notts.).—For additions to Boardroom at Union workhouse, Old Basford, for the Basford Board of Guardians. Mr. W. V. Betts, architect, Radford-road, Old Basford. Quantities by the architect:—
Messrs. G. Hopewell & Son, Old Basford, Nottingham* £420

CARDIFF.—For the erection of town hall and law courts. Messrs. Lanchester, Stewart, & Rickards, architects, 1, Vernon-place, Bloomsbury-square, W.C. Quantities by Messrs. Young & Brown, 7, Southampton-street, W.C.:—

	Law Courts.	Town Hall.	Both Buildings.
	£ s. d.	£ s. d.	£ s. d.
Shillitoe & Son	142,386 0 0	191,854 0 0	333,000 0 0
Willcocks & Co.	130,038 9 3	176,449 5 1	306,487 14 4
Pattinson & Sons	120,740 0 0	160,068 0 0	280,808 0 0
H. Lovatt	—	—	269,397 0 0
C. Wall	111,345 0 0	149,629 0 0	262,974 0 0
Patman & Fotheringham	107,400 0 0	143,720 0 0	251,000 0 0
Thomas & Co.	104,475 6 2	138,965 2 10	242,000 0 0
James Allan	101,817 0 0	139,556 0 0	240,373 0 0
S. Warburton	100,700 0 0	136,720 0 0	237,420 0 0
Turner & Sons	96,583 7 9	129,705 8 9	226,288 16 6

CHISWICK.—For alterations and additions to Tower House. Mr. J. H. Eastwood, architect and surveyor, 42, Cheniston-gardens, Kensington, W.:—
T. Nicols ..... £1,133 | J. Bryant £1,128

DEWSBURY.—For paving, flagging, &c., Stoney Bank-street, for the Corporation:—
H. & W. Barraclough, Brighouse* .. £396 0 6

HISTON.—For the erection of a minister's house, Histon, Cambs. Messrs. Geo. Baines and Reginald P. Baines, architects, 5, Clements Inn, Strand, W.C.:—

E. West	£1,100	Coulson & Lofts	£910
J. G. Cowell	1,075	William Warde	896
Pamphilon & Son	1,053	Page & Son, Buckden*	825
Scales & Robins	1,000		
Thoday & Co.	995		

KING'S LYNN.—For the erection of Baptist Chapel, Wisbech-road.

Bardell Bros.	£1,739 0	Renaut Bros.	£1,590 0
W. H. Brown	1,690 0	Barnes & Co.	1,495 0
R. Shanks	1,686 15	W. F. Smith, King's Lynn*	1,470 0

LITTLEHAMPTON.—For alterations and additions to Dorset House, for Mr. George H. Beecheno. Mr. Allen Foxley, architect, 11, Great James-street, W.C. Quantities by Mr. F. R. Ashby, 17, New Bridge-street, E.C.:—
Snewin Bros., Littlehampton* £1,913

SHEFFIELD.—For the erection of seventy-two miners' cottages, Tinsley Park Collieries, for the Tinsley Park Colliery Company, Limited. Mr. Percy B. Houfton, architect, Furnival Chambers, Chesterfield:—

	Per House.		Per House.
H. Laurence	£256 0 0	Aves & Houfton, Mansfield*	£205 0 0
H. Oakey	230 4 2	A. G. Bell, Nottingham*	203 0 0
J. H. Vickers, Limited	227 10 0	Chas. Levick	200 0 0
T. Barlow	214 0 10	F. Lee	198 0 0
J. W. Hutchinson, Mansfield*	205 18 9		

* Accepted for twenty-four cottages.

TAUNTON.—For the construction of a storage reservoir, &c., Luxhay, Pitminster, for the Town Council. Mr. F. W. Roberts, engineer, Taunton. Quantities by the Engineer:—

S. Saunders	£107,817 0 0	Bond & Hitchcock	£25,115 0 0
R. Neal	72,794 0 0	J. H. Dickson	24,554 0 0
J. Fisher	37,898 12 3	W. C. Shaddock, Plymouth*	22,653 7 4
P. Kerley	35,744 0 0		
Cooke & Co.	35,462 0 0		
W. Gibson	29,378 3 5		
E. Powell	26,550 0 0		

WHITLEY (Northumberland).—For the execution of road works, the Promenade, &c., for the Urban District Council. Mr. J. P. Spencer, C.E., Newcastle-on-Tyne:—
Johnson, Ryton-on-Tyne* (schedule of prices).

TERMS OF SUBSCRIPTION.

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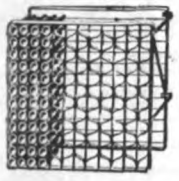

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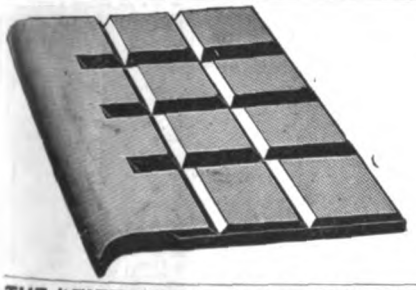

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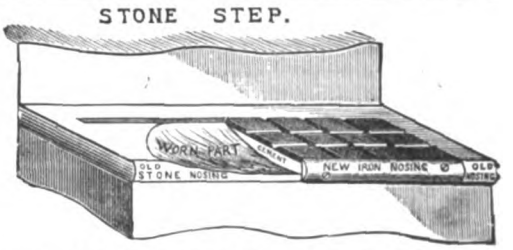

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DATE, 1900	LECTURER.	SUBJECT AND SYNOPSIS.
THURSDAY Oct. 4th	KEITH DOWNES YOUNG, Esq. F.R.I.B.A.	BUILDING IN ITS RELATION TO HEALTH. Soils. Foundations. The prevention of all that would prove detrimental to Health. Materials; Structure; Planning, &c.
Oct. 11th	A. WYNTER BLYTH, Esq. Barrister-at-Law, Medical Officer of Health for St. Marylebone.	SANITARY APPLIANCES. The Advantages and Disadvantages of various Sanitary Appliances used in Buildings. Principles of Ventilating and Warming Buildings.
Oct 18th	A. BUCHANAN, Esq. Instructor in Building Construction at University College, London, and Battersea Polytechnic.	PLUMBERS' WORK CONNECTED WITH DWELLING-HOUSES. Methods of making Lead Soil Pipes, Bends, Traps, and various Joints. Connexions to W.C.s, Baths, Sinks, Lavatories, Iron and Stoneware Drains. Ventilation of Soil Pipes & Drains. Flushing and Antisyphon Pipes. Cisterns & Connexions.
Oct. 25th	Prof R. ELSEY SMITH, A.R.I.B.A. Professor of Architecture, King's College, London.	THE DRAINAGE OF A DWELLING-HOUSE.
Nov. 1st	JAMES BARTLETT, Esq. M.S.A. Lecturer, King's College, London.	SETTING OUT WORK AND BY-LAWS. Principles of Calculating Areas. Cube space; Interpretation of Drawings to scale; Methods of Setting out Work. Checking Levels. Knowledge of the Acts of Parliament relating to Buildings. The Model By-laws issued by the Local Government Board, so far as they relate to the subjects of the Examination.

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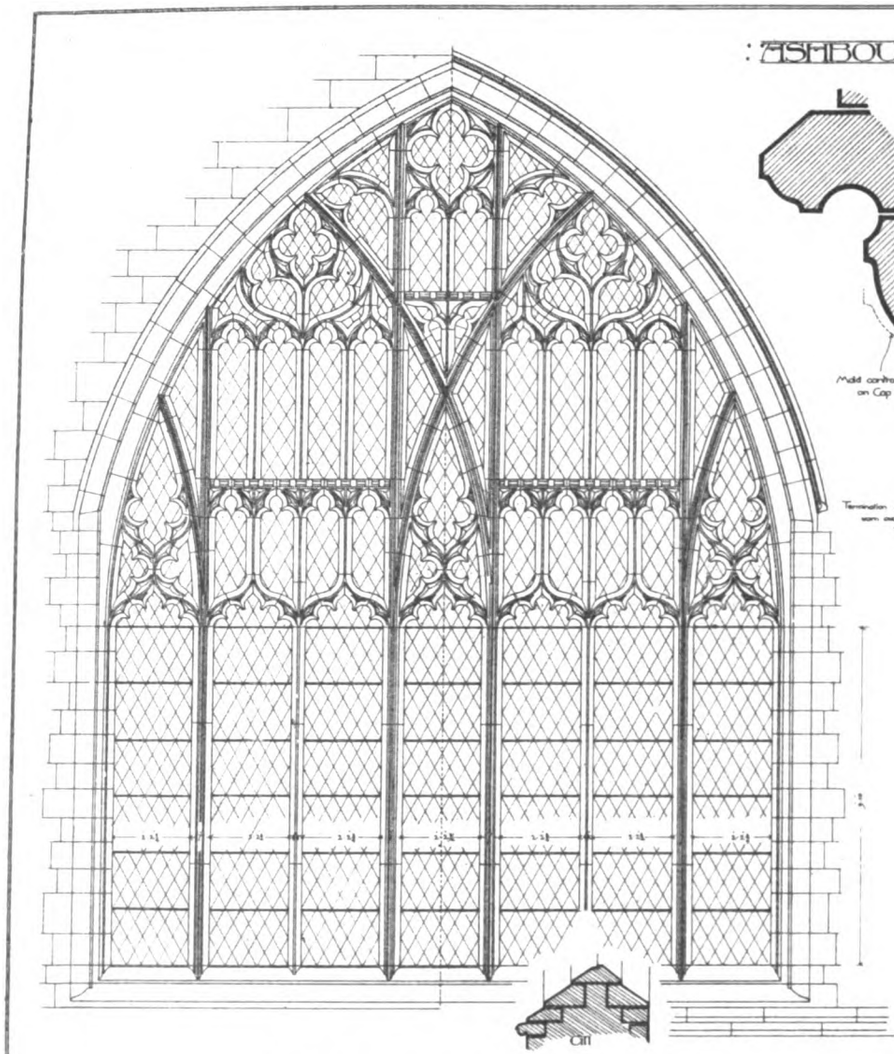
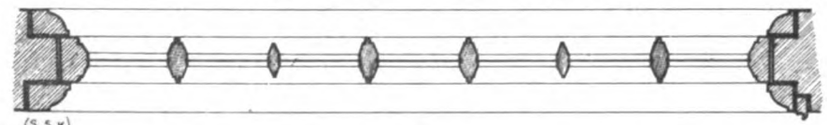


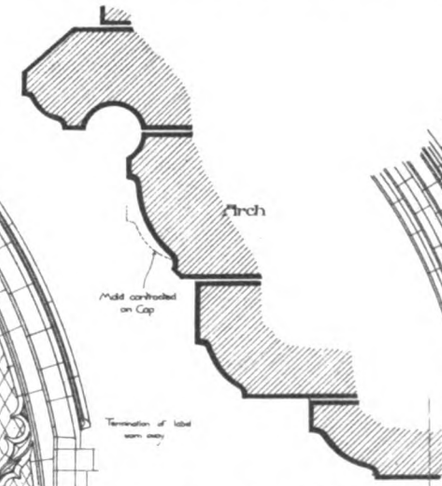
Inside Elevation Outside Elevation



(S.S.K)

Plan

SOUTH TRANSEPT WINDOW



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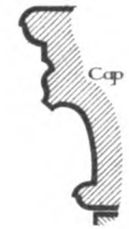

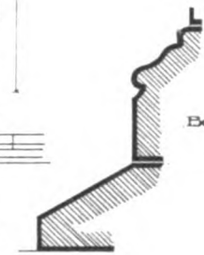

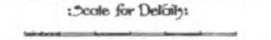

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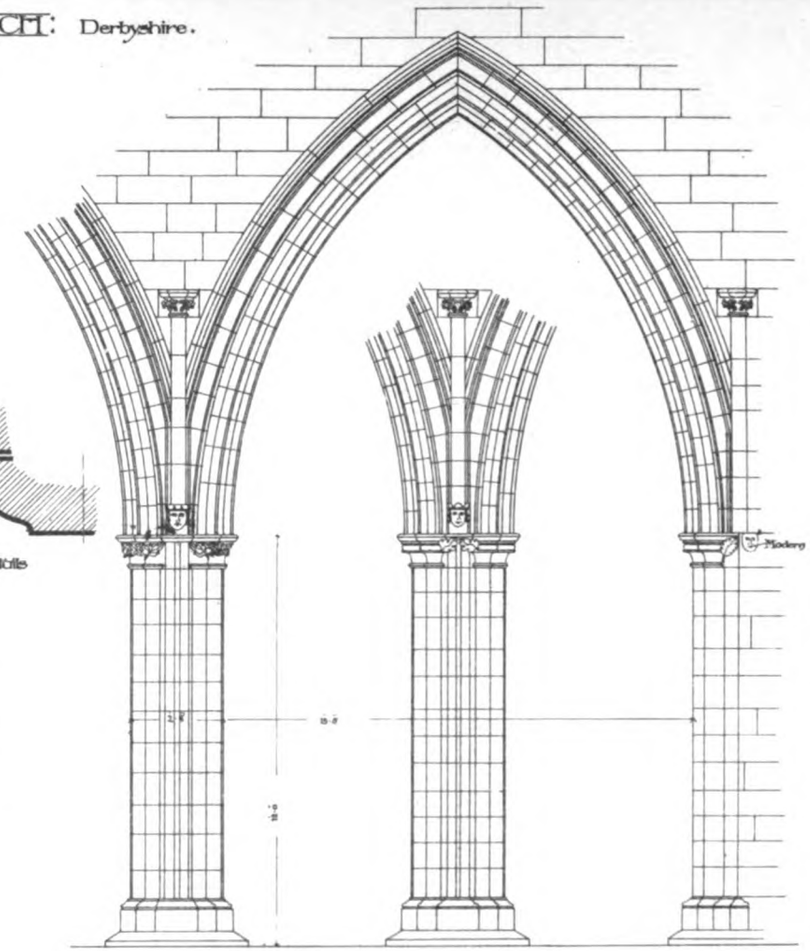
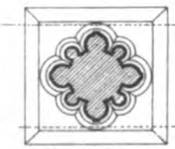
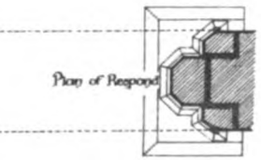
:General Scale:



Elevation



Plan of Pier



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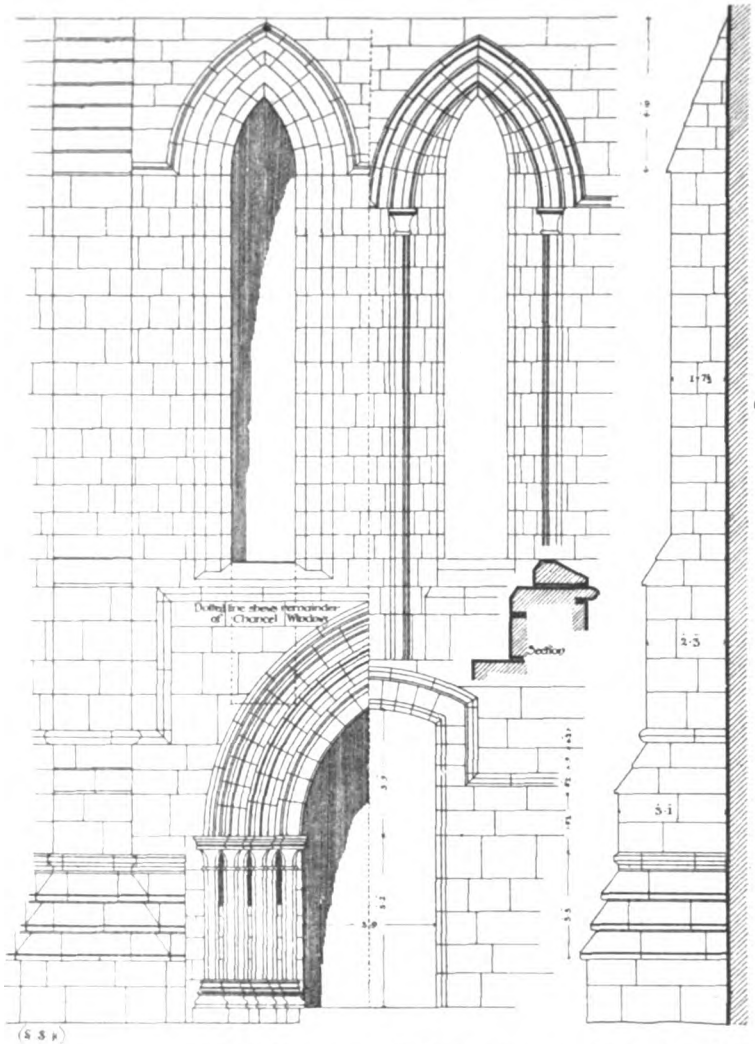
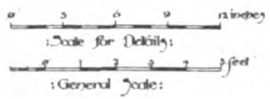
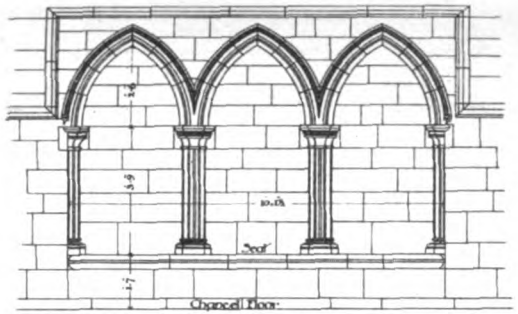
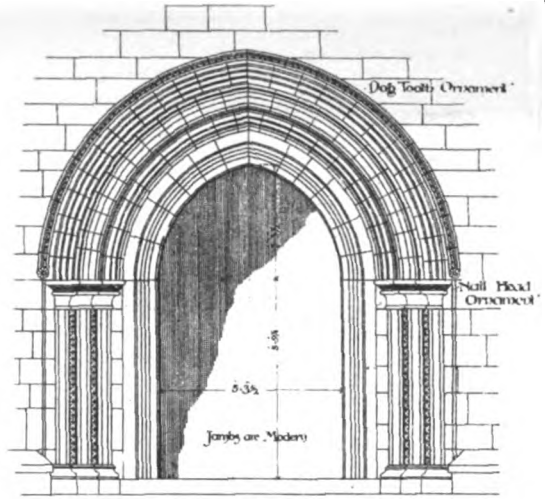


:Outside Elevation: :Inside Elevation: :Side Elevation of Buttress:

:ONE BAY OF CHANCEL:

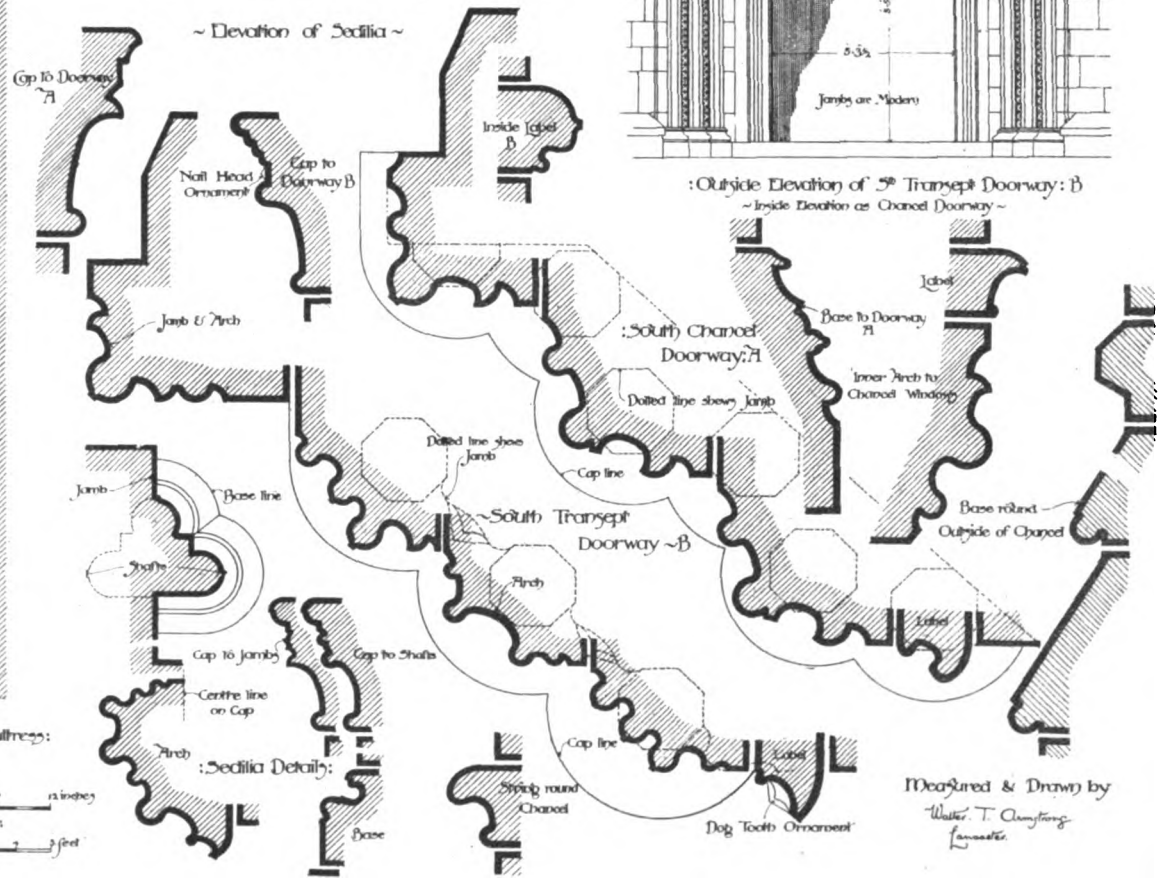






:Outside Elevation of S.E Transept Doorway: B
~Inside Elevation as Chancel Doorway~

~Elevation of Sedilia~



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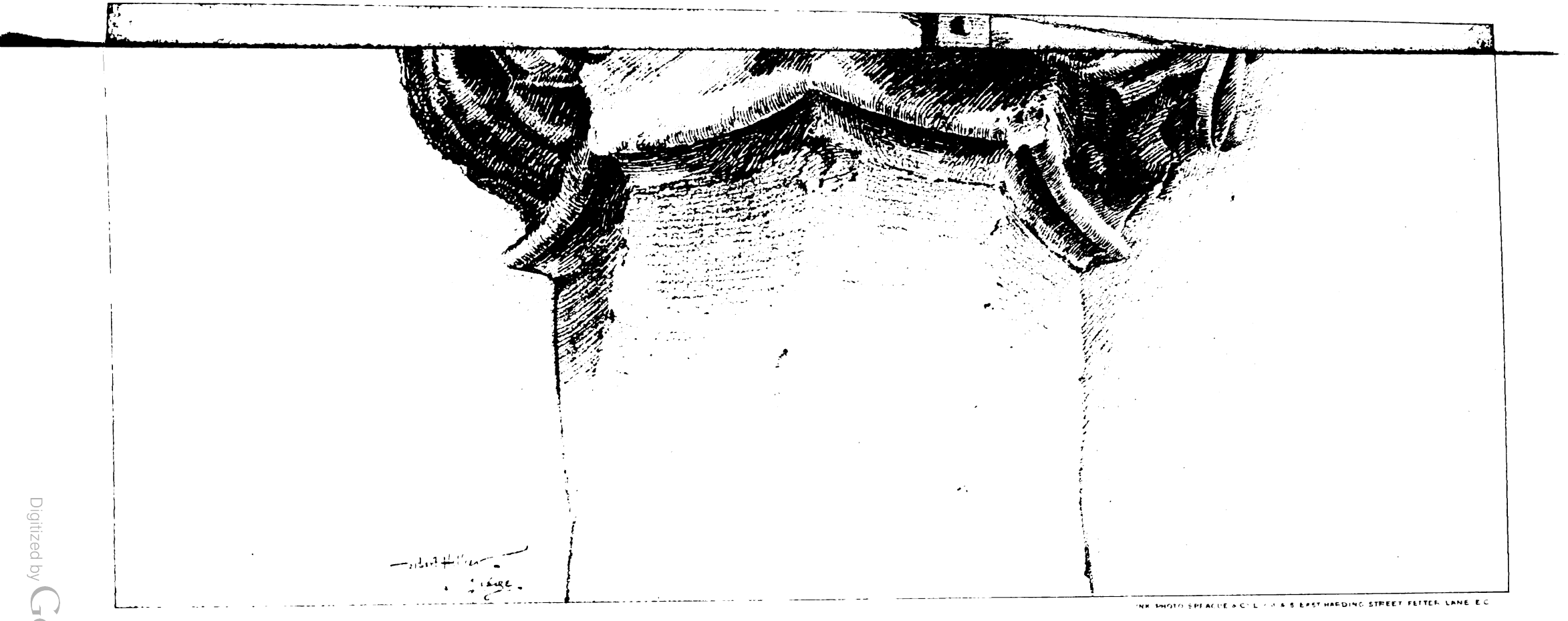

CAPITAL FROM LIEGE CATHEDRAL - Drawn by Mr Herbert Hillier.

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The Builder.

VOL. LXXIX., No. 3008. SEPTEMBER 29, 1900.

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Some Cities of Modern Italy.—Venice.

FOR half a century past the Ducal Palace has been the object of a continual interest in the world of art, and quite recently the public has been gravely informed in the newspapers that this celebrated building is in a most precarious condition, and will have to be rebuilt within the near future. Suggestions have even been volunteered as to its being "restored" in accordance with what is considered the original design—that is to say, with the portion next the Canal "della Canonica." Such statements have, of course, been received at their proper value by those who are acquainted with the palace and know something about the ordinary conditions of such buildings, but to the public such news was at least startling.

It seems true that a slight failure in the foundations on the side of the palace towards the Riva della Canonica (the canal spanned by the Bridge of Sighs) has more especially manifested itself of late years. This slight settlement has probably been in progress ever since the building of this flank in Renaissance times. The rest of the buildings are in the same state as they have been in for centuries, and therefore the nonsense published of late in the newspapers may have originated, as suggested in the report of the Ufficio Regionale, in the malicious insinuations of a discharged employee of that office, who also charges the Ufficio Regionale with want of care of the building. At the same time, to secure as much as possible the Riva della Canonica flank from farther deterioration, it is proposed to remove the heavy statues and marbles of the museum, and the books of the great library, from that portion of the palace where they are at present located. This, it is hoped, may have the desired effect and obviate more important measures.

The Ducal Palace of Venice was assigned as the home and headquarters of all the literary, artistic, and scientific societies of the city so long ago as the year 1823. Even in those days it was looked upon as a national artistic monument to be religiously preserved. Since then the greater part of it seems to have been abandoned to the emptiness and uselessness which has been the fate of so many old palaces during the nineteenth century. But although the original purpose of its erection has completely disappeared, and its huge rooms are seldom occupied by the learned societies, in a way it may perhaps be considered to be more largely made use of at the present day than at any previous period of its history. The enormous crowds of tourists who are marshalled through its otherwise empty rooms between the hours of 9 a.m. and 4 p.m. are quite astonishing, and especially on Sundays, when there is often difficulty in moving through them. Fortunately the floors appear to be in good condition; the weight of several hundred persons moving about in some of the great chambers is certainly quite equal to anything they were ever intended to bear. The income of the palace derived from entrance fees now amounts annually to about 70,000 fr. This sum is chiefly consumed in payment of officials, but a sufficiency remains for the maintenance of the building.

Many of the private palaces on the Grand Canal have been restored and subjected to necessary alterations and repairs for the purpose of letting out as residences for the foreigners who are the chief inhabitants of the city nowadays. These restorations have taken place chiefly during the past ten or twenty years, and in most cases they have been carried out with some regard for the conservative principles of modern times. A few of the more important examples are occupied by public offices and houses of business. The old patrician families whose names are still associated with them have long since faded into oblivion. It is even supposed that if the famous Republic were to be reinstated at the present day, not ten representatives of the ancient families could be found to carry on its traditions. In this respect Venice is unlike almost any other Italian city. In Florence, Rome, or Naples, for instance, the ancient families seem still to occupy the palaces of their ancestors, but in Venice one of the largest and most important of the old Italian aristocracies disappeared very soon after the fall of the Republic, just a century ago.

As a general rule, the ancient buildings of Venice are well cared for, and under the auspices of the newly-instituted "Ufficio Regionale per i Monumenti" much more may be expected to be done in that way in the future. An exception must, however, be made in the case of what appears to have been an old palace which has been recently restored and enlarged by a glass manufacturer named Baron Franchetti. This unfortunate building has been completely "restored" in the most unsympathetic, crudely modern style imaginable. Its reconstructed marble windows have a cast-iron rigidity of appearance by the side of neighbouring old buildings, and they are fitted with enormous sheets of plate glass with invisible iron frames. In fact, no better example of how *not* to restore an old building could be instanced than this; even the most ignorant tourist passes it by with a shudder. Unfortunately it stands in a conspicuous position on the Grand Canal, close to the iron girder bridge (the only thing with which it is in harmony), and produces a most unpleasing effect in that part of the city. The celebrated Ca d'Oro, a singularly rich example of the Venetian style, is said to be also in the hands of Baron Franchetti, and at present it is in process of "restoration," but it is to be hoped the "Ufficio Regionale" will exercise a sufficient control over the Baron's proceedings to prevent another disastrous disfigurement of the Grand Canal.

Not far from Palladio's wonderful church of the Salute, a simple unpretentious building in yellow brick, with the characteristic ogee-headed windows, is at present being erected. This is one of the largest,

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and, on the whole, most satisfactory modern buildings in Venice. At the end of the Guidecca Canal, farthest from S. Mark's, a district of the city unknown to the ordinary tourist, a huge flour mill with grain elevators, &c., has been erected during the last few years, but it is merely an enormous utilitarian building with vulgar "Gothic" details, and of no architectural interest. Some attempts are at present being made to provide new model dwellings for the poor, to replace the miserable and dilapidated hovels in which they have been condemned to exist for centuries past. There are several blocks of these near the Public Gardens, but the buildings are of a poor common place description, and the planning is not up to the mark of northern standards. However, with some attention to order and cleanliness they are an improvement on the old slums, and they have air space around them and proper drainage.

Amongst the modern buildings of the city should be noted the two enormous lunatic asylums, built on two islets in the great lagune towards Chioggia. However, they are not buildings of any architectural character; their outsides are of the plainest description.

No architectural or artistic monuments of any importance have been erected in Venice since the fall of the Serene Republic, about one hundred years ago, but during the last few years many more or less partial restorations of old works of art have taken place. The mosaics of S. Mark's Church have been restored over and over again. Artists of all ages seem to have had a special pleasure in replacing or adding to these works of their forefathers, and many of the latter productions are certainly very atrocious attempts. In the middle of the past century regular "restorations" were attempted, by Salviati, and afterwards by the Venice-Murano Company (an English syndicate), whose productions, having since fallen into decay, are again being restored. Very little of the outside of S. Mark's can really be considered old in any sense, except the monolithic columns with most of their capitals. The north and south sides of the church were completely rebuilt about twenty-five years ago, at the time the late G. E. Street and others made useless protests against this vandalism. The west front still retains a great deal of mediæval carving, and the columns already referred to are a curious study; where did they come from? They seem too small to have been stolen from Levantine classic buildings, in the way in which the later Venetians used to enrich their *patria*, and yet they are so evidently the spoils of other monuments.* Some of them have been the shafts of small Greek temples, perhaps; a whole series of the same section and the same variety of marble have the singular characteristic of a polygonal plan, without being fluted.

Internally S. Mark's retains a very venerable appearance, in spite of many restored mosaics, &c. The flooring, which was being subjected to all the destructive influences of "restoration" at the time of the celebrated protest twenty years ago, seems to have been afterwards abandoned in its original state in consequence of the protest. The portions which were then made new, show up in curious contrast with the old unrestored parts. In some places, where the tesseræ have really given way and the structure is in a ruinous condition, a mere filling-in of hard cement has been adopted, and the result, from an archæological standpoint, is satisfactory.

One of the most beautiful Renaissance buildings in the world, the little chapel of S. Maria degli Angioli, built in the fifteenth century, was restored about fifteen years ago, unfortunately before the introduction of the Government supervision in such matters. The restoration was not of so bad a character as might have been expected under the circumstances. The building is probably much in the condition in which it was left by its original builders. As an example of *cinque cento* construction it seems very defective; pieces of its marble incrustation are frequently giving way and falling down. In fact, it must be considered more as a huge shrine built in the open air, covered with a marble veneer, than a building in the strict sense; it seems almost to need protection from the weather.

To visit one of the thirteenth or fourteenth century churches of Venice restored in the sixties or the seventies, such as S. Maria del Orto or the Cathedral of Murano, carries one's fancy back to England and the more or less successful attempts of Sir G. G. Scott and G. E. Street to reproduce Italian Gothic churches on English soil. The type of Italian work which English architects of those days tried to assimilate is, perhaps, more especially Venetian than that of either Lombardy or Tuscany. The somewhat economical-looking, thin-walled brick and marble work of Venice was evidently found to lend itself to the exigencies of modern church committees and the benevolent church societies, better than the ponderous masses of the central Italian style. The huge brick façade, with wheel window and square pilasters, instead of buttresses, of Milan and Florence, has probably never been imitated in England; but the influence of the comparatively cheap Venetian church with a wooden roof is too well known to need a reference. In the case of S. Maria del Orto one feels as if one might be in an English church built in the sixties, because this particular church was so very completely "restored" about that same time, and in a way which has eliminated, as far as possible, every trace of the original building.

The "Ufficio Regionale per la Provincia Veneta" has recently published its "Relazione" for the years 1896-98; and this perhaps gives the very best résumé of the present state of the city of Venice in its artistic aspect. This Report, which is addressed to the Minister of Public Instruction, begins with an account of the repairs necessary to the Ducal Palace, and mentions various matters connected therewith which we have already embodied in the above remarks on that building. It then proceeds to treat of other public and private monuments which are more or less directly under its care, or subject to its influence. The campanile of S. Mark is in a perfectly sound condition, in spite of the false rumours as to its stability which obtain circulation from time to time. A German manufacturer of Milan has recently offered to place a lift inside it, but the proposal has been rejected as unsuitable for a monument of such historical associations.

The less important churches of Venice which have been repaired, or are in need of attention, are mentioned in detail. Amongst them may be mentioned the Church of S. Moise, the *barocco* front of which is in constant need of care. In the Church of S. Salvatore a proposal to insert one of those deplorable attempts at stained-glass windows which are still perpetrated in Italy has been put a stop to, and this action of the Ufficio Regionale is particularly laudable, as the chapel in which the window is situated contains an altar-piece by G. Bellini. In the same church the Ufficio Regionale has insisted upon the removal of certain curtains before pictures; such things are injurious to the works of art they are supposed to protect, rubbing and scratching the surface of the painting, and their chief use is merely to act as a means of extracting fees from tourists by the custodian. In several cases the Ufficio Regionale has exerted its authority to prevent the constant injury to paintings in churches by the dropping of candle-grease, and the harmful practice of swathing the monuments of the Doges and other architectural features of churches with damask hangings and trappings on festivals is earnestly protested against.

Applications for permission to sell the furniture, tapestries, &c., belonging to churches in the district have at times been favourably received, but, as a general rule, such alienation of ecclesiastical property is absolutely prohibited.

A question has arisen as to the non-national character of the two buildings, the Church of S. Giorgio degli Schiavoni and the Chapel of the Communità Evangelica (which contains a painting attributed to Titian). It has been decided that the first is to all intents and purposes an Italian church and national monument, but the second is now a private building belonging to a foreign (German) community, over which the Ufficio Regionale has no control.

Various monuments in the Church of SS. Giovanni e Paolo need repair, but as the guiding principle of the Ufficio Regionale is to avoid anything in the shape of "restoration," these repairs will consist merely of resetting such portions of monuments, &c., as may be loosened with age or accident, and nothing that is broken or defaced will be replaced.

Numerous references are made to alterations of old palaces and houses, more or less destructive to their historical character, but the Ufficio Regionale can only exercise a control over the outside portions. The ex-convent of the Carmine having been turned into a laundry, the Ufficio Regionale applied for its restitution as a national monument, but it proves to be absolute private property. It has, however, recently been rented by the School of Industrial Art, and the monumental portions are fortunately in safe keeping.

The Municipality of Venice is on the way to purchase several important public monuments. The catalogue of mural tablets, &c., in the city is being completed by Comm. Levy in accordance with the new rules. The schedules of the Ufficio Regionale are being properly filled up by private owners of works of art, but there is sometimes a difficulty in the case of provincial authorities and others, who protest against Government interference with their property. At Chioggia the cam-

* Many of these comparatively small Classic columns may have been stolen from the peristyle of some Greek theatre in the Levant. They were, perhaps, found convenient for ballasting the returning empty galley of the period.

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panile of the Duomo has been restored at a cost of 7,000 frs. At Vicenza the great hall of the Basilica Palladiana is causing anxiety, but the movement of the roof is being carefully studied and watched preparatory to important repairs, a scheme for which will shortly be laid before the Ministry. At Padua a list of the ancient painted houses is being formed.

A visit to Venice at the end of the nineteenth century is full of the deepest interest to every student of art and history; and it is with singular satisfaction that an old student revisiting the city finds it so little changed after the lapse of twenty-five years. The modernisations which are so very obtrusive in Rome or Florence have no counterpart in Venice; here no mediæval city walls remained to be pulled down, no opportunity has yet presented itself for the driving of a straight Via Garibaldi or Via Vittorio Emanuele through the crowded "calle."

Singularly deserted by every living vestige or characteristic of the Serene Republic, her palaces abandoned to the desolation of mere showplaces for tourists, or turned into cheap hotels and lodging-houses, her trade reduced to the manufacture of glass beads, the city is the mere shell of her ancient greatness. But although Venice has not kept pace with the rest of the world and is virtually in a state of decay, a probably larger population now fills the city than was the case in Republican times. This population is, however, of the poorest and most squalid order, and gives a very mean impression to the visitors from *terra firma*. The chief modern development to meet the exigencies of this increased population consists in the conversion of one of the largest of the old palaces into the "Monte di Pietà," and other palaces and convents into municipal offices and hospitals. Venice will probably never undergo the *sventramento* common elsewhere in Italy; it will survive in the next century as a curious example of a mediæval mode of life. How far such a system can be continued with a teeming population and modern demands for sanitation, suggests many difficult problems in the near future. The difficulty of disposing of the sewage increases as time goes on, and the condition of some of the small canals is often deplorable. If those which form backwaters out of the small amount of tide which takes place in the Adriatic could be completely closed, so much the better for public health; but the difficulty in the way of circulation, in a town where carriages are out of the question, renders the closing of these pestiferous little canals almost impossible.

Venice will remain for many a year to come the happy hunting-ground of the artist, whether for the mere painting of pictures or for the graver studies of an intensely interesting historic past. Circumstances do not admit of any change in the conditions of its life, and as it is no longer a centre of wealth and commercial activity, the means do not exist for so-called "modern improvements."

NOTES.

Art and Religion.

As usual, the relation of Art to the Church was taken up at the Church Congress; where, however, pretty much the same things seem to be said on the subject every year. Mr. W. Hole spoke in favour of mural decoration in churches, and wished to see a guild or brotherhood of church artists, who would be brought into touch with each other for their mutual help and encouragement, a guild which should include architects, painters, sculptors, workers in wood, metal, and glass —"all who were willing to devote a tithe of their time, skill, and labour to the glory of God and the service of the Church." Mr. Stirling Lee followed with a paper on the divorce between art and the Church, tracing this to the legislation against images in churches in Henry VIII.'s time, which was a check on our national ability at the time when art was making its greatest progress on the Continent. He remarked on what the world would have lost in the way of art had the Popes of that time shown the same "iconoclastic fury." But it must be remembered that the art which Julius II. and other Popes encouraged was hardly religious art; the æsthetic ecclesiastics of that day were not religious—often notoriously the contrary,—and looked on art for its own sake only, and not in any way as a handmaid to religion, for which they cared nothing except in an official sense. As to Mr. Lee's reference to the present attitude of the ecclesiastical law towards "images," we doubt if the mere liberty to set up conventionally accepted representations of the "Crucifixion and of St. John and St. Mary" would offer any very great opportunity to modern sculpture; it would only give opportunity for a kind of conventional religious art. Mr. G. F. Watts's communication in regard to art and religion, read at the meeting, is indeed a fine one; but it may be observed that Mr. Watts says nothing about "church art"; his temple is all Nature.

Memorial Tablets to the Woods.

THE City of Bath has paid a deserved tribute to the memory of the two architects, father and son, to whom the beauty of the city is mainly due, by placing memorial tablets on the houses which they occupied in Bath. These were unveiled, on Thursday last week, by the President of the Institute of Architects, with a certain degree of public ceremonial. One of them is on a house at 24, Queen-square, where the elder Wood lived, and the inscription runs "Here lived John Wood: B. 1704, D. 1754.' The other, to the younger Wood, is at 41, Gay-street, and is inscribed "Here lived John Wood, jun., B. 1727, D. 1781." In commenting on the work of the elder Wood at Bath, Mr. Emerson especially drew attention to the manner in which he had realised the need for a systematic grouping and aligning of buildings, squares, and terraces, in order to produce the best and most dignified architectural effect in a city. In this respect Bath, and Wood's system of building for it, form a standing lesson in regard to city architecture—a lesson much needed in this country. It is true that Wood had an opportunity, in the simultaneous building of a good deal of the city, which very rarely presents itself, in that manner, for immediate realisation. But it is perfectly possible, whenever a new street is formed or a new public building erected, to lay it out in accordance with a predetermined scheme, the details of which can be carried out little by little, but always with an eye to the final effect of the whole. This is the lesson which Bath, as laid out and improved by Wood, has to give us. It is an example of the dignity which accrues to a city from a thoughtful designing and laying out of its architecture and streets in conformity with a broad general design.

The Paris Exhibition.

As the time draws near for the close of the Paris Exhibition, it appears to become clear that, financially, it will not be a success. As far as can be ascertained not half the tickets are sold; the price charged by the hawkers during the last few weeks has never exceeded thirty centimes, and it will certainly become lower. The *concessionnaires* have been holding meetings in which their grievances have been ventilated, and deputations have interviewed the Minister of Commerce. The French people are now visiting it in thousands, carried up in cheap excursion trains from all parts of France. But for them it is a mere spectacle. For the purposes of education and intellectual enjoyment it is doubtful if the day of international exhibitions is not over. Those who desire to see particular subjects, either mechanical or artistic, can do so better at small exhibitions of particular things. Moreover, now that people can move about the world so easily, the products of a country can be seen in it by those who desire to be acquainted with them, so that the *raison d'être* of collecting everything from everywhere in one spot is very largely a thing of the past.

Electric Cables.

MR. A. H. HOWARD, the secretary of the Cable Makers' Association, has sent to all the members of the Institution of Electrical Engineers a paper giving a set of clauses for use in contracts for the supply of electric mains, and a list of twenty-one sizes of conductors, which we are told are to become the standard sizes after October 1, 1900. Eleven of the leading cable companies have signed this document, and presumably have considered it carefully. There is no doubt that the want of standardisation in the specifications drawn up by electrical engineers in the past has been a great hindrance to the progress of the industry. It has prevented makers keeping a stock of cables ready for delivery, as the sizes and combinations of wires necessary to make a cable of given cross sectional area are in many cases very numerous. The cable makers have at last also protested about the insertion of a clause in which the engineer is made the sole arbitrator. They want arbitration, but they think that it is inequitable to make one of the interested parties the only judge. The clause they suggest concerning the guarantee of the cables is a desirable one from the makers' point of view, but we think that it will not satisfy consulting engineers. They wish to limit their guarantee to making good "any fault due to defective material or workmanship" for a period of twelve months after the cable is laid. It is exceedingly difficult to prove that a fault is due to defective material, as the probabilities are that the defective material will be burnt up. Again, the only guarantee for good workmanship is for a representative of the consulting engineers to watch and test the cable as it is being made. Twelve months also is a very short period for faults due to inferior rubber, &c., to develop. Since more than a third of the total expense of an electric station is expended on the mains and ordinary electric tests are nearly useless to test the quality of the materials employed, consulting engineers

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will require a more stringent guarantee than the one the makers suggest. We think also that the table of standard sizes suggested is a very poor one. New sizes of wires are introduced which are not to be found in any British, American, or Continental gauge. After October 1, when a consulting engineer specifies for a cable 0·7 square inch in section he will get one made up of ninety-one strands of wire, each strand having a diameter of 0·098 in. A small calculation will show that this is only 0·686 of a square inch in section. Why should he not insist that each strand should be 0·099 in. in diameter, which would give a total section of 0·700 square inch exactly? We could name many youthful electricians who could easily make a far better table.

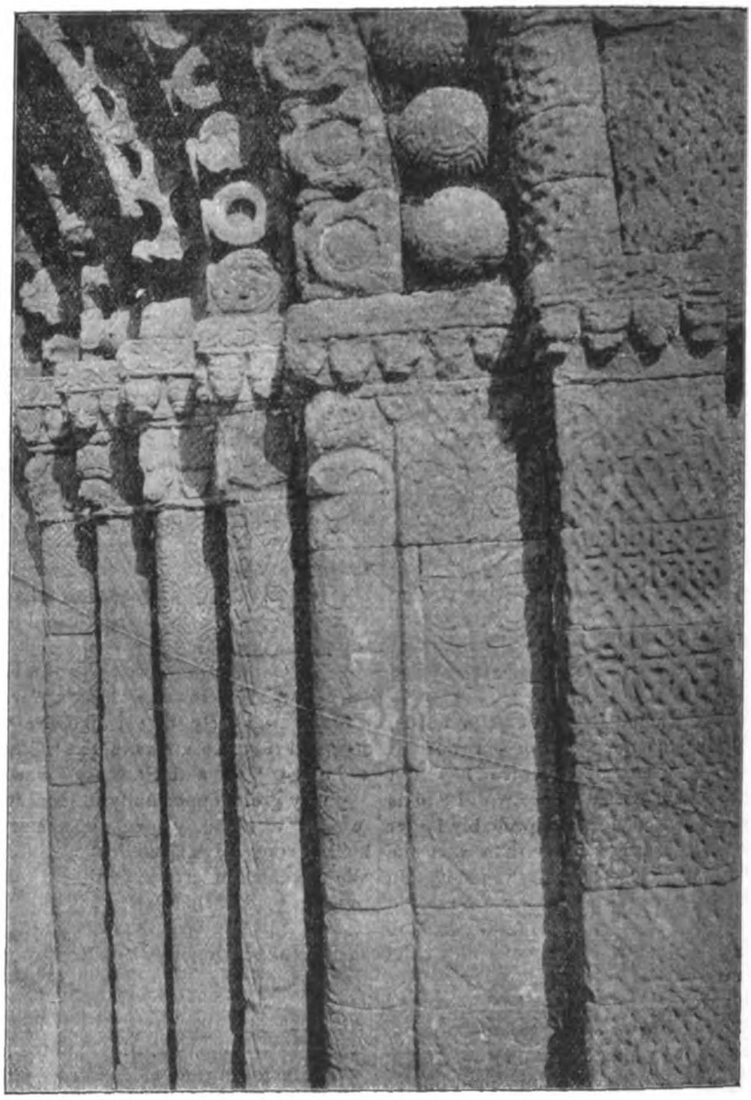
Telegraphic Isolation.

THE recent sudden destruction by fire of the chief telegraph and telephone office at Manchester, according to a correspondent in Saturday's *Times*, suggests the serious question of whether the central office in St. Martin's-le-Grand is adequately protected from a similar catastrophe. In winter-time we are accustomed to the breakdown of telegraphic communication, but this, as a rule, can be remedied in a few hours, as the cause is merely the breakage of a few wires. The breakdown at Manchester was much more serious, and illustrates that such an event may happen at any moment. The fire was apparently caused by the explosion of a spirit lamp in the neighbourhood of the test-room, and the dry woodwork and the inflammable coverings of the wires were instantly in a blaze. The serious consequences that followed such a trivial accident show that it is necessary to make telegraphic stations and telephone exchanges as fireproof as possible. At present there is far too much dry woodwork in them, and many of the materials used for insulating wires burn readily when a match is applied to them. With the high voltages now used in telegraphic work a fire might easily arise from the overheating of a wire. The use of lamp annunciators in telephone exchanges also will make special precautions necessary. The Manchester fire proves that the authorities were to blame, for such a fire ought to have been made a physical impossibility.

Sanitary Areas of Dartford.

DR. R. DEANE SWEETING'S Report to the Local Government Board on the prevalence of fatal diphtheria in the Dartford Urban and Rural Districts, though it chronicles a good many unsatisfactory incidents in regard to water-supply—dry-steined wells, "dipping-places" in the vicinity of polluting matter, &c., sums up with the opinion that "in all probability diphtheria has been imported at various times and in different ways during past years into all of the four sanitary districts of the Dartford Registration District, and that it has spread there commonly by personal infection. In three of these districts, viz., Dartford Rural, Dartford Urban, and Erith Urban, the spread of the disease has been largely aided by school-assemblage. Insanitary circumstances do not appear to have exerted any appreciably direct share in the spread or fatality of the disease, which has rather been kept alive by intermediate links of minor and often trivial sore-throat, connecting together the gaps in the incidence of recognised and notified diphtheria." Among the special points of sanitary import which require attention in each district, it is suggested that wells which are liable to pollution should be as far as possible abolished, and the Kent Company's water extended; in the Erith district the old Erith sewer and its branches, as well as other local sewers discharging on to the Thames foreshore, should be abolished; that in the district generally there should be better provision for flushing sewers and for water-closets; and in all the districts except Erith it is noted that action under the Housing of the Working Classes Act is required in regard to old cottage property. The report concludes:—

"The question of river pollution in the Registration District is one that concerns the Kent County Council as much as or more than the several District Authorities. Hitherto no action whatever seems to have been taken by that body with regard to the pollution of the Rivers Darent and Cray, which flow through three of the sanitary districts of the Dartford Registration District. The abundant pollutions which these streams receive have been described, as well as the points where the River Darent is taken for drinking, and passes over watercress beds. The County Council is evidently the body to take up the question as a whole, since, in all probability, both these streams receive pollutions before they enter Dartford Registration District."



Detail of Door, Clonfert Cathedral.

A Church in the Green Park.

IN the recently-published volume of the Harley papers there is a curious letter, showing that in the year 1713 it was proposed to erect a church at the north-east corner of the Green Park. That it was not built seems to have been the result of the opposition of Harley, then Earl of Oxford and Lord Treasurer. The letter runs:—"Pursuant to your commands I enclose a draft of the grounds desired by the commissioners for the site of a church. It is a corner of the park over against Devonshire House, that would be beautified by such a structure to terminate the houses, and it would put a stop to any further buildings on that side, and is not above an acre. The impossibility of finding another site in this part of the town, which, though it lies near St. James's Church, is in St. Martin's parish, has forced the commissioners to apply to you to intercede with the Queen for her approval of it. *Postscript.*—The prejudice that Devonshire House would receive by such a building is the greatest objection." This letter was thus endorsed by the Lord Treasurer:—"Concerning a church to be built over against Devonshire House. The Queen does not approve that suggestion."

Brechin Cathedral.

THE restoration of Brechin Cathedral, concerning which some particulars will be found in our general news column, though it is being carried out under an able and a very conservative architect, seems to involve a great deal of new work about the ancient

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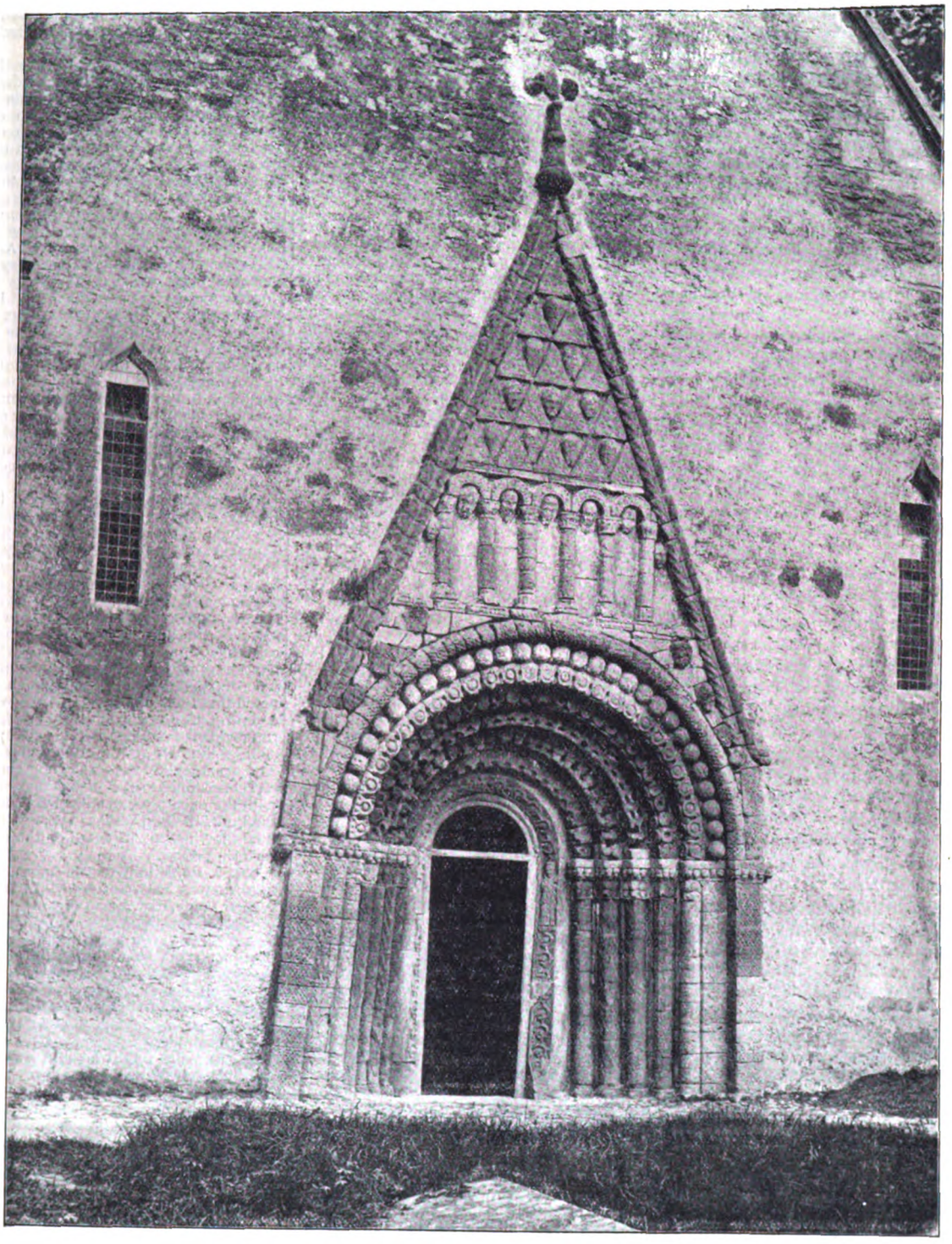

Door, Clonfert Cathedral.

building, which will leave it, we fear, rather like a modern church with some old bits in it. On the other hand, the incongruous flat ceiling and the galleries have been removed, which is so far a gain; and the foundations have been strengthened and rendered secure. The real defence for the new additions is that it is intended to make the church better suited for the spirit of public worship, and, by restoring the old plan, to provide for the seats lost by removing the galleries. This is a practical consideration which may rightly be considered to take precedence of questions of archæological sentiment — it seems indeed to be somewhat the case of Dunblane Cathedral over again; and on the whole it may be said that the balance of reasons is in favour of the work that is being carried out.

Clonfert Cathedral, co. Galway.

WE referred briefly, a week or two back, to the work which is being done at Clonfert Cathedral under the present rector, Canon McLarney, who has been making strenuous efforts to arrest the decay of the building and to put it in a more fitting condition for worship. The decayed wooden flooring has been removed, and "specially designed tiles of the most costly kind laid down." We have not seen the design of these tiles, but we should be inclined to think a plain but durable floor would have been more to the purpose than an attempt to unnecessarily thrust nineteenth-century design into the ancient building. The new choir stalls and Canons' stalls, of oak, are of course a necessary fitting for the carrying-on of the service. In the nave the square pews have been removed, the gallery at the west end taken down, and several arches, which had been filled up with brick or lath and plaster, opened out. The wall over the chancel arch was in an unsafe state owing to the decay of an oak beam which partially carried it; it has now been put in a secure condition. Other repairs have been carried out, and in the main we believe a good work is being done there; but when the rector says that he will be grateful "for gifts of chairs, stained-glass windows, vestry furniture, &c.," we have again to put a note of interrogation, and to ask whether it is proposed that the building should be filled with modern stained-glass windows from any or all sources, irrespective of style or design, as if stained windows were chattels, like chairs, for use in the church? We fear the rector's zeal is

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not entirely according to knowledge. We give a general illustration and detail, from photographs, of the remarkable twelfth-century doorway of the Cathedral, which we presume no restorer's hand will be allowed to touch.

Tintern Abbey.

CONSIDERING that some time since there appeared to have been some danger of the demolition of the glorious ruin of Tintern Abbey Church, it is matter for gratification that by purchase on the part of the Government it is now at all events safe, and we presume will be well looked after. The expenditure of public money in a purchase of this kind is a somewhat new departure in this country; there was a time when it would have been thought a waste of expenditure on a merely sentimental object; but a different way of thinking on these matters has been slowly developing in the public mind, and a Government which spends money on such an object will have no need to justify itself now.

The Photographic Salon.

THE eighth exhibition of the Photographic Salon is open at the Dudley Gallery. Like the previous exhibitions, it illustrates the fact that there are ways and means of treating photography so as to get rid of its hardness and over-accentuation, and give a landscape something of the effect of a monochrone painting by hand; and that portrait photographs may be arranged, in regard to lighting and in other respects, so as to give them an individualised character—sometimes by showing only the head clearly and "losing" the figure, or by treating an upright figure within a very narrow margin so as to give decoratively selected appearance; or by photographing on very rough paper, as in No. 48, to give the effect of a crayon sketch. Mr. G. Davison's "Tree against the Sky" (61) and his "Pine Glade" (127), and Mr. Hinton's "Summer Rain Clouds" (135) are successful efforts at giving an aerial landscape effect. In "On the Coast of Northumbria" (114) Mr. K. Greger has succeeded, by combining the incidents of a wreck on the flat shore and an effect of slanting sunlight through the low clouds, in conveying a poetic sentiment. But after all this is done, a great gulf separates such work from all that is properly and truly called "art." People may repeat, as much as they please, that they are making photography an art; they can never put it on a par with artists' work, and it is no use making believe. All this is contrivance rather than art. Look at such combinations of landscape and figures, too, as Mr. Robinson's "Blackberry Gatherers" (144) and "Flecked with Sunshine" (185)—what hopeless commonplace compared with a similar scene pictorially treated by a true artist. It is necessary to make a protest on the subject, because we see that even in journals of importance there is a disposition now to accept the situation and to support the claims of the photographers. It will not do.

LABOURERS' COTTAGES, LOUGHLINSTOWN, IRELAND.—A Local Government Board inquiry was recently held at Loughlinstown, in reference to a petition made by the Rathdown (No. 1) Rural District Council for a provisional order authorising the erection of forty-six cottages in the district, under the Labourers' Act. The amount of the proposed loan is 9,200*l.* Several medical men in the district gave evidence as to the insanitary condition of many of the cottages now inhabited.

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

I.—INTRODUCTORY.

IN the following papers the subject of Saxon ecclesiastical architecture is dealt with from the statistical point of view. The main purpose of them is to furnish a summary indication of the locality, extent, and character of the various remains of pre-Conquest churches scattered up and down the country. The questions where and in what numbers and degrees of preservation such remains are to be found, and what are the features common to them that mark them off from the monuments of other styles, are the only ones that immediately concern us. The art and ecclesiology of the structures will be only touched on incidentally in certain special cases where it has been thought desirable to single out exceptional examples and to direct attention to those points which make them of importance in the general study of mediæval architecture.

Before dealing with the actual monuments that form the subject-matter of this study, a word may be said about the subsidiary evidence of various kinds which helps us to elucidate the problems of pre-Conquest architecture. It may, in the first place, be assumed on grounds of general historic likelihood that Saxon England was, in proportion to its population, fully supplied with churches. Our old villages that date back to Saxon times were then to a great extent isolated and self-governing communities, and nearly always possessed in each case at least one landowner of wealth and position. The bishops were on their part pledged to the work of church extension, and with the impulse and the power to build both present, it is almost certain that each social aggregate would provide itself with a rustic shrine to be the centre of its common life. Some would go so far as to say that the village church was almost as common a feature in rural England before the Norman Conquest as in the days of Elizabeth or George the Third.

There are sufficient incidental references to churches in legal and other documents of the early mediæval period to bear out this surmise. Numerous churches are mentioned in Saxon land charters and wills and in Domesday, though there is no attempt to give a list of them, to discriminate their different architectural forms, or to indicate which were of stone and which of wood. A Domesday editor has remarked that "to refer to Domesday as in any way giving us correct information as to the number of churches is useless."* Domesday notices of churches are notoriously fortuitous, and vary for no apparent reason in the different counties. The silence of Domesday is clearly no evidence against the existence of churches in the various localities mentioned, but on the other hand the actual numbers indicated in some of the counties and in special places are evidence enough that churches were plentiful. Three hundred and sixty-four are mentioned in Suffolk, 222 in Lincolnshire, 186 in Kent, 132 in Hampshire. Twenty-four localities in Norfolk and sixteen in Kent had more than one place of worship apiece; Norwich city alone possessed fifty-four; Folkestone, Hoo, and Dartford, in Kent, respectively eight, six, and four. One manor in Hampshire, that of Chilcombe, which is said to embrace eight modern parishes, is credited in the Survey with nine churches, a number which would be fully up to modern requirements. Postling, in Kent, which in its fold of the Downs looks as if it had not changed since long before Domesday, had at that time two small places of worship. The churches mentioned in Domesday and the charters are referred to under the three terms *ecclesia, ecclesiola, capella*, and we are reminded hereby of the division of churches which seems to be indicated in the Latin form of a law of Canute by the terms *capitalis ecclesia, mediocris ecclesia, ecclesia adhuc minor*, and *ecclesia campestris*.† No definite architectural significance can be attached to these terms. There is one surviving instance of a Saxon *capella* or *ecclesiola* existing side by side with an *ecclesia*, an arrangement frequently indicated in the documents. This is at Deerhurst, in Gloucestershire; but the chapel is in architectural form a nave-and-chancel church of a complete type. The Saxon church at Bradford-on-Avon is probably referred to by William of Malmesbury as an *ecclesiola*, but it had nave, chancel, and a porch or porches.

One caution must be borne in mind in dealing with Domesday evidence. In cases where a church at a certain place is mentioned in the Survey and an edifice of early character is now to be seen on the spot, the tendency has sometimes been to leap to the conclusion that we have a Saxon building before us, though there may be nothing about it of pre-Conquest character. There was time between the Conquest and the Survey (after 1085-6) for Norman churches to be built, and this may have been the case at Albury and Abinger, in Surrey, where Domesday mentions churches, and we find buildings of early Norman date now upon the sites. It is a safe estimate that far fewer than half of the existing structures of pre-Conquest date are mentioned in Domesday, and some of the most conspicuous Saxon monuments, such as those in Northants, are ignored in the Survey. All the places in this county where Saxon churches exist are mentioned, but the entry *ibi ecclesia* is never added, though the church at Pattishall, a pre-Conquest example, is incidentally referred to in connexion with the location of a plot of land.

The presence on a site of carved tombstones and crosses of pre-Conquest type may be held to prove that there existed there in Saxon times a graveyard and in all probability a church. Such monuments, however, no more prove the Saxon date of the edifice in or near which they are now to be found than does the mention of an *ecclesia* at some special village in Domesday involve the antiquity of its present parish church. They do not tell us whether the church by which they were originally located was of stone or of wood, though it may be noted that their number, which in some parts, counting fragments, is very great, is at any rate evidence of considerable activity as well as skill on the part of the Saxon worker in stone. The ornamental forms and the figure sculpture on these stones are of importance in connexion with the decorative details of the churches, but the limits of the present papers will not permit the following-out in detail of the comparisons thus suggested.

Saxon fonts tell us no more than Saxon tombstones, but Saxon sundials have this further value, that, being of stone, they imply a church of this material. A full list of existing Saxon sundials is a desideratum, and would be a document with some significance for the stone architecture of the pre-Conquest period.

The monumental material with which we have primarily to deal consists of the existing remains of ecclesiastical buildings. If documentary notices are, as we have seen, fortuitous, the same might be said almost as confidently about the cases of actual survival. No general principle seems to be involved in the complete or partial preservation of certain examples and the total disappearance of others. We have no ground for saying that the churches which have entirely perished owed their destruction to the fact that they were of wood, while the stone ones were, as a rule, preserved. Local circumstances doubtless determined the treatment of the local shrine in the eleventh as in all succeeding centuries of the mediæval epoch. The timber churches that existed, no doubt in considerable numbers, at the Conquest were gradually replaced by stone structures, and this process is not yet complete, for the wooden walls of one example are still standing at Greenstead, in Essex. Many Saxon stone churches were pulled down and rebuilt by the Normans. At Lastingham, in Yorkshire, for example, there was a Saxon stone church,* but the fabric of the present edifice is Norman. This process of rebuilding has been going on ever since, for Saxon churches, as at Framingham Pigot, near Norwich, have been replaced quite in our own time by modern structures. The cases of complete or partial survival are, therefore, of an accidental or casual kind, and on this ground it may be questioned whether it is worth while to attempt to construct a *catalogue raisonné* such as the one now offered. A list of the sort will embrace not a few buildings that are still more or less completely Saxon, but the majority of the items must consist of little more than remains and indications that have had the good fortune to escape the ravages of time and the zeal of successive generations of builders. What does it avail, it may be asked, to catalogue a number of frag-

* "Domesday for Wiltshire," Lond., 1865, p. lxvi.
† Thorpe, "Ancient Laws," &c., p. 532.

* Bede, iii. 23.

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ments of old masonry accidentally preserved simply on the ground that they belong to a specially early period of our architectural history?

It may be admitted that if this work is done merely in the spirit of the collector, it may easily degenerate into something like a "fad." To inventory and label so many hundred specimens of Saxon masonry as if they were postage-stamps or beetles is not the proper way to deal with them. They have a human and historical as well as an architectural value, and this is not to be measured by the number of stones that make them up. A few cubic feet of walling are sufficient to establish for us on the spot a Saxon village church of stone, and this, with all its fittings and surroundings, its porch, its altar, its graveyard, was the centre of the social movements of that rural community that has remained till quite modern times the unit of the national life. It is a monumental link between ourselves and the older Britain of a millennium ago, and a point round which the patriotic imagination may fitly love to play. And further, these same few stones, when taken with other better preserved examples, may call up before our minds a building that in plan and technique may present striking and original features and furnish material for a new chapter in the architectural history of the Middle Ages. Readers of the recent paper by Mr. J. T. Micklethwaite on "Saxon Church Building"* will have noted the evidence there collected of forms and arrangements in our pre-Conquest churches that are abnormal, if not unique, in mediæval architecture as a whole. Since the appearance of the paper some striking confirmation has come to light of the views put forward in it. The discoveries at Barton-on-Humber and at Breamore, Hants (to be noticed in the sequel), are instances of this, and such discoveries must add a new stimulus to the investigation of these instructive and often puzzling vestiges of the past.

This investigation will have to depend largely on a study of features and details, for a very small piece of carving or moulding or masonry may supply chronological information of essential value, and may afford a means of correcting impressions derived from the general appearance and plan of a building. These last are in the Saxon period apt to mislead. Thus, for example, as a basilican church Wing, Bucks, seems naturally to take its place beside the seventh-century basilicas at Brixworth and Reculver, but as a fact, even apart from the advanced form of its crypt, Wing exhibits details that compel us to place it comparatively late. Bradford-on-Avon appears in general character a singularly early church, but when we reckon up its pilaster strips, and note the curious resemblance of its external arcading to that in the interior of the very Late Saxon church at Dunham Magna, in Norfolk, we begin to distrust the impression of great antiquity. On the other hand, the general aspect of the porch at Monkwearmouth, in Durham, would suggest a Romanesque rather than an Early Christian origin, but a careful interrogation of the various details and ornaments leads to the conclusion that the work is in reality of the early date assigned to it.

Hence it follows that the chronological significance of these details is very great, and they will help us better than anything else to arrive ultimately at a scheme of development within the Saxon period. All that is, however, attempted here is to describe and catalogue them, and it should be explained that in the discussion of criteria which follows there is no attempt to deal with the questions of the origin or use or Continental affinities of the various features that have to be passed in review. A study of the evolution of pre-Conquest architecture on the basis of the evidence of features and details is a piece of work much to be desired, but in this place we have only in view the simple question of Saxon or non-Saxon, and the purely statistical standpoint will as far as possible be maintained.

It may fairly, therefore, be claimed that there is more than a merely antiquarian worth in lists and detailed descriptions of pre-Conquest churches, for such must be the basis of any really scientific discussion of the early stages of the development of English architecture. That there is a continuity in this development, in spite of the Norman Conquest, is fully recognised in all serious studies, such as that of Mr. Prior in his "History of Gothic Art in England," and the facts of the primitive period have a significance for the ages of advance and of fulfilment.

In lists and descriptions of the kind spoken of completeness is an object of some moment, and should at least be aimed at, though it need hardly be said that the completeness of the present, or indeed of any practicable list, can be only relative. What is now offered represents a personal examination of about 300 examples, nearly all of which have been signalised by recent writers of greater or less authority as showing signs of a Saxon origin. Other examples no doubt exist that have come under the notice of local observers, though they are not yet generally known, and these would repay investigation. If this investigation, however, were carried out so completely as to cover every visible piece of Saxon masonry in all the British counties, the result would still not be a final one. There is a possibility that at any moment the stripping of plaster from a church wall of uncertain date might reveal unsuspected evidence of antiquity in the masonry below. It is a recognised fact that in a large number of cases the clearstory walls of aisled churches are of earlier date than the arcades which were cut through them in the Norman or later periods, and a good many of these are doubtless survivals from before the Conquest. The following *catalogue raisonné* is accordingly offered with all due reservations, though it has been carried far enough to give a reasonably correct idea of the subject embraced by it.

The system pursued has been to apply certain criteria to the examples offered for analysis, and to endeavour in the first place to distinguish those that have distinct pre-Norman features from the large class of buildings that are pretty obviously of the eleventh century, but are as likely to belong to the second as to the first half of it, and next to decide whether such pre-Norman features are decisive of Saxon origin. The list embraces accordingly three classes of buildings. In about 190 churches distinct pre-Conquest features have been noticed, and about 170 of these are marked in the list as Saxon. Many authorities who have studied this class of monuments would reckon up under this category a much larger number, but in the present state of knowledge a cautious attitude is desirable. Hence the mere appearance of a single pre-Conquest feature has not always sufficed to place a building on the Saxon side of the list, and about a score of examples, some of which really show Saxon details, such as double-splayed windows, are marked "doubtful," because the single feature in some cases hardly warrants a definite decision. Still more numerous have been the exclusions when a building, though of early character, lacks any distinctly pre-Conquest *cachet*, or has features that look suspiciously Norman. Well-known early churches, such as Ovingdene, near Brighton, or Lyminge, Kent, have for these reasons been placed on the Norman side. In regard to these decisions there must be conceded to every compiler of such a catalogue a certain right of independent judgment, the exact grounds of which cannot always be stated. The general aspect of a structure always counts for something in the decision about its date or style, and so, too, does its local position and surroundings. A very small piece of apparently Saxon detail in a structure, combined with a general look of antiquity, or with a broad resemblance to neighbouring buildings where similar detail is far more pronounced, may suffice to place an example in the pre-Conquest list, whereas a single Saxon feature in a structure which in itself and in comparison with its neighbours would be pronounced Early Norman may be reasonably regarded as a case of survival. In other words, the criteria, like a soldier's orders, must be interpreted in the light of common sense, and need not, in every conceivable case, be blindly followed. The writer would be the first to admit that his judgment is fallible, but the decisions on which the catalogue is founded are independent ones, given after a dispassionate consideration of all the evidence within his reach.

A further explanation may be given of the sense in which the word "pre-Conquest" is employed. It refers to style rather than to exact date. Just as the earliest work at Westminster is Norman, though executed before 1066, so buildings that are still essentially Saxon may have been actually reared after the accession of William. From the present point of view the question of exact date is not material. We have seen that there is a substantial reason why it is worth taking trouble to get at the facts of Saxon building. It may be possible by so doing to add a chapter to the great history of the development of the forms of religious architecture in the Middle Ages. If we can establish a Saxon style, or even efforts and experiments which might have resulted in a style, this has been done, and for this we need to mark the distinctions between Saxon work and Norman rather than to find the exact date of this or that particular structure.

* *Archæological Journal*, lvii.

STAINED GLASS AT THE PARIS EXHIBITION.

THE art of the glass painter and stainer has made so many advances in new directions the last ten years, that it is much to be regretted the newer influences at work in this craft are not shown in the British Section at the Paris Exhibition. But other countries are not so inconspicuous as we are in this department, and the Britisher will naturally turn to our next door neighbour, the United States, and take note of what our cousins are doing, for they make quite a bold show. The most distinct feature about these American windows is the make of the glass itself. Most of our readers are already familiar with the moulded glass of Louis Tiffany, and the visitor to the Exhibition has the chance of seeing—not, it is true, under the most favourable conditions, for the light is not direct upon the windows—what are the effects American glass painters aim at when they lead this glass together. They are right to value to the utmost the quality of the glass itself, a thing that was lost sight of far too much by the glass painters of a generation ago, and entirely ignored in the last century. In some of these American windows very little pigment is put upon the glass, for by moulding each piece as it is required *chiaroscuro* is obtained in a quite beautiful way; but so far as one may judge at Paris there appears to be an excess of opalescent glass which has a somewhat milky appearance. This may in a strong light disappear, but apart from that, great technical skill and scientific resources—for the making and staining of the glass itself touches the chemical more than the artistic side of the craft—have invariably led to the downfall of the art and its subsequent degradation, instead of its development and progress. The disposition to use your craft merely to display technical advantages and mechanical gains is great, and when this takes place the artist is merged in the artificer and manufacturer. It is not unlike the skilful carver using cherry stones wherewith to display his hand cunning. We know that the glass painters of the fourteenth century, with all their limitations, technical and otherwise, produced some grand windows, in spirit, harmony, and adaptation of means to end without rival; and though we are no advocates of the adherence to usages or customs, that keeping to the letter instead of the spirit of the Middle Ages, and elevating methods, because employed by the old workers, into canons, but on the contrary are glad to recognise the stretching forth towards untried methods which we meet with among the younger men; we do at the same time feel that with all the resources before an American stained-glass painter he must be strictly on his guard lest he should end in merely becoming a sublimated advertisement of materials. One's means can so soon control one, and that seems to be the danger ahead with Americans. It is in the air in their country much more than it is in an old country such as this, this perfecting of means to the exclusion of all else; and individuality goes when that is the chief consideration.

When we examine these American windows as works of art, and, ignoring the mechanical processes involved, look at them as the embodiment of ideas, the expression of an individual, we cannot say that we see the advance here that we do on the technical side. In some cases the flesh is over-painted, and the glass around being almost untouched gives these portions of the window undue prominence. Then that statuesque simplicity which it should be the aim of the artist to secure, if he wish to obtain the full effect of his resources, is wanting, or only partially secured; and it is easily understood why, if, as we have pointed out, the craftsman is all the time thinking of the materials he is using instead of the ideas that should fill his mind. There are no windows in the American section, in our judg-

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ment, that are as well designed or coloured as, say, the St. Cecilia or Faith, Hope, and Charity windows in Christchurch, Oxford, by Burne-Jones and Morris, and these have been in the cathedral these twenty-five years. And among the younger men we have seen windows (one we think of by Mr. Louis Davis) in which ordinary glass and methods were employed, and yet the result was delightful, because the artist controlled the work instead of being dominated by his materials; it was the artist's mind and not the manufacturer's that spoke.

Turning to the painted glass of other countries, the impression left upon the visitor is that a nicely-balanced taste, a controlling restraint, would greatly improve the works displayed. The colouring is either heavy or vulgar, and the painters do not appear to understand the proper use of white glass. It seems to us that a fair proportion of white glass should always be employed in a window if it is intended to be gem-like in effect, and this is particularly the case when working on a large scale. Coloured glass should be looked upon to a great extent as gems with white glass as a setting; certainly the most successful windows are designed on this plan, but the foreigner looks upon a church window as an opportunity for using all the coloured glass obtainable, and the result is a *hot*, crude effect, instead of a *cool*, delicate one.

Glass for domestic purposes is better, and there are many admirable examples of windows in which the design is obtained entirely by the leading and the careful selection of coloured glass, *no* pigment being employed. The English craftsman can here learn some valuable lessons in the designing of leading and the introduction of colour as accents. For domestic purposes much restraint should be shown in colouring, lest the effect be more suited to a public-house or restaurant than a private dwelling. Some of the old Dutch and Flemish glass, in which coats-of-arms in enamels with the design around supporting the heraldry carried out in tracing brown and yellow stain on white glass, are in every way admirable. The enamels took the place of gems, and the white glass was only just broken up here and there with paint, which formed opposing lines to the leads arranged on a geometrical plan.

Some of the windows at the Paris Exhibition are planned so that the leading produces the design with the use of coloured glass, and this is very cleverly managed. The coloured glass being sparingly employed is very choice of itself, and here the American makes of glass are seen to great advantage, for our cousins produce some very beautiful coloured glass—quite fantastic, in fact—glass that, twenty years ago, was not dreamed of in a glass-painter's philosophy, for then it never got beyond flashing a ruby on a blue or ruby on a yellow.

The general tendency all over the world is to let the leading take the place of paint on the glass, and to produce the effect by it and the uxtaposition of coloured glass. Morris, to whom we owe so much for having taken glass painting out of the workshop to put it in the studio, used many of his leads in a quite arbitrary fashion, in this matter following the mediæval craftsmen. Where a lead is not really wanted it should be left out, and the rule undoubtedly should be to use leads as outlines as far as is possible, also to keep paint off glass where form can be suggested without it; but on the other hand draperies are much improved ofttimes by delicate patterning, and a judicious amount of shading is also helpful; the dulling of some glass by "matting" also enhances the general brilliancy of the window, for one does not want every part of a church window to be glittering.

It comes to this: that the craftsman should never become the slave of any shibboleth, and this truism he must never lose sight of. It is the rushing to extremes that is so harmful. One generation of craftsmen do a certain thing or work in a particular way, and then another guild of craftsmen, instead of progressing by sure steps, turn aside and try to be original all through, and end by becoming just as great slaves to one method as ever did those who worked before them, whom they deride. The way men will tie themselves down to arbitrary methods is extraordinary, and so much of the painted glass seen in our churches is uninteresting because there is a slavish adherence to the past, the craftsmen being trammelled by precedent instead of being at liberty to learn of every one and use all means and methods that are legitimate in the carrying-out of his ideas. The one good of such a show as the one under review is that the knowledge of the whole world is there focussed, and the visitor should be able to learn at every turn either what to do or what to avoid.

ARCHÆOLOGICAL SOCIETIES.

KILDARE ARCHÆOLOGICAL SOCIETY.—This Society held its annual excursion meeting on the 12th inst. The members assembled at Harristown railway station, and proceeded to Coghlanstown, where they inspected the ruins of the old church and the Eustace "Cross Shaft." We gather from a report in the *Dublin Express* that Lord Walter Fitzgerald read a paper on the antiquities of the place. He remarked that the Eustace family at an early date were the proprietors of this district, and in 1535 Christopher FitzMaurice Eustace, Cotlanstown, was hanged for participation in the rebellion of Silken Thomas, and his possessions forfeited to the Crown. The churchyard of Coghlanstown lies near Storebrook demesne, a short way from the road leading from Kilcullen Bridge to Ballymore-Eustace, and four miles from the former. Near the burial ground to the south-west is a blessed well called St. James' Well, which, the journal of the Society stated, was dedicated to St. Michael. That, however, was a mistake. The ruins of the old church, though much overgrown with ivy, are in a fair state of preservation. Internally the church measures 50 ft. in length and 17 ft. in breadth, with walls 3 ft. 6 in. thick; the side walls appear to be their original height. There is a built-up doorway in the west wall, and above it a window; a little belfry, portion of which has recently fallen to the ground by the growth of ivy, tops the gable end. An arched entrance in the north wall leads into the church, and on either side of it is a small square niche. A special feature is that close beside the entrance on the inside is a doorway leading to a flight of steps, which winds around to a doorway-like opening into the church, about seven feet from the ground, but the steps do not ascend higher. Externally there is a square projection from the wall in which this short staircase is. Between this opening and the east wall is an ogee headed window, and close to it a square niche (the locker), near where the altar stood. The east wall is lit by a handsome little ogee headed window having a double light. In this wall there is a square niche to the right of where the altar stood. The south wall contains a niche near the east end, out of which the piscina projected; two more ogee headed windows are pierced in this wall, and then, opposite to the entrance in the north wall, there is a wide arched recess lit by a narrow-headed window. This recess causes a square projection externally. With the exception of the west and north windows, the remainder have their cut limestone jambs entire; the doorway and windows have a wide splay. There are no interments visible inside the church ruins. The head of a rude square font, pierced in the middle, lies sunk in the ground near the recess, and is formed out of a rough block of granite about 2 ft. square. There are two objects of interest outside the church ruins—an ancient cross base, and portion of a sixteenth or seventeeth century cross shaft belonging to the Eustace family. The cross base is situated on the north-eastern portion of the burial-ground. It consists of a roughly squared granite boulder, 32 in. by 21 in., having a socket cut in it 16 in. deep, and in the side of about 15 in. by 9½ in. The cross itself is not now to be found in the churchyard. The Eustace cross shaft is of limestone; in its present fractured condition it measures 2 ft. 6 in. in length, with faces of 10 in. and 7 in. At the upper end is a projection all round, on which is a socket 5½ in. by 2½ in., which probably held the cross-head. An inscription in raised letters ran all round this projecting band, but a few of the letters can only now be deciphered, owing to breaks and weathering. At the present time this cross shaft is being used as a headstone near the south-east end of the ruins. On each of the faces is a shield, one of which bears the inscription in incised lettering — "Eustace, Lord Portlester," and below it the date 1462. Another shield bears the Fitz-Eustace coat-of-arms, and on the other two are a couple of fleur-de-lys and a serpent. There appears to be nothing else of interest in the churchyard, and no headstones of any age. Quitting Coghlanstown, and proceeding to Ballymore-Eustace 2½ miles further on, a small ancient cross was pointed out close by the roadway, but rather obscured by the thick hedge which intervenes between it and the road. It is a small, plain, rough, unringed granite cross of ancient date, and stands 4 ft. 6. in. above ground. Across the arms it is 31 in., with sides 14 in. by 9 in. in width. Without digging at the foot of it, it is impossible to say how much of the shaft is below ground, and whether or not it is fixed in a base. There is a tradition that when it was being conveyed towards the churchyard it either got damaged or the conveyance broke down, and so it was stuck in the ground where it now is, namely, on O'Connor-Henchey's demesne of Slanvebrooke. Arrived at Ballymore-Eustace, which was reached about noon, a stop was made at the parish church, which is surrounded by trees on the top of a hill overlooking the village. The graveyard contains two ancient crosses, and close by one of these the party gathered to hear a paper read by Sir Arthur Vicars on the history of the place. The name Ballymore, he explained, means the "great town," the other portion of the name being derived from the once powerful family of Eustace, which sprang from the Poer or Power family in the fourteenth century, and which owned such extensive possessions between that place, Kilcullen and Naas, that the district was at one time called by the annalists "Criche Justasach," or the Eustace territory. Very shortly after the Anglo-Norman invasion of Ireland, Ballymore became one of the principal manors belonging to the Archbishops of Dublin, who erected a castle there for the protection of their tenants and property. It must have seen its full share of war and rapine, as it stood on the edge of the Pale or English land, close to the mountainous country that for centuries sheltered the brave and turbulent septs of O'Toole and O'Byrne, who never lost an opportunity of harassing the new settlers on their ancient patrimony in Kildare, out of which they had been driven by the Normans. Of Ballymore Castle not a trace now remained; its very site is forgotten, though tradition says it stood on Garrison Hill. The paper went on to sketch the history of the castle and its neighbourhood. Ballymore, like most of the other towns in the County Kildare, suffered greatly during the troubles in 1798. Several of the houses were burned, including the Protestant church, and the place now contains no relics of antiquity except a couple of unsculptured granite crosses, which, though ringed, are not perforated. The smaller cross of the two is now only 6 ft. in height. It is fixed in a base, and most of the head is broken off. It stands amongst the graves to the south-east of the church. The other cross is 11 ft. in height above ground. On either side of the shaft near the head is a large boss. Another one projects from the centre of the head on one side only. In comparatively recent times—in 1689—some incised lettering was cut on the arms outside the double ring. The cross stands close to the church on the north-west side. At the east end of the church the foundations, overgrown with briar, of the old church, dedicated to the Blessed Virgin Mary, are traceable. The party next proceeded to a place called "The Piper's Stones." Here, again, Lord Walter Fitzgerald had some information prepared for the members, which he read. He explained that the existing objects of antiquarian interest lying a short distance to the south-west of Ballymore-Eustace are three in number. In the first place there are the large boulders of granite placed in a circle 31 ft. in diameter in the townland of Broadleas Commons, called "The Piper's Stones." They are now twenty-nine in number. Formerly they made up a complete circle of closely-placed boulders, though now there are large gaps in the ring showing where in times past many had been broken up and carried away for building purposes. At a place called Athgreney there is another similar circle of stones, and in the Deer Park, near Blessington, formerly there was a third one, each called "The Piper's Stones," but the latter was demolished years ago for building purposes. Though these stone circles are thought by some to be connected with Druidical worship, they are probably sepulchral monuments, and may have answered both purposes. A quarter of a mile to the north-east of "The Piper's Stones" are the remains of a pagan sepulchral moat, called Knockshee, meaning "The Fairy Hill." Little is now left, three-quarters of it having

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been demolished years ago, probably by some farmers, for the purpose of top-dressing the adjoining lands. In Pagan times annual or triennial fairs took place at these moats in honour of a dead chief, and were partly commercial and partly religious gatherings. On the introduction of Christianity it is very remarkable how many of the primitive churches were built in close proximity to a moat. It was clearly intended that the power of the Church should gradually attract the assembled crowd from the moat with its Pagan associations, and draw them under religious influences. Half a mile to the north-west of "The Piper's Stones" is a prostrate granite monolith, known as "The Long Stone." It formerly stood in a small rath-like enclosure now levelled, and which was thrown down in the year 1836. Curious stones, which closely resembled that known as "The Long Stone," are to be found at Furness, Cradockstown, Punchestown, Newtown (Tipperary), Kilgowran, and Mullaghmast. These "Long Stones" were also sepulchral monuments, though at the same time they may have been objects of worship, as we are told in the "Annals of the Four Masters."—This concluded the day's proceedings.

COMPETITIONS.

WALSALL MUNICIPAL BUILDINGS.—On the recommendation of the assessor, Mr. J. Macvicar Anderson, F.R.I.B.A., the General Purposes Committee of the Corporation have recommended the Council to adopt the design of Mr. J. Glenn Gibson, of 4, Gray's Inn-square, London, W.C. The other premiated designs, in order of merit, are those sent in by Messrs. Cranfield and Potter (London), Messrs. Pite and Balfour (London), Messrs. Cackett and Burns Dick (Newcastle-upon-Tyne), and Mr. James A. Bowden (London), each of whom becomes entitled to a premium of 100*l*.

BUILDING TRADES' GIFT TO THE NATION:

HOMES FOR DISABLED SOLDIERS.

WE are asked to announce the following further list of contributions:—

	£	s.	d.
The Birmingham Master Builders' Association, and instalment (per Mr. W. Sapcote)	200	0	0
The Manchester Builders' Association	65	3	0
Mr. Samuel Warburton (Manchester)	20	0	0
The Longridge Builders' Association	9	5	0
Workmen of Messrs. Thompson & Beveridge	7	11	8
Association of Clerks of Works and Builders' Foremen (Bristol)	5	5	0
The Preston Builders' Association	5	5	0
Messrs. J. & W. Simpson, and Workmen	3	15	6
Mr. J. Parsons, and Workmen	3	0	0
Workmen of Mr. Samuel Warburton (Manchester)	2	11	6
Mr. James Kent, and Workmen	2	11	6
Workmen of Mr. A. E. Symes (Stratford)	2	2	0
Workmen of Mr. F. Britton	2	2	0
Messrs. W. H. Lambert & Sons, and Employees	1	10	6
Mr. J. A. Murray, and Workmen (Reigate)	1	4	0
Mr. H. R. Oldrey, and Workmen	1	1	0
Mr. W. Carr, and Workmen	1	1	0
Employees of Messrs. Bray & Pope	1	0	0

TRADE CATALOGUES.

MESSRS. RICHMOND & CO. send a well-illustrated catalogue of gas-heating apparatus of every description. Numerous illustrations are given of cooking apparatus for use in large hotels and restaurants, of hot closets and plate warmers, of water-heaters, and of washing, ironing, and drying apparatus. A water-heater is described which requires no water storage, tank, or boiler, and with which the consumption of gas is automatically regulated by the consumption of hot water. In view of the fact that a considerable proportion of carburetted water-gas is mixed with the coal-gas supplied in many districts, and that water-gas is heavier and requires a different proportion of air to that required by coal-gas, the special "water-gas attachment" figured in this catalogue may prove beneficial in many cases.

The Bon-Accord Acetylene Gas Company send a catalogue of acetylene generators, lamps, and burners. Illustrations are given of acetylene search-lights, of portable acetylene lamps for contractors, and for harbour and railway lighting, of acetylene street lamps, and of apparatus for use in photographic studios. We are glad to observe that a word of warning is given regarding the use of ordinary coal-gas fittings for acetylene. As acetylene gas is used under a higher pressure than that under which coal-gas is usually supplied, the ordinary gas brackets and fittings are generally too defective for use with acetylene. The Bon-Accord Company states that it employs skilled gasfitters, and will undertake the whole work of fitting pipes and brackets for use with acetylene.

We have received from Messrs. Mather & Platt, Limited, Salford Iron Works, Manchester, two beautifully illustrated pamphlets describing their dynamos and motors. One of them was prepared in connexion with their exhibit at the Paris Exhibition, which we recently described. Illustrations are given of many large combined engines and dynamos recently supplied by this firm. Incidentally these prove how rapidly electro-chemical industries are developing in this country. They have recently supplied seven very large combined engines and dynamos to a firm which uses them for the production of caustic soda and bleaching powder. We were glad to notice also that there is a demand for polyphase generators in this country. The pamphlets show an overhead conveyor for carrying parcels from one platform to another of a railway-station, which is of very neat and novel design, and ought to prove most useful. For small powers they still manufacture their well-known "Manchester Dynamo." The steel-clad type of motor made by this firm fulfils all the conditions of the most stringent fire-office rules, and their motor starting switches and regulators are cheap and well designed.

The Consolidated Telpherage Company, of 20, Broad-street, New York, has sent us their "circular No. 7" describing aërial cableways and tubular despatch. In addition to many novelties which we recently described, illustrations are given of an overhead telpher line, at Ampere, N.J., for carrying castings from a foundry to an electric works.

Finch's Sanitary Engineering Company send us a most useful catalogue of underground conveniences erected by them, with practical information for surveyors to assist them in designing others. A whole set of large-scale plans are given, showing the arrangement adopted on different shaped sites, with a short specification of the fittings, and a ruled blank page opposite for memoranda. We are glad to see what seems rather an innovation on some of the plans, but is a very desirable one viz.: the provision of free urinals for women in addition to the penny closets. The catalogue also includes details of water-waste preventers, manhole covers, channels for inspection chambers, lavatory basins &c.; and a short list of weights of animals and men, which is strictly connected with the main subject of the catalogue, since so many of these underground conveniences have to carry traffic over them.

Messrs. Doulton send us their new catalogue of sanitary specialities for hospitals, a department of sanitary work which, as they remark in their preface, has made more rapid advance than any other. In designing these fittings the endeavour has been to use glazed ware wherever possible, to keep everything clear of the floor, and in all operating and hospital workrooms to have treadles for working valves and wastes, to avoid touching them with soiled hands. The catalogue includes the "Simplicitas" closet with a non-absorbent seat; the pedestal "Simplicitas," of special strength; the metallo-ceramic joint as applied to the same type of closet; cast-iron rolled-edge baths with metallic enamelling—we are glad to see that these are treated with entire simplicity, instead of that misplaced so-called "ornament" with which baths are so often disfigured; hospital baths on wheels; glazed-ware lavatories, spray lavatory for operating-room, &c. The drawings are beautifully produced; it is a kind of sanitary catalogue *de luxe* in fact, as far as paper and engraving are concerned.

Messrs. Coligny & Fullford send us their large catalogue of lamps of every description—suspension lamps, vestibule lamps, hand and spirit lamps, stable or garden lamps, &c.; regenerative gas lamps for station lighting; the Coligny-Welch lamp for railway carriages, and the Coligny-Welch signal lamp we presume also for railway use. In the matter of practical efficiency of lamps the catalogue promises admirably; but in regard to the more ornamental kinds, for use in sitting-rooms and halls of houses, the firm would be wiser to get an artist to make them some designs—those which are shown are mostly very commonplace in taste and over-ornamented.

Messrs. John Spencer (Wednesbury) send a catalogue of their tubes and fittings for wrought iron, gas and water supply, with priced schedules of sizes; also wrought-iron coils, pit and mine props, drive points for wells, boring tubes, high-pressure hot-water tubes, iron and steel ascension pipes, malleable iron unions, &c.

The Vandergrift Land and Improvement Company send us a kind of illustrated album of "Vandergrift, Its Homes and Industries," with an embossed figure of the Apollo Belvedere on the back (we do not see the connexion of this decoration with the subject of the book). Vandergrift appears to be "the home of the American Sheet Steel Company, the Chilled Roll Foundry, and the Vandergrift Lumber Company": it is, in short, one of those immense manufactories which have become the centre of a kind of town entirely formed by the residences of the company and the employees. No information is given; it is only a set of pictures intended to convey an idea of the extent of the place, and the charms of its habitations. They omit the small detail of mentioning where Vandergrift is situated, except that the river winding past it is called the Kiskiminitas.

The "Souvenir Worthington" is a pamphlet issued by the Worthington Pumping Engine Company containing illustrations of their pavilion at the Paris Exhibition and of the machines exhibited or at work in the Exhibition.

Messrs. Sissons Bros. (Hull) send a leaflet describing and illustrating some of the tints in their sanitary washable distemper, which they claim covers double the surface of the same quantity of white lead paint, and that the labour per square yard is 40 per cent. less than in laying on oil paint. It is made in sixty tints.

Mr. W. Wilson Cobbett sends a small ornamental advertisement of the "Scandinavia M. C. M." belting for driving machinery, but it only contains recommendations of the belt, without any information as to its material or structure.

Messrs. Johnson & Phillips, of Old Charlton, Kent, have sent us a handsomely illustrated catalogue of their "Ark" lamp and arc lamp accessories. It is devoted exclusively to describing arc lighting and the requisite appliances, and contains a good deal of information which will prove useful to those who are considering the relative merits of the various kinds of arc lamps. This information is often conveyed in a striking manner. For example, a photograph of the carbons used by an "open" type arc lamp in the course of the year is contrasted with the carbons used by a lamp of the "enclosed" type. The former cost 3*l*. 16*s*., the latter only half-a-crown. The lamp itself is favourably known to electricians, and it is stated that there are over twenty thousand in use. Trimming is only necessary once every four or five weeks, and this can be done by an unskilled person. The coloured illustrations in this catalogue are exceedingly well-done, the metallic lustre of the copper fittings of the lamp being almost exactly reproduced. We were favourably impressed with the lamp standards shown, and the design of the wrought-iron brackets.

The catalogue of "English Electric Bells &c.," issued by Messrs. Julius Sax & Co Limited, Eagle Works, Coldharbour-lane, S.E., describes fully the many types of bells, pushes, indicators, &c., made by this firm. We note that there are some entirely new patterns and designs, and several novel appliances. The list of "alarm contacts" for protection against burglary is an interesting one. We have "burglar alarm matting," sold at a few shillings per foot, which rings a bell when trodden on and can be concealed beneath carpets and rugs. There are also "burglar alarm contact frames" which ring when touched, "thread trap" alarms, &c. A novel direct-reading testing set is described for measuring the resistance of lightning conductors. Very full "specifications" are given of each item in this catalogue, so that customers know exactly what Messrs. Julius Sax & Co. keep in stock. The London Fire Brigade use the system of electric call bells devised by Mr. Julius Sax.

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Illustrations.

NEW PREMISES ON THE SITE OF CHRIST CHURCH, BIRMINGHAM.

THIS block of building, which covers an area of over 2,460 square yards, is rising upon the prominent site formerly occupied by Christ Church, Birmingham, against the demolition of which, some two years ago, there was a considerable, but ineffectual, outcry raised.

The new buildings are of Horsley Castle stone with green slate roofs, and are almost entirely commercial in character, comprising for the most part shops, showrooms, and offices, but there are certain suites of rooms which may be adapted for club premises or kindred purposes.

The view given shows the frontages to Colmore-row and Waterloo-street, with a

New Premises, Birmingham. Block Plan.

glimpse of the dome over the circular corner at the junction of Colmore-row with New-street. The block plan shows the general lines of the site.

The façade to New-street will be similar in character to that to Colmore-row, but as yet this portion of the building is not commenced, owing to the unexpired leases of some small shops standing beneath the level of the old churchyard at the top of New-street.

The architects are Messrs. Essex, Nicol, & Goodman, and the builders Messrs. John Barnsley & Sons, both of Birmingham.

HOUSE IN NEW YORK.

THIS house has been designed for Mr. Herbert Robbins of New York on a site of 40 ft. frontage by 100 ft. deep, and to comply with certain special requirements; the object being to provide state rooms and a grand staircase in the manner of early eighteenth-century English houses. The upper part of the staircase is based on the well-known example at Ashburnham House, and owing to the greater brilliancy of light in New York than in London, the light provided from the lantern is ample in this case. The material intended is stone.

The architect is Mr. Reginald Blomfield. The drawing was exhibited at the Royal Academy Exhibition of this year.

DESIGN FOR DECORATION OF AN OVERMANTEL.

THE original drawing of this design, made on brown paper and the lights touched with white, is by Mr. J. Ogden, and was exhibited at this year's Royal Academy. We have endeavoured to reproduce it so as to give as nearly as possible the effect of the original drawing.

The memorandum in the right-hand corner, "scale 2½ in. to the foot," is incorrect for the reproduction, which is, as far as we remember, about one-third smaller than the original drawing; but the words could not be effaced without leaving a scar on the lithograph.

SKETCHES IN CLARE MARKET.

CLARE MARKET itself has a long while since completely vanished, and so in turn have most of the streets, inns, and shops made familiar to us by Dickens, and interesting as picturesque bits of Old London.

While one regrets to see these "links with the past" improved out of existence it must be owned that the locality, from a hygienic point of view, is in a bad way, and there still remain an extraordinary number of dirty, squalid-looking courts and alleys which certainly should not exist.

The proposed new street from Holborn to the Strand will sweep away a large proportion of this neighbourhood, cutting through Vere-street, which, according to an old map, led directly into the original market. The old shop in this street, with its picturesque and somewhat Italian appearance, must have looked directly on to the market square, and is, I understand, to be included in the demolition. Clare-street to-day is but a kerbstone market to which the poorer classes go to buy fish, vegetables, and wearing apparel; many of the houses are shored up, and the work of destruction has already commenced.

Holles-street has already disappeared, and will soon be followed by the greater part of Houghton-street, commencing at the old shop which stands at the corner of New Inn-court, that very undignified entrance into New Inn.

With the advent of the new street the last remains of this old part of London will soon be numbered among the things of the past. Let us hope that the new street—built, as it were, upon its ashes—may be made an avenue of architectural beauty worthy of our great city, and something of which Londoners may feel proud.

GEORGE W. COLLINS.

Books.

The Royal Tombs of the First Dynasty: Eighteenth Memoir of the Egypt Exploration Fund. By W. M. FLINDERS PETRIE. London; Kegan Paul & Co.; and Offices of Egypt Exploration Fund.

ARCHITECTURAL remains occupy but a small portion of the eighteenth memoir of the Egypt Exploration Fund. The work described is that carried out during the winter of 1899-1900. The illustrations include a large number of seals, marks on pottery, plain vases of various shapes, and plans and sections of the tombs in which these were found. As Abydos is a subject for several years' work, this book does not profess to be complete, but is only an instalment, to be followed by further numbers.

The group of royal tombs dealt with here lie closely together, each forming a large square pit lined with brickwork, and surrounded, either on its own level or higher up, by rows of small chambers, in which the domestics of the king were buried. The accompanying plan, that of the tomb of Q1, reduced from one of the plates, shows the arrangement of the central chamber and surrounding cells. It was floored with wooden planks, of which some portions remain, and roofed, so Professor Petrie concludes, with wooden beams, though we do not gather that any of these roofing beams are left. The woodwork appears to have been burned, which Professor Petrie sets down to accidental conflagration from vagabond visitors lighting fires in the chamber. The fact of floor beams having been used, however, to support the floor planking, leaves little room for doubt as to the construction of the roof. All around the chamber in this tomb were large beams of 10 in. to 13 in. deep, and 9 in. wide, recessed to hold the ends of the flooring planks, and with deep mortice holes at intervals to hold upright posts. Some detail yet remains of the wooden floor, and large holes for the roof beams remain in the walls, and in one place "a round cast of the rough-hewn end of the beam." The holes are not opposite to each other, pointing to the fact that there was a central beam to take the ends of the cross ones.

The majority of the illustrations in this issue are of more interest historically than artistically; but we should mention specially the ivory carving shown on Plate xvii., with a figure of a bound captive, which is of more than ordinary interest. For Professor Petrie's remarks on it, and conclusions drawn from it we must refer the reader to the book.

Archæological Survey of Egypt. Sixth Memoir; a Collection of Hieroglyphics. By W. L. GRIFFITH.—Seventh Memoir; Beni Hasan, Part IV. London; Kegan Paul & Co.; and Offices of Egypt Exploration Fund.

IN the Sixth Memoir the collection of coloured reproductions of hieroglyphic signs is very valuable and curious, and Mr. Griffith, who comments on and explains them, besides sketching their development, is such an acknowledged master of the subject that we do not suppose there is any other English student who can pretend to criticise or correct him. Some of his general remarks as to the eccentricities of hieroglyphic writing are worth quoting, as they throw a curious and unexpected light on the whims of ancient hieroglyphists:—

"There are also *sportive* hieroglyphs. These are often exceptional signs, and always used in an exceptional way, either because of some magical power attributed to them, or in order to present the reader with a puzzle for his amusement, or for his bewilderment—as in secret writing . . .

In the Pyramid texts, signs representing human beings are systematically deprived of their bodies and legs, so that only heads and arms appear. The animals are generally treated in the same way. Apparently this was an attempt to deprive the signs of magic motion. Similarly, in funerary texts of the Middle Kingdom, birds and animals are sometimes deprived of their legs and serpents of their tails. These mutilated signs are of course to be read as though they were complete, and may, for the purposes of this volume, be treated as identical with the complete signs to which they correspond.

Various other tricks of the scribes may be detected. The transferred use of ideograms, and the different employments of certain signs as phonograms, vary with the period and even with the individual scribe. . . . . It may almost be presumed that the further we push back into antiquity the greater exactitude shall we find in the use of the signs. To the early scribes each sign had a distinct meaning connected with its origin; but with the development of cursive writing, and indeed the spread of writing into common use, the scribe gradually made himself independent of the delicate differences which distinguished the forms of allied signs. The tendency was to express words either by one distinct sign or by a group so arranged that the meaning would be unmistakable, even when the individual signs might be confounded. This led to a larger use of determinatives and of phonetic complements, and eventually to a handling of signs as conventional symbols even in hieroglyphic writing, and to the forgetting of their origins."

We have no doubt that, as Mr. Griffith remarks at the close of the chapter, it would be "a stupendous work" to trace the origin and history of each sign minutely through its various uses and forms; he has only attempted here to give some general indications of the nature of these changes.

The present issue is a continuation of the task commenced by the author in "Beni Hasan III." He has been able to give more study to the subject since then, and offers the present treatise as a further step in the study of the history and origins of the hieroglyphic characters.

No. IV. of the Beni-Hasan memoirs is a most fascinating book, giving a number of coloured illustrations of paintings of birds, animals, decorative jars, &c., and also black and white drawings of various implements and processes, including pigeon-traps, vases, tools, a pair of pillar scales, &c., all of them reproductions of original ancient drawings. The illustrations are mostly from the tomb of Chnemhetep I. Many of the birds are beautifully depicted; two or three different breeds of ancient Egyptian dogs are shown, one of them with a considerable resemblance to a greyhound, another with some of the characteristics of a dachshund. Among the vases figured is a form repeated several times, with three mouths, which appear to have been used for the symmetrical disposal of three large lotus flowers with their stalks inside the vase, as shown on the one which we reproduce. Plate xxi. shows also the whole scheme of coloured wall decoration on the north wall of the shrine in tomb No. 3. The whole volume is one of the most generally interesting which the Archæological Survey of Egypt has issued.

St. Peter in Rome, and his Tomb on the Vatican Hill. By ARTHUR STAPYLTON BARNES, M.A. London: Swan Sonnenschein & Co. 1900.

THE interest of this book is chiefly historical, if we can call that history which seems to depend so much upon tradition, assumptions, and con-

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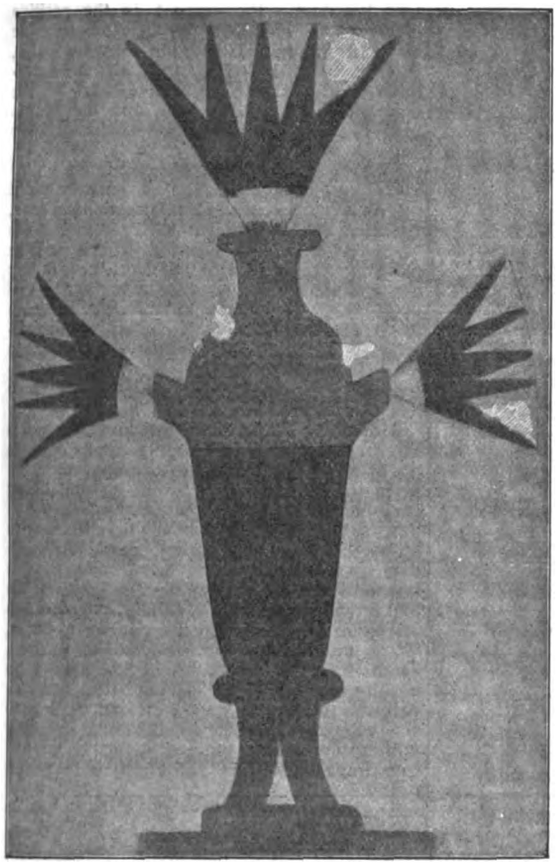
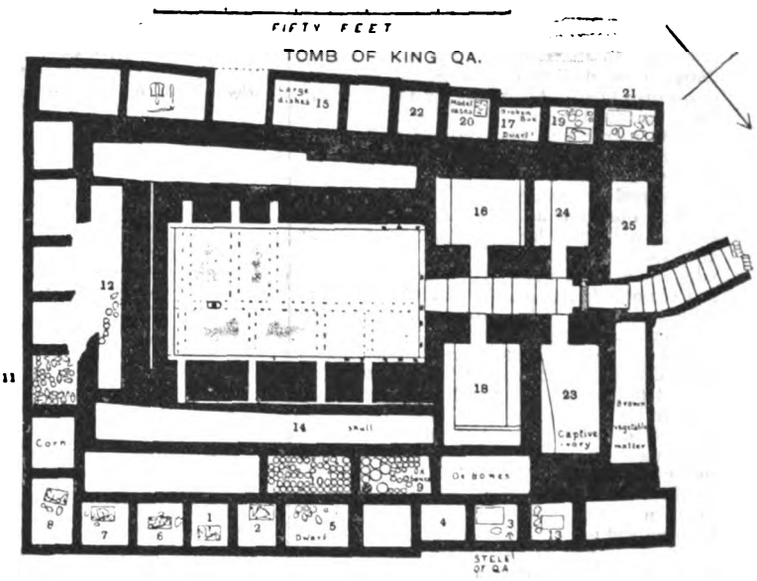


From a Painting of a Vase and Stand at Beni-Hasan. [See page 272.



jecture ; but it is an attempt to trace out the history of the abodes occupied by St. Peter in Rome and of the transference of his remains from one site to another, and to prove, or to represent it as probable, that they are actually interred under the chord of the apse of the present basilica.

The author is a Catholic, and we take it that the book is especially addressed to Catholics as being of special interest to them ; but it proves absolutely nothing in regard to its main subject. The only reason we should mention the book (and the reason, we presume, why a copy has been sent to us), is that there are two or three chapters devoted to the history of Old St. Peter's basilica, and the changes introduced when the new building was commenced, which are of considerable interest and are based on documentary evidence, which can hardly be said in regard to the main subject of the book. This portion of the book is illustrated by a reduced reproduction, as a frontispiece, of Mr. Brewer's remarkable restoration of Old St. Peter's about the year 1450, published in the *Builder* of January 2, 1892.* The most interesting point which the author makes in connexion with this part of the subject is in regard to the large end transept of Old St. Peter's, between the nave and the apse, which is shown in Alfarano's plan made in 1589, long after the western portion of the old basilica had been pulled down, but when it might be supposed that the lines of the foundation walls were still traceable. Mr. Brewer adopted Alfarano's plan, evidently, as the basis of his restoration. But a curious point brought out by the author is that none of the older views of the basilica, dating from before 1500, give any indication of this transept ; at the present time, he tells us, at least twelve such representations are known to exist, and in none of them is an external transept indicated, though, according to Alfarano's plan, it must have been far too prominent an object to have been overlooked. The author observes that the first inference from this was to suppose that Alfarano had merely inferred, from the fact that the basilica of St. Paul had such a transept, that St. Peter's would be planned on the same lines, and that his transept was conjectural. But there exists a drawing by Bramante, in the Uffizi at Florence, which shows the ground plan of Old St. Peter's in the middle of a sketch for the new church :—

"Now Bramante died in 1510 so the drawing cannot possibly be later than that year, while it is probably some years earlier. It [was made, therefore, either before the commencement of the destruction of Old St. Peters in 1506, or else immediately after that event had taken place, and in either case may claim to rank as strictly contemporary evidence. Now this drawing shows the plan of the church, with one or two slight exceptions to which we will return, to have been just as Alfarano drew it eighty years later, and the accuracy of Alfarano's plan is triumphantly vindicated. In spite of the evidence of the earlier drawings, it is clear that the transverse nave did actually exist, at any rate in the year 1506."

This is a curious dilemma of documentary evidence. The author's proposed solution is this :—There are drawings as late as 1470 showing the church without the transept, but none later. Is it possible, he asks, that between 1470 and 1506 the whole western portion* of the church was pulled down and rebuilt with the transverse nave as shown in the later plans, and then again pulled down when the great new church was projected? It is not at all impossible, for the enthusiasm in regard to the new and grand scheme was so great that there would not be much scruple about removing anything that stood in its way, even if of comparatively recent erection ; and the author notes that though there is no record of such a building operation, there is record of very large sums expended on building work in the Vatican account books shortly after 1470. This is the most interesting point brought out in the book. It certainly seems almost impossible that such a feature as a long transept or transverse nave, the same height as the main nave, shonld, if it existed, have been marked by no indication in the earlier drawings, which, though rude, are obviously intended as correct representations.

The general history of Old St. Peter's and of the gradual building of the new church is embodied in one or two subsequent chapters, and one or two illustrations from ancient engravings (known to students of the subject) are reproduced, which may serve to give the general reader an idea of the romantic history of the piecemeal erection of the great church, and the way the vast piers and arches for the dome stood nakedly against the sky for many years, until the hour came and the man. In the scheme of the book, all this information is only subservient to the main argument as to the position of the actual tomb of St. Peter, concerning which we need say nothing further here.

*The reproduction was made with our knowledge and permission.

*The orientation of St. Peter's, it will be remembered, is the opposite of the orthodox eastern orientation ; the altar being at the west end.

Arbor Vitæ: a Book on the Nature and Development of Imaginative Design, for the use of Teachers, Handicraftsmen, and Others. By GODFREY BLOUNT. London : J. M. Dent & Co. 1899.

THIS is one of the most important of a class of books of which several have appeared in recent years, the main object of which is to go back to the ideas which are supposed to be at the basis or root of artistic form, and to invite the reader to think out the thing anew for himself, as the best and first step towards original production, in place of depending on existing and traditional forms. In his first sentence, indeed, the author says that his aim is "to supply a traditional basis of design for those who are engaged in practising or teaching ornamental handicrafts ;" but we hardly think the use of the word "traditional" indicates properly the scope of the book. The idea pervading it seems to be rather to try to lay the foundation of a new tradition, by considering what was the probable origin and first meaning of the principal types of ornament, which are classified and considered in different chapters under the titles "First Patterns," "Leaves and their Classification," "The Budding and Fruiting of the Spiral," Ends and Corners," &c. The book contains a good deal of thought, and is well written and interesting to read, though it is permeated by a good deal of that exaggerated kind of prose-poetry for which the example of Ruskin is mainly responsible. Thus, instead of entitling one chapter "The Filling-up of Spaces" (which is what it really means), the author must call it "The Fulfilment of Space," a misuse of English and an exaggeration of style, as if one were dealing with some question of the millennium, instead of the best method of designing to fill a square or a circle, or any other defined space.

"It is popular to deny that art can have any mission. The a-morality of art has become a catchword and commonplace—the last stronghold of a prevalent anarchy. Art, nevertheless has a message which it will only tell to those who, daring to trust in the sacredness of sense, can see through sense to where body and soul are reconciled."

To the philosophical artisan—a recognised product of the present day—this may seem very sublime, but we doubt whether it will help any one to design ornament, or whether there is really any useful meaning to be extracted from it.

The fact is, that where a man has any innate talent for decorative design, his best school will probably be an acquaintance with the best types of decorative work already in existence, which is what is properly to be called "traditional" knowledge. He who is familiar with the best work of past times will be most able to produce something good and more or less new ; to add something of his own to the traditional style. To attempt to go behind all the traditional work and begin

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ab ovo is very interesting to thinkers about art and art history, but we doubt if it gives much assistance to the worker. The most original designer can do little more than add something of his own to what his predecessors have done. The attempt at being entirely original, going back to nature and first principles, is apt to lead to eccentricity rather than to any better quality.

The real recommendation of Mr. Blount's book is that it is an able analysis of a great subject, written with a good deal of enthusiasm and eloquence, and containing a good deal of suggestion for thought. Consequently, though it may not help any one to design, it is interesting to those who already care for the subject, and may awaken interest in those who do not; and therefore it is worth attention by both classes of readers. We must however protest (not for the first time) against the view implied in its pages, that the salvation or renewal of modern art is to come from the artisan and from decorative craft, and that picture painting is "moribund." This is a kind of shibboleth of ultra-modern criticism, which is totally untenable. It takes twenty times more training and more intellect to produce a great painting, or even what may be called a good painting, than to produce a good piece of mere decorative design — wrought metal or silk hanging, or whatever it may be; and the art-artisan who thinks otherwise, and fancies himself equal to the painter and sculptor, is vainly puffed up.

Ancient and Modern Ships. Part I. Wooden Sailing Ships. By GEORGE V. C. HOLMES. London: Chapman & Hall. 1900.

WE presume that this small volume, by the Secretary of the Institution of Naval Architects, is the first part of a treatise which is to be completed by another on modern iron ships. The portion of the subject treated in this volume, wooden sailing ships, is however by far the most picturesque and historically interesting. Some of the antique galleys, propelled entirely by banks of oars, hardly come into the subject of sailing ships, but they are a necessary link in the history.

We can easily understand that the task of making anything like a consecutive history has been difficult, and that, as the author says, the annals of shipbuilding have been, till a recent period, very badly kept, and the drawings and paintings which have survived from the classical period were made by artists who thought more of pictorial effect than of accuracy. Probably, however, these antique representations, mainly on vases, are so far historical evidence that whatever detail they represent had a foundation in fact; the artist did not invent.

The early part of the history, however, and of the illustrations, contains a good deal of the conjectural element; the real interest is in the last two or three hundred years of shipbuilding, where we have reliable drawings and models now existing, and can follow out the development of the modern sailing ship from the crude and unwieldy forms of its predecessors. Of this series a sufficient number of very interesting illustrations are given, from the heavy bulk of the seventeenth century battleships, with their immense built-up sterns and poop lanterns, to the modern "greyhound of the seas" as shown in the portrait of the American clipper of half a century ago, *The Great Republic*, with her long low sharp hull and her astonishing pyramids of canvas. The speed of some of these fast sailing ships, with a favourable breeze, was greater than is generally supposed. One of Donald McKay's ships, the *Sovereign of the Seas*, once kept up a speed of over eighteen knots for twenty-four consecutive hours. They must have been splendid objects under full sail, and one may well regret that steam has put them in turn out of date.

The earlier ship models of the modern period furnish curious examples of the effect of mere conservatism and convention in structures built for a practical purpose. Anything like practical experiment or scientific reasoning must inevitably have shown that the immense poops, and other peculiarities of construction, could have nothing but an injurious effect in a seaway, but shipbuilders of that date do not seem to have had any more regard for scientific reasons in designing ships than a tailor has in cutting out clothes—it was simply "the way we are making them now."

It is interesting to note that one of Henry VII.'s ships, the *Sovereign*, was built under the superintendence of Sir Reginald Bray, who also superintended the building of the chapel at Westminster; so closely were land and marine architecture connected in those days.

We cannot go further into the subject in these columns, but the book is one that will interest many of our readers, and we could have welcomed a larger work upon so fascinating a subject.

BOOKS RECEIVED.

FABBRICATI CIVILI DI ABITAZIONE. Dell' Ingegnere Carlo Levi. 2ª Edizione. (Hoepli; Milan.)

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

12. SYSTEMS OF HOUSE WIRING—"TREE" SYSTEM—SUBDIVIDED MAIN SYSTEM—DROP IN VOLTS—WOOD-CASING—TUBULAR SYSTEMS — ELECTRICAL ACCESSORIES—COST.

BY the Electric Lighting Acts of 1882 and 1888 consumers have the right to demand to be supplied by any company whose distributing mains are not more than fifty yards from their houses. They must serve the company with a notice stating the maximum power they will want, and mention a reasonable date for the commencement of supply. The company lays the service mains to the consumer, usually taking them into a lower floor of the building at some convenient point, where they fix a fusible cut-out on each main. From the end of this cut-out the wiring which belongs to the consumer begins, a loop of wire being left for the company to fix up their supply meter and demand indicator. The responsibility of the company ends at the meters, and all they do before turning on the supply is to test the insulation resistance from earth of the house wiring, and see that it conforms to their regulations. They must, however, maintain a fairly constant pressure at each consumer's terminals, the variations from the declared pressure must in no case exceed 4 per cent., and they must not occur so often as to cause the light to be unsteady.

There are two general systems of wiring a building, namely the "tree system" and the "sub-divided main" system. In the "tree system" (fig. 1) a pair of mains is run to the various floors of the building, and branches are taken from it to the distributing boards on each floor. In fig. 1 A represents the company's double pole main fuse, M the meter, B the main fuse for the house, and C the double pole main switch. D and E are distributing boards for two floors. These boards contain both switches and fuses for lamp circuits to various rooms, and all the switches and fuses should have small ivory tablets placed beneath them describing the circuit to which they belong. In private houses we have in addition separate switches placed in the most convenient place in each room, or sometimes if the room be large a small ornamental switch-board.

In the sub-divided main system, which is now the more popular and is practically universally used when the building is large, we have a main switch-board (fig. 2), and various sub-mains running from this board to the various distributing boards on the several floors. One great advantage of this method of wiring is the ease with which faults can be localised. At the main switch-board we can isolate and test each section of the wiring in turn, and having found the faulty section we can proceed to isolate and test the various circuits on its distributing board and hence rapidly find the fault.

In the case of large consumers the companies often insist that they must be wired on the "three-wire" system (fig. 3). The object of doing this is, of course, that one side of the three-wire system of supply be not unduly loaded, and hence lead to disturbances of the pressure of the supply to other consumers. In this case two meters are requisite, and they are placed on the mains connected to the two "outers" of the supply system. That they measure the energy consumed may be shown as follows:—Let V be the pressure between the positive outer and the middle main, and let A be the current in the positive outer. Let similarly V^1 be the pressure between the middle and the negative outer, and let A^1 be the current in the negative outer. The energy consumed by the lamps between the positive and the middle main is obviously V A watts, and between the negative and the middle main is V^1A^1 watts. Hence the total energy consumed is $VA + V^1A^1$ watts, and thus it can be measured without reference to the current in the middle wire, which is $A - A^1$ amperes. The volt coil of the meter whose ampere coil is in the positive outer must be connected between the positive and the middle main. Similarly the volt coil of the other meter must be connected between the middle and the negative main. In a three-wire sub-divided main system we have three bars on the main switch-board, the bar connected to the middle main being twice as large as either of the others.

Although the three-wire system of supply is a great advantage to the supply company, it is not of any great benefit to the consumer, the saving of copper in the "tree" system being very small and in the sub-divided main system practically nil, as the system is only three-wire up to the main distributing board. An accident of fairly frequent occurrence in this method of wiring is when the fuse on the middle wire blows without either of the other two fuses going. This might happen, for example, if the middle main got accidentally earthed. In this case, if both sides of the system be equally loaded, then taking the pressure between the outers as 200 volts, we shall have 100 volts across each set of lamps and they will burn as usual. Suppose, however, we had two lamps on one side and eighteen lamps on the other, then these two sets would be in series, and we would have 180 volts across the terminals of the two lamps and the remaining twenty volts across the terminals of the eighteen lamps. The consequence would be that these two lamps would be burned out, and every new lamp switched on in that section would be burned out. The remedy, of course, is simply to replace the fuse on the middle main.

If the wires used throughout a building be insufficient in section, then when all the lamps are turned on it will be found that the farther we get from the main switch-board the less bright will the lamps become. The reason of this is the loss of pressure, or, as it is generally called, the drop in volts, that occurs in the mains themselves. In the early days of wiring buildings for the electric light consulting engineers were accustomed to calculate the sizes of the mains on the basis of 1,000 amperes per square inch of section. It was found that with this current density the main heated very little, and that, so far as danger from fire was concerned, it was absolutely safe. For example, suppose that the house were to be wired for 100 16-c.p. 100 volt lamps. These lamps would require 60 amperes, and hence a $\frac{1}{16}$ cable whose section is approximately 0·06 of a square inch would carry the current safely. Suppose that we required 110 yards then, since this cable has a resistance of 0·7,154 ohms per mile, the drop in volts would be $\frac{0·7,154}{10} \times 60$, *i.e.*, 2·683 volts. Hence nearly three per cent. of the total energy supplied would be wasted in the mains, and the lamps burning at a less pressure than 100 volts would give considerably less light. For this reason it was soon found that the smallest main consistent with safety was not necessarily the most economical main to use. We might save a fraction of the initial expense by using such a small main, but only at the expense of a considerable annual loss in light or, to use electrical language, candle hours.

Electricians now generally design the wiring so that the drop in volts at the farthest lamp may be at the most 2 per cent. of the declared pressure. Remembering, however, that a drop of 1 per cent. in the pressure means a loss of 7 per cent. of the light, and that a drop of 2 per cent. means a loss of nearly 20 per cent. of the light, it is always advisable to use as large mains as possible, so long as they do not materially increase the price of labour and fittings. The following example, due to Professor Ayrton, illustrates this point. Suppose that we have ten 16-candle-power lamps at the end of a pair of mains, each 100 ft. long, made of Silvertown cable, quality S. Suppose also that the declared pressure between consumer's terminals is 100 volts, and that the current each lamp takes is 0·6 ampere. The following table illustrates what happens when the drop is

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1 and 2 per cent. and also when it is negligible :—

Drop of pressure in volts	0	1	2
Price in shillings of 200 ft. of main. ..		17	12
Approximate light in candles of the ten lamps.....	160	149	138
Approximate current in amperes taken by the ten lamps	6	5·94	5·88
Cost of electric energy in shillings per 1,000 hours at 6d. per unit ..	300	297	294

We see then from this table that by having a 2 per cent. drop we save five shillings on the initial cost of the cable and three shillings on the meter bill for the year, but we lose 11,000 candle hours of light. At 6d. per unit this amount of light obtained with ordinary glow lamps would cost more than one pound. The interest on five shillings, the diminished outlay, would be about 4d. per year. Hence in this particular case we would save about seventeen shillings a year by using the more expensive cable.

An important item in the wiring of a building is the main switchboard. This is made of a non-conducting fireproof material such as slate which is generally enamelled. It is placed in a dry and secure place, and should be carefully fixed and mounted. It is advisable also to arrange that if a fire broke out on the board it would have difficulty in spreading. All the screw holes for fixing it to the wall should be bushed with ebonite bushes so as to prevent possible earths. In addition the boards are usually "split," *i.e.*, the part that contains the positive "bus" bar is separated from the part that contains the negative "bus" bar. In three-wire systems the board should be divided into three distinct portions. The sub-circuits are taken from the metal bus bars, and there ought to be a cut-out on each pole, and, if the circuit be an important one, a switch on each pole, but generally a switch on one pole, is sufficient. An ammeter and voltmeter are nearly always fixed on the board, and by studying their indications a great deal can be learned about the working of the system. The main switchboard ought to have an incombustible frame, with glass front, and be kept under lock and key. In special circumstances an oak, teak, or mahogany frame may be allowed. It ought never to be placed on matchboarding or on the wood walls of lifts.

When arc lamps are used for lighting they always need to have a resistance placed in series with them, otherwise they will not burn steadily. In 100-volt direct current circuits it is customary to run the arc lamps two in series. Each lamp takes about forty volts, and so twenty volts is expended on the resistance placed in series with them. In alternating current circuits, if the resistance be wound inductively, then the pressure may be cut down, the required amount without much energy being expended in the coil, owing to its power factor being so low. In this case the resistance is termed a choking coil. Both resistances and choking coils must be mounted on insulated bases and surrounded with well-ventilated iron cases, as they get hot when the current passes.

There are several systems in use for protecting the cables throughout a house from injury. The one most commonly used is to employ wood casing. It consists of lengths of wood which contain two grooves separated by a fillet or width of wood. The width of this fillet is usually about an inch in the case of main circuits, and about half-an-inch for subsidiary circuits. American whitewood is the wood most commonly employed, as it can be obtained cheaply and is free from knots and flaws. Sometimes the casings are made of oak or walnut moulded to match existing fittings. When the cables are placed in the grooves a capping is screwed on. In order to fix up casings workmen who have been trained as carpenters or joiners are necessary. Whenever casings pass through floors they should be protected by a covering of sheet-iron extending 4 in. below the floor and 2 in. above it. As wood is very absorbent, it ought never to be placed behind wet plaster or in a damp place. Moisture considerably lowers the insulation resistance of the wiring, and may lead to a dangerous leakage of current. If the casings are buried in plaster they ought to be coated inside and out with shellac varnish. When the electric light is to be introduced into a house wood casing is perhaps the easiest and cheapest system to adopt. If the casing be run along the surface of the walls, then it is always a simple matter to get at the cable in order to fix additional lamps or alter the position of old ones.

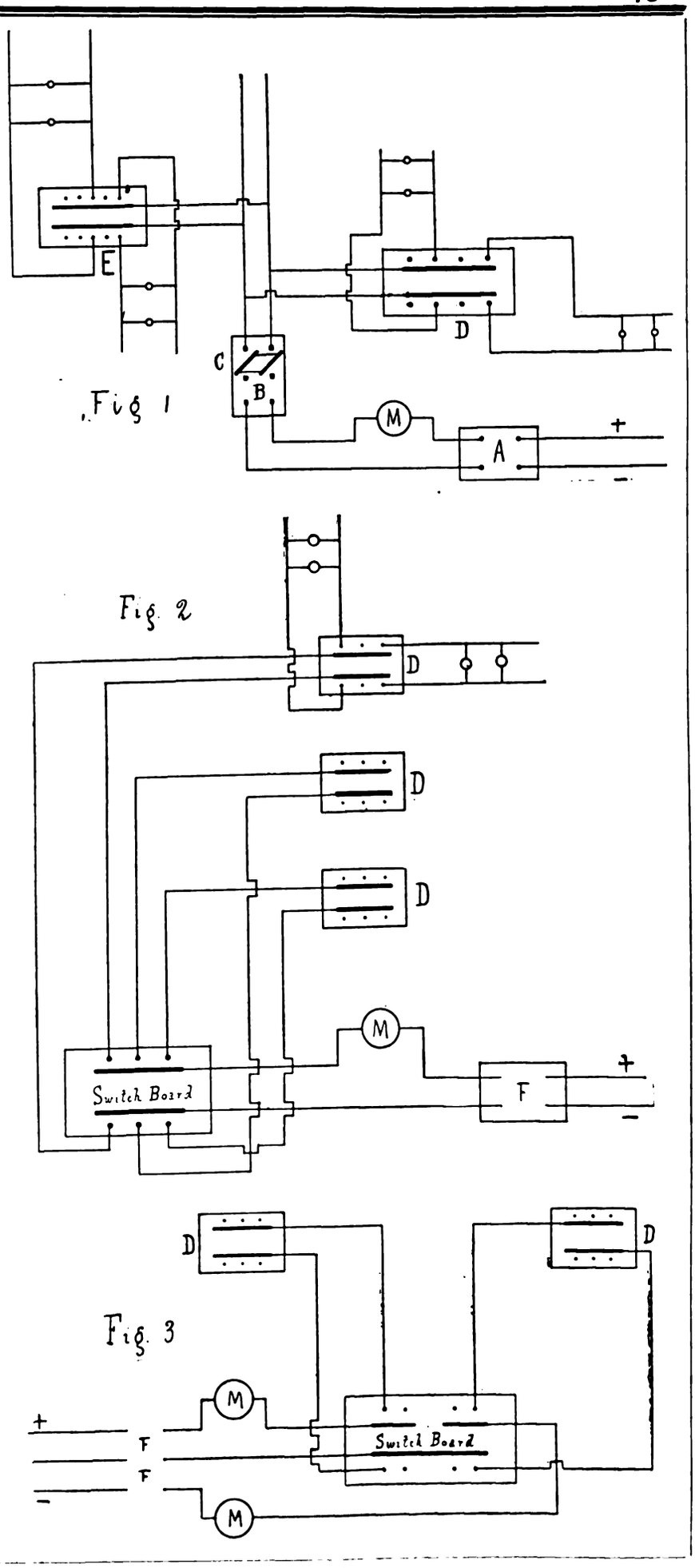

Fig 1

Fig. 2

Fig. 3

The metal tube system of wiring is in many respects the most desirable one to adopt. In this system all the wires and cables are run in pipes generally made of tempered steel and sometimes insulated in the inside. These pipes can be put in the building during the early stages of its erection, and the cables can be drawn in after the plastering and decorating have been completed. Special junction and inspection

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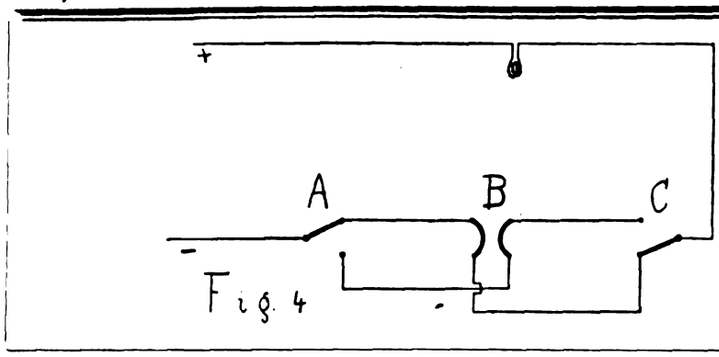

Fig. 4

boxes are placed at various points along the piping so as to enable the cables to be drawn into the pipes. Cords also are sometimes left for this purpose. These pipes form a perfect mechanical protection for the cables, as nails and screws cannot pierce them. After the pipes are fixed they are painted with a coat of oil paint. Where the pipes enter the fuse boxes nuts and washers ought to be fixed on both sides of the outer case and means taken to make the joints watertight. In the "Simplex" system of steel tubing the pipes are formed of thin steel and have a coating of enamel both inside and out to prevent rust. The tubes can easily be cut by a hack-saw or by filing, and a most ingenious system of junction boxes, inspection bends, and T pieces has been developed. This is the cheapest of the tubular methods of wiring and is extensively used.

In the "concentric wiring" system both the conductors are contained in one cable. The "outer" consists of stranded wires placed over the insulation of the "inner," and is in connexion with the earth, so that it is at zero potential. This system cannot be used in many towns in this country, as few companies earth the middle wire of their three-wire system of supply, and so a house wired in this manner would not satisfy the requirements of the supply company, as its insulation resistance to earth would be zero. Where it can be employed, however, this system is a desirable one, as there is very little fire risk and not much chance of getting an accidental shock.

The requisites of a good switch are that it should have a quick make and break, and that the metal surfaces in contact should be of ample size for the current it has to carry. It should be mounted on porcelain or enamelled slate, and the handle must be insulated so that it is impossible to get a shock from it. The introduction of 200 volts into house lighting has made it imperative that small switches should be so constructed that there is no possibility of the metallic cover of the switch touching the live contacts. If a lamp has to be controlled from several points, "two way" and "reversing" switches must be used. In fig. 4 a lamp controlled at three points, A, B, and C, is shown. At A and C "two way" switches are placed, and B is a "reversing" switch.

A little consideration will show that the lamp can be turned on and off at any of the points A, B, and C.

Great improvements have recently been made in cut-outs. In old-fashioned fuse blocks a piece of tin wire was clamped between two screws, often without washers. The variations of temperature soon worked the fuse wire loose at the contacts, and led to the wire melting at the working current, causing unnecessary trouble and annoyance, and leading to the insertion of fuses too large to properly protect the circuit. The spring-clip fuse now generally used obviates this difficulty. There is little fear of this fuse melting prematurely, and the fuses are made of different sizes, so that it is impossible to insert a large fuse into a circuit intended for a small current. In 200-volt circuits double-pole fuse blocks should not be used, as they have been known to arc from one side to the other over the partition. Two single-pole fuse blocks in separate covers should be used. In these circuits, also, fuses should not be inserted in ceiling roses or switches.

It is difficult to give any useful idea as to the relative costs of the various systems of wiring, as the cost of labour and the difficulties to be overcome are very variable quantities. If wood casing be used and the wiring be done properly, then the price varies from the minimum of 20s. upwards. The cost of labour will be about 7s. or 8s. per point to the contractor, the cable about 5s. per point, casing 2s., switches 1s., lamp 1s., and fuse boards, &c., about 3s. a point. The price of fittings is, of course, very variable, but 2s. 6d. a point is about the lowest that could be allowed. The cheapest system of wiring is simply to enclose the two conductors in lead tubes and fix them in position by cleats or metal saddles or clips—in fact, a very similar system to that used for fixing gas pipes when they were first introduced. When this method is adopted the price may be reduced to as low as 15s. per point. It will be seen that the price of electric wiring is still high. If a house could be wired for the electric light as easily and as cheaply as pipes can be put in for gas a great impulse would be given to the electrical industry.

GENERAL BUILDING NEWS.

PARISH CHURCH, RUTHERGLEN, LANARKSHIRE.—The memorial-stone was laid on the 15th inst. of a new parish church for Rutherglen. The building is being erected on the site of the former church in the High-street. The tower of the old building has been left standing a little apart from the new one. The edifice will seat 1,200 persons and will cost over 10,000*l*. Mr. J. J. Burnett is the architect, and Messrs. Douglas, Hunter, & Whitson are the measurers. The contractors are as follows:—Masonry, Messrs. John Park & Son; joinery, Mr. James Morrison; plumbing, Mr. Bowie; plastering, Mr. George Murray; slating, Mr. William Buchanan; heating engineering work, Messrs. James Cormack & Son. Mr. Jas. A. Kennedy is clerk of works.

CHURCH, TWECHAR, DUMBARTONSHIRE.—A church is to be built in the mining village of Twechar. Plans have been prepared by Mr. James Davidson, Coatbridge.

ST. MARY'S CHURCH, COCKERTON, DURHAM.—Memorial stones were laid on the 20th inst. of St. Mary's Church, Cockerton. The church will have a nave 48 ft. by 24 ft., and a chancel 22 ft. 6 in. by 18 ft. Part of the west end is to be temporarily formed into a vestry and porch. The seating accommodation will be 150. The work is being executed in hammer-dressed wall stone from a quarry in Teesdale. The dressings will be of buff terra-cotta from Commondale, near Grosmont, and the roof will be of Ruabon tiles. The chancel stalls are of red deal. The work is being carried out from the designs and under the superintendence of Messrs. J. P. Pritchett & Son, Darlington, and the following are contractors for the various works:—Masonry, Mr. Dodds, Melsonby; tiling, Mr. Wandless, Darlington; carpentry and joinery, Mr. Richardson, Barton; plumbing and glazing, Mr. Coates, Darlington; painting, Mr. Carter, Darlington.

MISSION HALL, NEWPORT, MON.—A Presbyterian mission hall is being erected at the corner of Corporation and Eton-roads, Newport. Mr. David Jones is the builder, and Messrs Habershon, Fawckner, & Groves, of London and Newport, are the architects.

FRIARY CONGREGATIONAL CHURCH, WEST BRIDGFORD, NOTTINGHAM.—The memorial-stones of this church were laid on the 20th inst. The church will adjoin a school erected on Munsters-road. The building will be in late Gothic style, with a tower 56 ft. high. There will be a nave and side aisles, and at the end farthest from Munsters-road the choir will be situated. At each end of the choir seats will be a vestry, and behind a large parlour, adjoining which will be an infants' room, connected by a passage with the school. The floor of the church, which will have a gradual rise from the pulpit, meeting-room, vestry, &c., is to be of wood. The arcade on both sides of the building will have octagonal columns, and the lower parts will be cased with wood. At each end of the church, the internal walls of which are to be plastered, there will be five large tracery windows, and on each side five clearstory three-light windows, all of which will be glazed with leaded lights. Messrs. Sutton, of Nottingham, are the architects. The cost will be about 5,300*l*.

MEMORIAL VESTRY, PARISH CHURCH, SHIFNAL, SALOP.—A memorial vestry, which has been built at Shifnal Parish Church, was dedicated on the 21st inst. The vestry, which has been built by Mr. Robert Bridgeman, of Shrewsbury, stands on the north side of the chancel, in the corner between the chancel and the north transept, on the site of an ancient building. Codsall stone is used throughout, and the roof is lead. The design was by Mr. W. D Caroe, of London.

WESLEYAN CHAPEL, LLANISHEN.—The memorial-stones of a Wesleyan chapel at Llanishen were laid on the 10th inst. The chapel will accommodate 300 persons, and there will be a schoolroom attached for 50 scholars. Mr. Edwin Seward, of Cardiff, is the architect.

BOARD SCHOOLS, MIDDLESBROUGH.—The "Hugh Bell" Schools in the Grange-road, Middlesbrough, were opened on the 24th inst. The schools are an addition to the Grange-road schools opened in 1892. The architect of the original schools and also of the present additions was Mr. J. Mitchell Bottomley, of Middlesbrough and Leeds. Messrs. Bastiman Bros., of Middlesbrough, were the contractors for the recently executed work; Mr. J. Johnson was the clerk of works.

SCHOOL BUILDINGS, WOLVERHAMPTON.—New buildings, to accommodate 350 infants, have just been commenced at the junction of Bromley-street and Bagott-street, Blakenhall, in the parish of St Luke, Wolverhampton. The structure will consist of schoolroom, two classrooms, and babies' room, with cloakroom, lavatory, and offices, and will be built with local red bricks, tiled roofs, and the floors laid with wood blocks on concrete. The contract is being carried out by Mr. James Herbert, of Wolverhampton, under the supervision of Mr. Fred. T. Beck, architect, of the same town. The cost of the buildings will be about 1,700*l*.

WORK AT BRECHIN CATHEDRAL.—According to a recent report in the *Scotsman*, the restoration of Brechin Cathedral is actively proceeding under the direction of Mr. Honeyman. When the plaster ceiling was removed, the old clearstory was found to be almost uninjured. The old side walls rested on foundations composed of weather-worn stones, with a little clay amongst them, a few stone coffins cut across to suit the thickness of the wall, and a few incised slabs, two of which have been preserved. In the foundations of the west gable of the south aisle there were also found a number of carved stones, part of a Norman building, which had stood on the same site; and in a part of the chancel wall, which had to be taken down owing to its decayed condition, were found several other pieces of Norman work, built into the wall and still retaining traces of coloured decoration. The fragment of the chancel that remains is, however, sufficiently preserved to admit of the same design being continued throughout the portion which it is now necessary to rebuild. In the restoration scheme the design of the windows is repeated along each side. No trace of the east gable remains; it will have to be rebuilt. The architect has everywhere endeavoured to leave the old masonry untouched as far as possible, and it has only been interfered with for structural reasons. The stone used is from the locality, and similar to that which was used originally in the building. The principal entrance will be by a new porch at the north side of the church. The restoration of the aisles involved a fresh design, as there was nothing left to guide the architect as to their former appearance. The new work is in keeping with the character of the old building. For the old foundations in various parts of the structure a bed of concrete has been substituted. The cathedral, as restored, will accommodate over a thousand persons. It is hoped that it will be ready for occupation by this time next year.

CONGREGATIONAL SCHOOLROOM, EASTBOURNE.—A Congregational schoolroom at the corner of Whitley-road and Seaside, Eastbourne, was opened on the 19th inst. The building is of red bricks with stone dressings, and will hold 400 persons The design was by Mr. P. J. Popplewell, of Sutton, Surrey, and the building was erected by Mr. H. Sisley, of Eastbourne. On the remaining portion of the site a church is to be erected.

WESLEYAN MISSION-HALL, YORK.—A Wesleyan mission-hall, at the corner of Skeldergate and Queen's Staith-road, York, was opened on the 10th inst. The building measures about 50 ft. by 60 ft., and is of red brick, with stone dressings. The main entrance is at the corner of Queen's Staith-road. On the ground floor is a schoolroom with classrooms opening from it, and upstairs a large hall with accommodation for 400 persons. The contractors were Messrs. W. Birch & Son, bricklaying; Mr. John Plows, masonry; Mr. W. Usher, joinery; Mr. Morris, plastering; Mr. J. Birch, plumbing; Messrs. Bakes & Co. and Mr. J. Dodgson, painting; Messrs. Grundy & Co., heating; and Mr. Wainhouse, electric lighting. The architects were Messrs. Hornsey & Monkman.

PROPOSED PIER PAVILION, BOURNEMOUTH.—Mr. A. E. Sandford Fawcett, an inspector to the Local Government Board recently held an inquiry at the Council Chamber, Bournemouth, with respect to an application made by the Bournemouth County Borough Council for sanction to construct on the pier and land adjacent to it, at an estimated cost of 37,000*l*., a pavilion or assembly-rooms, or reading and refreshment rooms, and other conveniences; also for the determination of the period within which they shall repay so much of that sum as they are authorised to borrow without the sanction of the Board, and for sanction to borrow

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the further sum required for such purpose. The scheme, which has met with some opposition, was explained by Mr. F. W. Lacey, the Borough Surveyor. From the beach there would be access to the basement, where refreshment-rooms and lavatories would be placed, also the engines, &c., for the electric light and for heating the building. On the ground floor there would be east and west entrances to the pier, independent of the pavilion. The chief feature would be a large concert-hall capable of holding 1,200 people on the ground floor and 500 in the galleries. Reading-rooms and refreshment-rooms would be placed on each side, and provision would be made for tea-room, billiard-room, and large corridors.

CONVENT OF OUR LADY OF SION, BAYSWATER.—The wall of the south aisle of the chapel attached to the Convent of Our Lady of Sion has lately been underpinned and restored by Mr. Alfred E. Nightingale, architect, Albert Embankment, Messrs. Jones & Willis have fixed stained-glass windows, representing the "Incarnation," "Last Supper," "Crucifixion," and "Annunciation."

WORKHOUSE, STEYNING.—The Steyning Board of Guardians have resolved to erect four cottages, and the plans prepared by Mr. Clayton, architect, have been recommended for approval.

MISSION BUILDING, NEWCASTLE.—The foundation-stone of St. Wilfred's Mission building, which is situated in Blandford-street, Newcastle, was laid on the 25th inst. In the basement will be a gymnasium, on the second floor a mission-hall to seat 300 persons, and on the third floor a church-hall. Mr. Charles S. Errington, of Newcastle, is the architect.

METHODIST CHURCH SCHOOLS, &C., FENTIMAN-ROAD, LAMBETH.—The foundation-stones of these buildings were laid on Saturday, the 22nd inst. Perpendicular Gothic architecture, freely treated, has been adopted. The church is flanked on one side by a bold square tower, which is terminated by a small spirelet and weather vane. A staircase in the tower leads up to a small end gallery. A projecting narthex, containing the two main entrances, forms a prominent feature of the design. The dressings are of Bath stone, and the facings of red brick. The seating is arranged circular on plan, so that the whole of the congregation face the preacher. The preacher's platform, or rostrum, is placed centrally in an octagonal apse, where the choir is also accommodated. The organ chamber is arranged on one side of the apse, having organ fronts into both church and apse. The vestries are placed immediately behind the apse. A large schoolroom, with gallery, is provided, together with additional classrooms and other conveniences. The school is placed by the side of the church, facing Fentiman-road. A church parlour is provided, also fronting upon that road. The contract amount for the whole block, including boundary walls, is 6,506*l.*, and is let to Mr. Richardson, builder, Peckham. The architects are Messrs. Geo. and Reginald Palmer Baines, of 5, Clement's Inn, Strand.

CAFÉ, ABERDEEN.—A new café, known as the "Empress," has recently been opened in Union-street, Aberdeen. The architect was Mr. G. F. Milne, Union-street, Aberdeen, by whom the fittings were also designed, and the upholsterers were Messrs. Galloway & Sykes, of the same city.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, WHALEY BRIDGE, CHESHIRE.—A Local Government Board inquiry into an application by the Whaley Bridge Urban District Council for sanction to borrow 7,000*l.* for purposes of a water supply, was held at the Mechanics' Institute, Whaley Bridge, on the 19th inst. The inquiry was conducted by Mr. H. Percy Boulnois. The scheme was explained by Mr. Stirling, the engineer.

WATER SUPPLY, SELSTON, NOTTINGHAM.—A Local Government Board inquiry into an application by the Basford Rural District Council for permission to borrow 1,000*l.* for purposes of water supply for the parish of Selston was held by Colonel Langton Coke in the National Schools, Selston, on the 21st. inst. Messrs. G. & F. Hodson, of Loughborough, have been appointed engineers.

NEW WATERWORKS, HALIFAX.—The ceremony of cutting the first sod of the new Halifax Corporation Waterworks at Walsham Dean was performed on the 17th inst. The scheme comprises three reservoirs, one above the other, at the north end of the Walsham Valley, and 1,150 ft. above sea level. They will have a combined capacity of 650,000,000 gallons. The drainage area is 2,325 acres, almost exclusively moorland. The engineer is Mr. G. H. Hill, of Manchester. The amount of the contract is 170,000*l.* The cost of land, extras, &c., will bring up the total cost of the scheme to about 220,000*l.*

LANDING STAGE, &C., PENZANCE.—The Highways Committee of the Penzance Town Council have reported that with reference to the provision of a landing stage, the Surveyor had drawn up two plans prepared by him, viz.:—No. 1, for a landing stage or jetty running from the Esplanade to about 300 ft. in the direction of the rock known as the Elephant Rock, at an estimated cost of 900*l.*; and No. 2, a landing stage or jetty, running from the shingle only, on the same site, at an estimated cost of 365*l.*

WATER SUPPLY, GREAT BADDOW, NEAR CHELMSFORD.—A Local Government Board inquiry has been held at the Corn Exchange, Chelmsford, by Mr. H. H. Law, C.E., an inspector of the Board, with reference to the application of the Chelmsford Rural District Council for sanctionito borrow money for experimental works of water supply for the Great Baddow special drainage district and the parish of Springfield. The Medical Officer to the Council said that the rural portions of both parishes derived water from shallow wells, but the urban portions were supplied by works belonging to the Chelmsford Rural Council. Of the total population, about 4,000 were supplied with water from the mains. It was estimated that during the next twenty years the number of persons wanting water would be about 6,000. The amount of water required per head could not be taken at less than thirty gallons. The amount in round figures of water required per day would be 200,000 gallons At the present time the average supply per head was only about eighteen gallons. In order to eke this out the amount of water used for sewer flushing had had to be decreased. The gathering-ground of the present spring, which was situated to the north of Baddow-road, was liable to pollution. This spring yielded an average of 114,000 gallons a day. The Surveyor explained that it was proposed to sink an experimental boring 10 ft. in diameter to a depth of 350 ft. near the present pumping-station at Great Baddow.

TYNE IMPROVEMENT.—At a meeting of the Tyne Improvement Commission on the 13th inst. a very extensive scheme of dredging in the river was adopted, which would, it was stated, involve an expenditure of more than 450,000*l.*, or 200,000*l.* more than originally estimated, the increase being due to the insufficiency of the original data, the additions to the work originally contemplated, and increased cost of labour and material. Alderman Richardson said it was not proposed to apply to Parliament for increased borrowing powers, but that 25,000*l.* per annum should be reserved from revenue to complete this great work which Parliament and the public imposed upon them.—*Times.*

SOCIETY OF ENGINEERS.—An interesting visit was made by the members and associates of the Society of Engineers on Wednesday, September 26, to the works of the Gas Light and Coke Company at Beckton. The works occupy a position on the River Thames, about one mile below Woolwich, on the Essex marshes, and, being the largest manufacturing works of the Gas Light and Coke Company, produce about one-half the gas supplied by that company. The coal, which is principally seaborne, is brought by steam colliers and unloaded at two T-shaped piers by hydraulic cranes lifting grabs or skips. It is shot into small waggons, which are weighed, made up into trains, and conveyed by locomotives to the part of the works where the coal is required. The waggons are provided with a movable slide so that the coal may be shot from the elevated railway into the coal stores of the retort houses ready for use. The elevated railway, connecting the piers with the retort houses, also traverses the works and provides space underneath for the storage of coals. The carbonising plant consists of 8,404 retorts, contained in fourteen retort houses, and about one half of these are operated by machinery; hydraulic power, compressed air and power transmitted by ropes being used. The retort houses are all provided with a stage on which the stoking is conducted, the space underneath being used for tending the furnaces and disposing of the coke, the bulk of which is shipped into sailing vessels at the wharf. The gas, on leaving the retorts, is cooled and then passed through the ammonia-extracting and the other necessary purifying plant, and, after being measured, is ultimately stored in gas-holders. From the gas-holders it is pumped under pressure to the storage stations in different parts of the metropolis. The daily make of gas, including oil gas, of which about 8,500,000 cubic feet are made, is about 58,000,000 feet. The works include a foundry, smiths', fitters', and carpenters' shops, stores, &c., and every description of plant necessary for repair and maintenance.

WATER SUPPLY, DERWENT VALLEY.—The *Leicester Post* states that the total costs, charges, and expenses of the respective Corporations incidental to the preparing, applying for, obtaining, and passing of the Derwent Valley Water Act, 1899, were Leicester Corporation, 33,078*l.* 16s. 8d.; Derby Corporation, 30,174*l.* 3s. 9d.; Sheffield Corporation, 23,716*l.* 14s. 4d.; Rotherham Corporation, 2,311*l.* 5s. 4d.; Nottingham Corporation 6,033*l.* 6s. 10d. Total, 95,314*l.* 6s. 11d.

EXTENSION OF WATERWORKS, PRESTWICK.—At a special meeting of the Ayr District Committee of the Ayrshire County Council recently, Mr. John Bell, Chairman of Committee, presiding, an application was made on behalf of the Prestwick Water Supply Committee for sanction to borrow 5,400*l.* for the extension of the domestic water supply reservoir, so as to increase its capacity by 21,000,000 gallons. The application was granted.

WATER SUPPLY, RUTHIN.—At a meeting of the Ruthin District Council, held on the 24th inst., the Sanitary Inspector submitted three schemes for supplying the village of Llanarmon, viz., from Tyddyn y Gwynt, on the Bathafarn estate, at an estimated cost of 478*l.* 14s.; from Llyn Gweryd, on the Gelli Gynan estate, at a cost of 464*l.* 16s. 4d.; and from Ffynnon Wenwyl Spring, at a probable cost of 470*l.* 7s. 2d. The Medical Officer condemned the Llyn y Gweryd scheme, as the water, owing to the quantity of decomposed vegetable matter it contained, was unfit for domestic purposes. Ultimately a committee was appointed to consider the matter, and report to the next meeting. Mr. J. D. Lewis, engineer, Denbigh, was provisionally appointed to prepare plans, specifications, &c., of the proposed scheme for supplying the districts of Llandyrnog and Llangynhafal with water.

STAINED GLASS AND DECORATION.

ST. BARNABAS CHURCH, KENTISH TOWN.—This church has lately been decorated throughout from the specification of Mr. Alfred E. Nightingale, architect, Albert Embankment, London.

FRESCO, ST. COLUMBA'S CHURCH, SUNDERLAND.—On the 24th inst. the Bishop of Durham unveiled a fresco in St. Columba's Church, Southwick, Sunderland. The artist was Mr. Eadie Reid.

MEMORIAL WINDOW, ST. NICHOLAS U.P. CHURCH, ABERDEEN.—A stained-glass window has been erected in this church in memory of the late Rev. Mr. Walton. The window is symbolic of Faith, Hope, and Charity. The window was designed and executed by Mr. Henry F. David, in the workshops of Messrs. G. Donald & Sons.

WINDOW, ST. JAMES'S CHURCH, ABERDEEN.—The vestry of this church have accepted the design for the large east window of the church which has been prepared by Mr. Douglas Strachan. Four large lancets, which form the chief part of the window, are to be filled with representations of the four Evangelists, each with his appropriate symbol. In the large circular opening at the crown of the window Christ in glory, surrounded by the choir of angels, is to be represented, while the two smaller circles beneath are to be occupied by representations of Moses and Isaiah, the whole window thus representing Christ surrounded by the Heavenly Intelligences, the Law and the Prophets, and the Evangelists. The spandrels have been filled with flowers and fruits emblematic of Christ, as the rose, the lily, the vine, and the pomegranate.

FOREIGN.

FRANCE.—The scaffoldings having been removed from the Gare de Lyons, one can now see the three groups of sculpture placed under the attic. They are the work of MM. Baralis, Gascq, and Charpentier, and represent Mechanism, Steam, and Electricity. Two large figures of "Lyons" and "Marseilles" crown the façade.——M. Guadet, who is directing the rebuilding of the Comédie Française, hopes to get it finished by December 15, so that it can be inaugurated on New Year's Day.——The jury on the open competition for the erection of a monument in honour of the miners at Lourches (Nord) has awarded the prize to the design by M. Theunissen. The pedestal has been designed by M. Moyaux, architect, and on it is placed a statue of Mathieu, the architect, who discovered the coal beds in the Pas-de-Calais. The statue is surrounded by symbolical figures, and stands on a block of coal. At the back of the pedestal is a group of work people, men and women, and the sides represent a gallery in a coal mine with the strata of coal showing.——At the beginning of November, the monument erected to the memory of M. Carnot, at Lyons, will be inaugurated. The monument is the work of M. Gauquié, and consists of a column 18 metres high, ornamented with escutcheons bearing the French cock. The figure of Carnot is leaning against this column, the base of which is decorated with four groups; a woman in mourning, symbolising the town of Lyons; a lion; and two young people personating the alliance of France and Russia.—— The Municipal Council of Oran has adopted the design of M. Mouriez, architect, for the construction of a theatre, which is estimated to cost 850,000 francs.

AUSTRIA.—Sketches are invited by the administration of the fourth communal district of Vienna for a large monumental fountain; the competition closes on October 25 next.——Particulars concerning the competition for the Lanner-Strauss monument have been drawn up by the Artists' Association of Vienna. It has been decided to restrict the competition to German and Austrian artists; to offer prizes of 2,000, 1,500, and 1,000 kronen respectively for those sketches placed 1st, 2nd, and 3rd in order of merit, and to close the competition on December 31 next.——Considerable interest is being evinced in the erection of the proposed monument to Queen Elisabeth in Buda-Pesth. The work is to be designed and executed by Hungarian artists only, and will not be commenced until after March 1 next. The Municipality of Prague have invited Czech architects to send in sketches for large additions to the old town hall, and the author of the first premiated design is offered as much as 10,000 kronen.

INDIA.—The directors of the North-Western Railway have sanctioned the expenditure for water-supply works at Bibinani, in the Quetta district.—— The Bombay-Baroda and Central India Railway Company are about to concentrate the locomotive arrangements at Fatehgarh, at a cost of more than

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1¼ lakh of rupees.——It is proposed to construct a light railway between Maldah and Rajmehal.——The Punjab Government is about to be approached by the Simla Corporation, which desires to make a very large expenditure in connexion with municipal improvements.——The survey for the Rameswaram extension of the Pamban branch of the South Indian Railway, from the station of Mandapam, across the Pamban reef to the island of Rameswaram, is now complete. This branch will form part of the connecting link between India and Ceylon; and in the meantime will be very useful for native purposes, as giving direct access to the sacred shrine of Rameswaram (one of the seven sacred shrines of India), and will be the means of opening up a new harbour on the southern side of the island.

UNITED STATES.—Efforts are being made in Philadelphia towards securing the extension of Fairmount Park, or Boulevard, and Messrs. Schermerhorn & Reinhold, architects, have devised a plan for a concourse extending from a point near the centre of the city to the Green-street entrance of the Park. The plan amongst other things provides for a boulevard, 275 ft. in width, from the north side of Carlton-street. The total length is about 5,000 ft., and the estimated cost 3,000,000 dols It is stated that the proposed road will reclaim a practically abandoned and undesirable district, demolishing several slum neighbourhoods, and generally be a great improvement to the city.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. William A. Pite, architect, has removed his offices from 3, Upper Montague-street to 11, Hart-street, Bloomsbury, W.C.

EXPERIMENTAL ROAD-PAVING, FORE-STREET CITY.—An interesting experiment, which if successful will to a certain extent effect a revolution in street-paving, is now being made in the City. Hitherto, in the case of asphalt the paving has been laid in such a way as to necessitate an upheaval of a considerable section in the event of its becoming necessary to repair pipes, &c., below the surface. A new system is now being given a trial. The paving consists of flags that are 9 in. square, and are composed of 1½ in. of hardened asphalt and 1 in. of cement. The flags are laid on mortar, the asphalt side uppermost, with a bed of cement. The principal advantage claimed for them is that they may be taken up and relaid with the utmost ease and the minimum of expense. If a pipe needs mending only about a dozen blocks will have to be removed. At first the flags are dark grey in colour, but it is stated that after a week's traffic they will become light grey. As far as the ratepayers are concerned the result is a matter of very little moment, inasmuch as the pavement is being laid on the condition that no charge shall be made unless the experiment proves thoroughly satisfactory. If at the end of a fixed period it is shown that the new system is equal as regards durability to the existing one, the Corporation will pay the bill; otherwise, no claim whatever will be made. The experiment is being made in Fore-street, between Moor-lane and Finsbury-pavement; and the pavement is being laid by the Val de Travers Company, Limited, Hamilton House, Bishopsgate-street Without.—*City Press.*

CITY ENGINEER'S REPORT, BRISTOL.—After explaining the nature of the preparations for the visit of the Queen to Bristol to open the Convalescent Home, Mr. T. H. Yabbicom, the City Engineer, in his annual report remarks that during the year private streets to the extent of 5,908 yards, at a cost of 12,745*l.* 7s. 2d., have been made up by Corporation workmen, under Section 150 of the Public Health Act, 1875, at the expense of the owners of the property abutting thereon. Private streets to the extent of 1,436 yards, and involving a cost of 2,898*l.* 17s. 5d., have been made up principally by contractors in accordance with contracts entered into by the late St. George Urban District Council, and apportioned by the Corporation. All these private streets have been declared highways to be re-paved hereafter by the city, and added to the list for street watering, making a total length of streets declared highways of 4·17 miles, at a cost of 15,644*l.* 4s. 7d. The average cost of this work has been 7s. 2½d. per foot run of frontage. Wood paving has been substituted for the road material formerly used in the city during the year to the extent of 8,095 superficial yards, and at a cost of 5,183*l.* 11s. 4d., at an average cost of 12s. 10d. per yard. The total area of wood paving in the city repaired by the Corporation during the year was 160,967 superficial yards, independent of the portion maintained by the Tramways Company. The area of macadamised highways repaired during the year was 402,256 superficial yards, in which work 39,503 tons of material were used. The cost for labour, hauling, and material used for highways was 21,850*l.* Respecting sewerage, amongst other work, 621 ft. of old sewers were destroyed, three tidal valves were fixed, and five cleansed. The cost of sewer cleansing and reconstruction executed during the year, and chargeable to the general district rate, was 11,523*l.* The hydraulic paving plant was working for four and a half months, and the quantity of work turned out was by hand, 395 coping stones, and 209 edging stones; by machinery, 5,582 yards of paving slabs. The cost of working the destructor and repairs was 1,499*l.*

ORGAN, DUNKELD CATHEDRAL.—An organ has recently been placed in Dunkeld Cathedral, in the gallery. The oak case for the instrument is carved in Gothic character to harmonise with the old oak wood-work in the cathedral. The case was designed by Mr. A. J. Murray, architect, of Aberdeen.

STREET IMPROVEMENTS, MANCHESTER.—At a recent meeting of the City Council it was resolved to reinstate in the Manchester Corporation Bill (1901) a clause for the widening of Corporation-street, on condition that satisfactory plans defining the area and the properties to be affected were meantime approved by the General Purposes Committee, which had recommended the postponement for a year at least of the request for Parliamentary powers in the matter. At a meeting of the Improvement and Building Committee the subject again came up for discussion, and this Committee confirmed the action already taken up on the question by unanimously agreeing—"That in the opinion of this Committee compulsory powers should be obtained to acquire the whole of the properties bounded by Hanging Ditch, Cannon-street, Market-street, Corporation-street, and Market-place, and that the City Surveyor be instructed to submit plans, which are to be laid before the General Purposes Committee at an early date." The estimated cost of the scheme, so far as purchases alone are concerned, is about 500,000*l.* No decision has been arrived at as to what class of buildings shall be placed on the cleared area, and the Committee are in no way bound as to their future action in that respect, but they stand by their original recommendation that Corporation-street, in the locality indicated, shall be widened to twenty-five yards from its present width of sixteen yards.—*Manchester Courier.*

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

10,711.—FOLDING-RULES: *J. G. Lilley and F. W. Lilley.*—For locking the joints of a measuring rule when it is opened a sliding bolt is arranged within a dove-tailed groove above the central hinge, and a similar bolt is devised for each of the hinges upon the arms of the rule, the latter bolts being passed through notches cut in the hinge pins.

10,716.—A BALL AND FLOAT VALVE: *S. Robertson.*—The valve, which is adapted for flushing or supply cisterns, is fitted so as to slide in a sleeve or cylinder which is attached to the casing, the valve having grooves for packing rings which are kept apart with diaphragms or webs; a deflecting outlet or drown pipe directs water against the cistern's side in its flow from a chamber formed around the water outlet, by which contrivance noise and shocks are obviated.

10,752.—A MACHINE FOR WORKING STONE: *T. A. Currie and G. E. Currie.*—Power-driven hammres and tools are employed for dressing and surfacing the stone, an eccentric or crank with its connecting-rods drive two pivoted levers, whose ends operate in slots which are cut in the hammers, that are formed of side-plates. The side-plates have several other plates, which constitute their working faces, and buffers at the remoter ends of the slots are provided for the hammers. The stone can be dressed on more faces than one in any required direction by an adjustment of the position of the bearing-blocks and the throw of the leavers.

10,774.—A TOOL-SLIDE FOR LATHES: *F. G. Wilke.*—The two parts of the slide have inclined surfaces, and a screw to adjust the tool's height moves the slide's upper portion. A rotary cutter operates upon the work-blank, which may be clamped upon the slide. The slide-rest is described as being available for lathes or other metal or wood-working machinery.

10,798.—PLASTIC COMPOSITIONS: *J. A. Wheeler & S. W. Eells.*—The material is intended to serve as a substitute for wood and stone and for the making of flooring, wainscotting, doors, and various hollow ware articles; its chief constituent part is a wooden or other fibrous pulp, whilst, for fireproof goods, asbestos fibre, mingled with talc, ashes, &c., is used instead of the pulp; after it has been wetted and mixed with potassium or sodium silicate the fibre or pulp is kneaded with pounded lime, when it is ready for moulding or baking, zinc white or white lead or slaked quick-lime being added if a white finished article is desired, or calcined pulverised magnesite, soaked in chloride of magnesia or some other chloride may be mixed with the compound. For hardening the moulded goods their surfaces should be coated with a solution of magnesium or other chloride.

10,830.—SIPHONS: *W. Ross.*—A float operates within a cylinder, into which the siphon's shorter leg is introduced. Water will flow into the siphon through a valve that opens upwards, but the valve becomes closed when the pull-chain is used for pressing the float downwards and starting the flush. A heavily-weighted piston which will descend through its own weight may be adopted instead of a float.

10,831.—GRABS: *H. B. Fleming.*—From a curved bar are hung, with ropes or chains, a pair of pivoted forks whose upper ends are joined with toggle-levers which carry a spring-catch. When the grab is loaded the catch is caused to engage with a hole in the curved bar. When the catch is freed by a pull upon the rope the forks will fall into the opened position and will thereby liberate their load. The catch may be mounted so as to slide in the frame, and be held with a stretched ring of rubber, or it may be pivoted in the frame and be retained in its place with a spring. For moving granulated material the prongs of the grab can be filled up with plates.

10,832.—PROPS FOR MINING PURPOSES: *W. Balmer.*—Props, after the telescopical kind, are made of flanged tubes that will slide inside one another, and are packed with coal dust, stone, or some similar friable material. When it is desired to remove or lower the props, the filling material is taken out through holes that are cut in the lower tubes. Caps or covers may be provided for the holes if necessary.

10,856.—TREADS OR STEPS FOR LADDERS: *A. E. Fairman.*—The ladder, which will serve for a gangway when it is turned horizontally, is equipped with steps that are pivoted on to the string boards or sides as well as on to cross bars, which are secured with bolts to parallel metal bars set lengthwise and pivoted underneath the platform.

10,874.—TILES FOR ROOFING PURPOSES; *C. Wilke.*—The tiles are fashioned with upper V-shaped ribs and recesses, also with under ribs that will engage with the recesses of the lower tiles, and with lower grooves that will engage with the ribs of the tiles below; hanging ribs are made for engagement with the roof battens, and projections on the tiles interlock with dovetail-shaped grooves cut in the sides of the adjacent tiles. For the manufacture of the tiles is devised a cover, which is hinged on to a table, and carries two pivoted ribbed arms whereby the ribs and recesses are to be fashioned. The material is gathered away from between the knives affixed to the cover-plates by means of a cutter or scoop. For removal of the goods from the mould are provided vertical rods, projecting through the base of the mould and affixed to a plate which is worked with a treadle.

10,905.—STAGING FOR BUILDING PURPOSES: *M. Perret.*—A staging for use in the making of concrete floors, &c., is formed of boards supported upon bars that slide the one within the other, are joined with clips, and have pivoted hooks or angle-pieces which will rest upon the supports or joists. The bars, made of either wood or metal, have cross-sections of ribbed, angular, or channelled shapes; and, in order that the retaining-clips shall neither project above the bars' upper edges, nor interfere with the laying of the boards evenly, they are caused to slide upon ribs made upon the sides of the bars.

10,917.—A MACHINE FOR USE BY CARPENTERS, WHEELWRIGHTS, AND OTHERS: *C. W. Ferguson.*—The machine is devised for sawing, boring, mortising, and turning processes alike. It comprises a band-saw mounted upon two pulleys and a circular saw carried round an axis. Both the saws are mounted upon the ends of two radial arms, in order that the axis may be lifted or lowered, and that the band-saw may be tightened. If a chuck or a boring-tool takes the place of the circular saw, a screw and a lever feed the spindle forwards; and if the machine is to be worked as a lathe a back-centre can be held in a bracket bolted on to it. The drilling machine will serve for mortising purposes.

10,945.—A FASTENING FOR BRUSH HANDLES: *J. H. Hill.*—For a removable fastening of the handle to the stock a ferrule is affixed to the former, and is provided with a pin that engages with a bayonet-shaped slot cut in a socket secured to the stock.

10,965.—AN APPLIANCE FOR WATER-PIPES IN TIMES OF FROST: *N. M. Hopkins.*—To prevent the pipe from bursting when the water is frozen the inventor causes air or gas to be forced with a pump into the main supply pipe or by the means following:—Within a chamber which is joined to the service pipe by a passage (to be opened or closed with a cock), is contained a float that carries a valve, whilst lugs or rails prevent the float from sinking too low. To the service pipe should also be attached a nozzle that shall extend beyond the passage into a sleeve that is flared at both its ends. For vertical pipes an expansion-chamber is adopted. The invention is supplementary to that specified in No. 27,528 of 1898.

10,970.—PAINTING OF SURFACES FROM A DISTANCE: *J. F. Redman.*—A telegraphical arm, which is pivoted to a block upon a trolley, carries a spray-producer, which may be either pivoted or weighted and fitted with a guide-rope. Two guys at the sides support the arm, and at its back is another arm which engages with a spring and a nut upon a pivoted bolt; other arms and pulleys bear upon the surface which is to be painted or covered and retain the spray-producer at a certain distance from the surface. Tubes and a valve supply compressed air to the spray-producer, and a detachable frame, mounted upon the trolley, holds the paint and a pump, which, together with a stirrer, can be worked with either a hand-wheel or a motor to be turned by air drawn from one of the supply tubes.

10,000.—AN APPLIANCE FOR CRANES: *W. H. Wise.*—The object of the invention is to enable that with the winding-in of one of the slewing-ropes the other shall be paid out; the outer ends of the slewing-ropes are fastened upon opposite sides of

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the crane, the ropes are passed around pulleys, and are then secured at their inner ends to the opposite sides of an endless chain loop which is driven by a motor.

11,005.—A WINDOW APPARATUS: *R. Leggott*—For opening and closing purposes are employed a lever, links, and a notched sliding-rod; a spring pin which is pressed into a notch of the rod holds the window in position when it is opened; the opened window is secured by means of a clamping screw, and when it is closed by means of a pawl or catch that has been forced, through the action of a compressed spring, into engagement with the hook of a bracket.

11,016.—SPIGOT AND SOCKET PIPE-JOINTS.—*R. Ewing.*—A jointing for stoneware and other pipes is effected by moulding a ring or band upon the shoulders in the bottom of the socket and forming small shoulders upon the faces of the bands which will take plastic material, and upon the faces of the spigot bands; upon the spigot end and mouth of the socket may also be fashioned bands and rings, cement being filled in through holes in the socket; the faces of the rings are curved when elastic packing is not inserted between the rings of the spigot and the socket.

11,078.—MORTAR FOR BUILDERS' USE.—*W. J. Chrystal.*—The compound is made of lime-waste, vat or soap waste, sand, ashes, or similar silicious materials, ground together in a mortar-mill, and previously roasted or dried if it is desired to keep the compound in bags; for a boiler or pipe covering some fibrous material—such as hemp waste, crude asbestos, cocoa-nut fibre, refuse from paper-works, or esparto grass—is added to the composition, together with clay to make it adhesive and plastic. The mortar is described as being suitable for building purposes, as well as being a fireproof, vermin proof, sound proof and non-conducting substance.

MEETINGS.

FRIDAY, SEPTEMBER 28.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., &c., on Sanitary Law: Introductory remarks, Public Health Acts—English, Scotch, Irish; other Statutes relating to Public Health; By-laws (models, &c.), Regulations, Orders, Memoranda, &c. 8 p.m.

SATURDAY, SEPTEMBER 29.

The London and Provincial Builders' Foremen's Association (Memorial Hall, Farringdon-street).—Monthly Meeting. 7.30 p.m.

MONDAY, OCTOBER 1.

Society of Engineers.—Mr. Robert Henderson on "Paper-Making Machinery." 7.30 p.m.

WEDNESDAY, OCTOBER 3.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., &c., on "Sanitary Law; Public Health London Act; Metropolis Local Management Acts; By-Laws and Regulations in Force in the Administrative County of London." 8 p.m.

Builders' Foremen and Clerks of Works Institution.—Ordinary meeting of Members. 8 p.m.

THURSDAY, OCTOBER 4.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., &c., on "Sanitary Law, Factory and Workshop Acts, Smoke Legislation, Food and Drugs Act, 1899." 8 p.m.

FRIDAY, OCTOBER 5.

The Architectural Association.—Annual General Meeting. Address by the President, Mr. W. Howard Seth-Smith, and distribution of prizes. 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., &c., on "Duties of a Sanitary Inspector, Outdoor." 8 p.m.

Civil and Mechanical Engineers' Society.—President's address by Prof. R. H. Smith. 8 p.m.

SATURDAY, OCTOBER 6.

British Institute of Certified Carpenters.—Meeting at Carpenters' Hall. 6 p.m.

Northern Architectural Association.—Visit to Co-operative Societies' Building, Blandford-street, Newcastle.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 10.—By THOMAS CROXTON (at Hinckley).

Nuneaton, &c., Warwick.—Moxon's Farm, 133 a., f., r. 160*l.*	£2,975

September 14.—By Messrs. SPELMAN (at Norwich).

Thorpe-next-Norwich, Norfolk.—The Red Lion, p.h., f.	£,200
Thunder-lane, six freehold houses	940
Thunder-lane, two plots of building land, f.	130
Bixfield, Norfolk.—A freehold house, and 1 a. 0 r. 34 p.	100

September 15. By AUSTIN & Co.

Caterham, Surrey.—1 to 6, Providence Villas, u.t. 93½ yrs., g.r. 34*l.*, r. 154*l.*	925

By SCORELL & LAKE.

Westbourne Pk.—4, Modena-st., u.t. 66½ yrs., g.r. 8*l.*, r. 38*l.*	335
6, Gadsdon Mews, u.t. 66 yrs., g.r. 4*l.*	145
Leytonstone.—237, High-road, u.t. 46 yrs., g.r. 7*l.*, r. 28*l.*	375

By STEPHENSON & ALEXANDER (at Cardiff).

Southerndown, Glamorgan.—Craig-yr-Eos, and 18 a., f.	3,600

By Messrs. COBB (at Rochester).

Cliffe, Kent.—Buttway Farm, 3 a. 2 r. 28 p., f.	1,220
Reed-st., two cottages and plot of garden land, 0 a. 3 r. 12 p., f.	592
Rochester-rd., three cottages and 0 a. 1 r. 6 p., f.	330
Rochester-rd., Walnut Tree Fields, 6 a. 0 r. 6 p., f.	£330

September 19.—By W. R. NICHOLAS & Co.

Baydon, &c., Wilts.—The Russley Park Estate, 116 a. 0 r. 30 p., f.	5,000

By BAXTER, PAYNE, & LEPPER.

Chelsea.—95 and 96, Cheyne-walk, f., r. 185*l.*	3,480

By FOSTER & CRANFIELD.

Romford, Essex.—1 and 2, Harrow-cottages, f.	400
Islington.—43, Arlington-square, u.t. 27 yrs., g.r. 5*l.* 5s., e.r. 45*l.*	370
Canonbury.—20, Canonbury-rd., u.t. 18 yrs., g.r. 6*l.* 10s., r. 16*l.*	340
Dulwich.—3, Hillsboro'-rd., u.t. 64 yrs., g.r., 7*l.* 10s., r. 42*l.*	450

By WM. WESTON.

Turnham Green.—15, 16, and 24, Chiswick-rd., f., r. 78*l.* 2s.	1,260
Acton.—70, 72, and 74, Church-rd., f.	1,395
Westbourne-pk.—3, 4, 5, and 6, St. Luke's Mews, u.t. 62½ yrs., g.r. 20*l.*	950
Kilburn.—Alpha-pl., i.g.r. 12*l.*, u.t. 58 yrs., g.r. 2*l.*	180

By DOUGLAS YOUNG & Co.

Streatham.—Madeira-rd., Melrose, f., e.r. 70*l.*	975
Norwood.—4, Werndee-rd., f., r. 32*l.*	395
Kensal Rise.—26, Felixstowe-rd., f.	325
Stockwell.—24, Tregothnan rd., u.t. 82 yrs., g.r. 8*l.* 8s., r. 40*l.*	355
Streatham.—11 to 15, Edgington-rd., u.t. 87 yrs., g.r. 18*l.* 15s.	685

By A. PREECE (at Holloway).

Holloway.—21 to 27 (odd), Mulkern-rd., u.t. 61½ yrs., g.r. 20*l.* 10s., r. 128*l.*	1,180
61, Calverley-grove, u.t. 61½ yrs. g.r. 6*l.*, r. 30*l.*	275
143, Elthorne-rd., u.t. 61½ yrs., g.r. 7*l.*, r. 36*l.*	345

By WALTERS & RAWLENCE (at Frome).

Witham, Somerset.—The Witham Friary Estate, 522 a. 1 r. 23 p., f.	7,800

September 20.—By BOYCE & EVENS.

Woodford.—1 and 2, Sherwood-cottages; also 1 and 2, Mansfield-cottages, f.	690
Hackney.—26, Mare-st., f., r. 60*l.*	740
Walthamstow.—68 to 80 (even), High-st., f., r. 315*l.*	5,530

By C. C. & T. MOORE.

Commercial-rd. East.—Union-st., &c., f.g.r., 31*l.* 10s., reversion in 79 yrs.	780
54 to 66 (even), Watney-st., f., r. 400*l.*	7,390
68 and 70, Watney-st., and 21 and 23, Morris-st., f., r. 162*l.*	3,135
Stepney.—34 to 42 (even), Gold-st., 26½ yrs., g.r. 13*l.* 15s.	735

By WORSFOLD & HAYWARD (at Dover).

Dover, Kent.—60, Bulwark-st., u.t. 34½ yrs., g.r. 4*l.*, r. 20*l.*	220
44 and 46, Wyndham-rd., u.t. 993 yrs., g.r. 4*l.*	240
18, Effingham-cres., u.t. 26 yrs., g.r. 1*l.*, r. 35*l.*	400
9, Portland-place, f.	185

By J. A EGGAR (at Farnham).

Long Sutton, Hants.—Enclosure of land, 15 a., f.	245

September 21.—By FRANKLIN, GALE, & NEWTON.

Ipsden, Oxon.—Hailey Farm, 33 a. 2 r. 29 p., f.	860
North Stoke, Oxon.—Five freehold cottages	200

By W. B. HALLETT.

Goring, Oxon.—River-rd., a building site, 1 a. 0 r. 16 p., f.	250

By RAMSEY & Co.

Clapham Common.—48, The Chase, f., r. 50*l.*	680
Carshalton.—Park Hill-rd., &c., six plots of building land, f.	235

By RIDER & SONS.

Notting Hill.—281 and 283, Latimer-rd., u.t. 43 yrs., g.r. 8*l.*	410
15, 16 and 17, Raymede-st., u.t. 75 yrs., g.r. 15*l.*	725
82 and 84, Blechynden-st., u.t. 65½ yrs., g.r. 12*l.* 12s.	520

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.			
Hard Stocks	1 15 0	per 1,000	alongside, in river.	
Rough Stocks and Grizzles	1 11 0	,,	,,	,,
Smooth Bright Facing Stocks..	2 18 0	,,	,,	,,
Shippers	2 2 0	,,	,,	,,
Flettons.....	1 9 6	,,	at railway depôt.	
Red Wire Cuts ..	1 15 0	,,	,,	,,
Best Fareham Red	3 11 6	,,	,,	,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,,	,,
Do., Bullnose	4 12 0	,,	,,	,,
Best Stourbridge Fire Bricks	4 4 6	,,	,,	,,
GLAZED BRICKS.				
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,,	,,
Headers	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	17 0 0	,,	,,	,,
Double Stretchers	19 0 0	,,	,,	,,
Double Headers..	16 0 0	,,	,,	,,
One Side and two Ends	19 0 0	,,	,,	,,
Two Sides and one End	20 0 0	,,	,,	,,
Splays, Chamfered, Squints	20 0 0	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	14 0 0	,,	,,	,,

PRICES CURRENT (*Continued*).

	£ s. d.			
Double Stretchers	15 0 0	per 1,000	at railway depôt	
Double Headers..	14 0 0	,,	,,	,,
One Side and two Ends	15 0 0	,,	,,	,,
Two Sides and one End	15 0 0	,,	,,	,,
Splays, Chamfered, Squints	14 0 0	,,	,,	,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.	
	s. d.			
Thames and Pit Sand	8 0	per yard, delivered.		
Thames Ballast	6 9	,,	,,	
Best Portland Cement	37 6	per ton	,,	
Best Ground Blue Lias Lime..	24 0	,,	,,	

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.	

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt	
Bath ,, ...	1 7	,,	,,
Beer ,, ...	1 6½	,,	,,
Grinshill ,, ...	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale ,,	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York ,,	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super. at rly. depôt.	
,, ,, 6 in. Rubbed Ditto..	2 10½	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 3 in. self-faced Ditto	0 9	,,	,,

SLATES.

in. in.	£ s. d.			
20×10 best blue Bangor..	11 5 0	per 1000 of 1200 at rly. dep.		
,, best seconds ,,	10 15 0	,,	,,	
16× 8 best ,,	6 8 6	,,	,,	
20×10 best blue Portmadoc	10 18 0	,,	,,	
16× 8 best blue Portmadoc	6 0 0	,,	,,	
20×10 best Eureka unfading green...	11 8 6	,,	,,	
16× 8 ,, ,,	6 15 0	,,	,,	
20×10 Permanent green and Sedan green	10 0 0	,,	,,	
16× 8 ,, ,,	5 12 6	,,	,,	

TILES.

	s. d.			
Best plain red roofing tiles..	41 6	per 1,000 at rly. depôt.		
Hip and valley tiles....	3 7	per doz.		
Best Broseley tiles	48 6	per 1,000	,,	,,
Hip and valley tiles....	4 0	per doz.	,,	,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,,	,,
Do. ornamental Do.	60 0	,,	,,	,,
Hip tiles.....	4 0	per doz.	,,	,,
Valley tiles.....	3 9	,,	,,	,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50 9	per 1,000	,,	,,
Hip tiles	4 1	per doz.	,,	,,
Valley tiles.....	3 8	,,	,,	,,

WOOD.

BUILDING WOOD.—YELLOW.

	£ s. d.		£ s. d.	
	At per standard.			
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0		18 0 0	
Deals: best 3 by 9	14 10 0		15 10 0	
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0		13 10 0	
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0		less than 7 in. and 8 in.	
Deals: seconds	1 0 0		less than best	
Battens: seconds.....	0 10 0	,,	,,	,,
	At per load of 50 ft.			
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0		5 0 0	
Seconds	4 5 0		4 10 0	
Small timber (8 in. to 10 in.)	3 12 6		3 15 0	
Swedish balks.....	2 15 0		3 0 0	
Pitch pine timber (35 ft. average)..	4 0 0		4 10 0	

JOINERS' WOOD.

	£ s. d.		£ s. d.	
	At per standard.			
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0		28 10 0	
3 in. by 9 in.	24 0 0		25 0 0	
Battens, 2½ in. and 3 in. by 7 in.	20 0 0		21 0 0	
Second yellow deals, 3 in. by 11 in.	22 10 0		24 0 0	
,, ,, 3 in. by 9 in.	20 0 0		21 0 0	
Battens, 2½ in. and 3 in. by 7 in.	16 10 0		18 0 0	
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0		18 0 0	
Battens, 2½ in. and 3 in. by 7 in.	13 10 0		14 10 0	
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0		26 0 0	
Do. 3 in. by 9 in.	22 0 0		23 0 0	
Battens.....	16 10 0		17 10 0	
Second yellow deals, 3 in. by 11 in.....	18 10 0		20 0 0	
Do. 3 in. by 9 in.	17 0 0		18 0 0	
Battens.....	14 0 0		14 10 0	
Third yellow deals, 3 in. by 11 in.....	15 0 0		16 10 0	
Do. 3 in. by 9 in.	14 0 0		14 10 0	
Battens.....	12 10 0		13 10 0	
White Sea and Petersburg:—				
First white deals, 3 in. by 11 in..	15 10 0		16 10 0	
,, ,, ,, 3 in. by 9 in. ..	14 0 0		15 0 0	
Battens.....	12 10 0		13 10 0	
Second white deals 3 in. by 11 in.	14 0 0		15 0 0	
,, ,, ,, 3 in. by 9 in.	13 0 0		14 0 0	
,, ,, battens	11 0 0		12 0 0	
Pitch pine: deals	16 0 0		18 0 0	
Under 2 in. thick extra	0 10 0		1 0 0	
Yellow Pine—				
First, regular sizes	30 0 0		33 0 0	
Broads (12 in. and up)	2 0 0		more.	
Oddments	22 0 0		24 0 0	
Seconds, regular sizes	24 10 0		26 10 0	

[*See also next page.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Plans and Sections for Laying-out Pleasure Grounds	Old Swindon U.D.C.	50*l.*	Oct. 22

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Old Granite Setts	Camberwell Vestry	Engineer, Vestry Hall, Peckham-road, S.E.	Oct. 1
*Forty-eight Cottages, Belvedere, &c.	Erith U.D.C.	Council's Surveyor, High-street, Erith	do.
*Road-making, &c., Works, Montague-av., Brockley	Lewisham Board of Works	Surveyor, Town Hall, Catford, S.E.	Oct. 2
*Road-making, &c., Works, Crofton Park-rd., Brockley	do.	do	do.
Granite Road Metal (900 tons)	Wealdstone U.D.C.	F. H. Parr, Civil Engineer, Wealdstone	do.
Street Improvements, Quarry-street	Whitworth (Lancs.) U.D.C.	T. Biker, Surveyor, Facit, near Rochdale	do.
Quartzite Road Metal (1,000 tons)	Windsor Town Council	E. A. Stickland, Borough Surveyor, Alma-road, Windsor	do.
Store Buildings, Welbeck-road, Walker, Newcastle	Walker Co-operative Society, Ltd.	Secretary, Society's Offices, Lamb-street, Newcastle-on-Tyne	do.
Marble Mosaic Pavement, East Parade	Leeds Guardians	Butler, Wilson, & Oglesby, Architects, 12, East-parade, Leeds	do.
Cast-iron Water Pipes and Laying (10 miles), Balmore	Stirlingshire County Council	Kyle & Frew, Engineers, 140, West George-street, Glasgow	do.
House, Muchalls, Aberdeen	.....	Walker & Duncan, Architects, 3, Golden-square, Aberdeen	do.
Building Work at Workhouse, Wisborough Green	Petworth Guardians	A. F. Mant, Union Offices, Petworth	do.
Electricity Buildings, Pleck-road	Walsall Corporation	A. Wyllie, Borough Engineer, Walsall	do.
Granite Road Metal (2,500 tons)	Aldershot U.D.C.	N. F. Dennis, Civil Engineer, Aldershot	do.
Footpaths, &c.	Bishop's Stortford U.D.C.	E. S. Scott, Civil Engineer, North-street, Bishop's Stortford	do.
Street Works, Whitfield-avenue	Dover Town Council	H. E. Stilgoe, Civil Engineer, Town Hall	do.
Sewerage Works, &c., Whitfield-avenue	do.	do.	do.
Sewerage Works	Bridgnorth Town Council	E. Trevor, Borough Surveyor, Bridgnorth	do.
Offices, &c., Dock-street, Middlesbrough	North-Eastern Railway Company	W. Bell, Architect, York	Oct. 3
Additions to Schools, near Tamworth	Kingsbury School Board	J. W. Godderidge, Architect, Tamworth	do.
Roads, Hemsworth and Kinsley	Hemsworth R.D.C.	T. H. Richardson, Hemsworth	do.
Roads, &c., Chanctonbury-road	Hove (Sussex) Town Council	H. H. Scott, Engineer, Town Hall, Hove	do.
Water Supply, Long Rock, Cornwall	Ludgvan U.D.C.	J. J. Hill, Council Offices, Ludgvan	do.
Additions to Schools, Mardy	Ystradyfodwg School Board	J. Rees, Architect, Pentre, Glam.	do.
Laying and Jointing Cast-iron Pipes, &c. (2,200 yards)	Neath R.D.C.	W. E. C. Thomas, Engineer, Council Offices, Neath	do.
Storm Water Reservoir Works	Littlehampton U.D.C.	H. Howard, Surveyor, Town Offices, Littlehampton	do.
*Roadways and Footpaths	Chaseside Building Estate	Walton & Lee, Surveyors, 10, Mount-street, Grosvenor-sq., W.	Oct. 4
Alterations to House, Leatherhead	Mr. C. Burgin	J. Ladds, Architect, 7, Doughty-street, W.C.	do.
Footpath, &c., Royal Hill	Southend Corporation	A. Fidler, Civil Engineer, Southend	do.
Alterations, &c., to Schools, Spennymoor	Tudhoe School Board	G. W. Rogers, Architect, Spennymoor, Durham	do.
Alterations to Hall, &c., St. Albans	.....	F. W. K. Tarte, Architect, 12, St. Peter-street, St. Albans	do.
Settling Tanks	Burley (Yorks.) Sewage Com.	H. A. Johnson, Civil Engineer, 15, The Exchange, Bradford	do.
*Pumping House at Bedford	Midland Railway	See Advertisement	Oct. 5
Retaining Wall, &c., River Medlock	Manchester Corporation	City Surveyor, Town Hall	do.
Additions to Schools, Westgate, Rotherham	.....	J. Platts, Architect, Old Bank Buildings, Rotherham	do.
Furniture Depository, Exmouth	Messrs. Blackmore & Sons	E. E. Ellis, Architect, The Strand, Exmouth	Oct. 6
Churchyard Extension, &c., Methley, Yorks.	.....	A. W. Jackson, Melwood House, Methley	do.
House, St. Levan, Cornwall	.....	Mr. C. Botterell, Polggiga, St. Levan	Oct. 8
School, Cefn Cribbwr, near Bridgend	.....	Cook & Edward, Architects, Bridgend	do.
Rebuilding Poyntington Viaduct	Dorset County Council	E. A. Ffooks, County Council Offices, Sherborne	do.
Roof Works, Sutton, near Dublin	G. N. Railway Company (Ireland)	T. Morrison, Amiens-street Terminus, Dublin	do.
School Room, &c., Rosaline-road, Fulham	Trustees of Fulham Baptist Chapel	T. Boughton, 18, Doria-road, Parson's Green	do.
Alterations to Offices, Piccadilly	Manchester Corporation	J. M. M'Elroy, Town Hall	do.
Road Works, Milton-road, &c.	Margate Town Council	Borough Surveyor, Town Hall, Margate	do.
Surveyor's Materials, &c., Manchester	L. and Y. Railway Company	R. C. Irwin, Hunt's Bank, Manchester	do.
Post Office, Clonmel, Ireland	Office of Works, Dublin	Secretary, The Office, Dublin	Oct. 9
Pipe Sewer (3,050 yards)	Canterbury Corporation	A. C. Turley, Civil Engineer, High-street, Canterbury	do.
*Sewerage Works	Bromley U.D.C.	Surveyor, Council Offices, Bromley, Kent	do.
Alterations to Premises, Wellington-street	Bingley U.D.C.	H. Bottomley, Surveyor, Town Hall	Oct. 10
*Workmen's Dwellings	Twickenham U.D.C.	Surveyor, Council Town Hall, Twickenham	Oct. 11
*Cottages, Parker-road, Grays	Gray's Thurrock U.D.C.	Surveyor, Council Offices, Grays	do.
*Making-up Roads	Beckenham U.D.C.	Surveyor, Council Offices, Beckenham, Kent	Oct. 15
*Making-up Bromley Gardens	Beckenham and Bromley U.D.C.	do.	do.
*Broken Granite	Hanwell U.D.C.	Council's Offices, Hanwell, W.	do.
Limestone (2,000 tons) Road Metal, &c.	Tredegar U.D.C.	W. C. Widdowson, Surveyor, Tredegar	do.
*Constabulary Head Quarters, Springfield	Essex County Council	Clare & Ross, Architects, 66, Duke-street, Chelmsford	Oct. 20
*Electric Light Station	Dartford U.D.C.	Hesketh & Stokes, 110, Cheapside, E.C.	do.
*Two Shops in South End, Croydon	.....	F. & W. Stocker, Architect, Queen-street, Cheapside, E.C.	Oct. 24
Two Semi-detached Villas, Bloomfield	.....	G. B. Moffat, Architect, 7, Wellington-place, Belfast	No date
Two Houses and Shops, Beeston, Leeds	.....	Mr. J. Dawson, Punch Bowl, Beeston	do.
Offices, Barrow-in-Furness	.....	E. M. Young, Architect, 90, Duke-street, Barrow	do.
Steam Laundry, Stabling, &c., Cardigan-lane, Leeds	.....	J. B. Bailey & Son, Architects, 3, Scott-street, Keighley	do.
*Swimming Baths, &c.	Edmonton U.D.C.	W. G. Scott, Architect, 25, Bedford-row, W.C.	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Camberwell Vestry	4*l.* 4s. per week	Oct. 2

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xviii. & xxi.*

PRICES CURRENT (*Continued*). At per standard.

	£	s.	d.	£	s.	d.
Yellow Pine Oddments	20	0	0	22	0	0
Kauri Pine—						
Planks, per ft. cube	0	3	6	0	4	6
Danzig and Stettin Oak Logs—						
Large, per ft. cube	0	2	6	0	2	8
Small " "	0	2	4	0	2	7
Wainscot Oak Logs, per ft. cube	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	0	0	9
¾ in. do. do.	0	0	7	-	-	-

PRICES CURRENT (*Continued*). At per standard.

	£	s.	d.	£	s.	d.
Dry Mahogany—						
Honduras, Tabasco, per ft. sup. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	16	0	0	20	0	0
American Whitewood Planks—						
Per ft. cube	0	2	3	0	3	0

PRICES CURRENT (*Continued*).

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	9	7	6	-	-	-
Compound Girders " "	13	10	0	-	-	-
Angles, Tees and Channels, ordinary sections	12	10	0	14	10	0
Flitch Plates	12	0	0	-	-	-

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PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	10 0 0	10 10 0
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0
Staffordshire "Marked Bars"	13 5 0	- - -
Hoop Iron, basis price	11 5 0	11 15 0
" " galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 10 0	- - -
" " to 24 g.	12 15 0	- - -
" " to 26 g.	13 15 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 15 0	- - -
" " 22 g. and 24 g.	15 5 0	- - -
" " 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 10 0	- - -
" " 22 g. and 24 g.	19 0 0	- - -
" " 26 g.	20 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 0 0	14 15 0
" " 20 g. and 24 g.	14 15 0	15 10 0
Cut nails, 3 in. to 6 in. (Under 3 in. usual trade extras.)	11 10 0	- - -
LEAD—Sheet, English, 3 lbs. & up.	20 0 0	- - -
Pipe in coils	20 10 0	- - -
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 1	- - -
Thin "	0 1 3	- - -
Copper nails "	0 1 3	- - -
BRASS—		
Strong Sheet "	0 0 11	- - -
Thin "	0 1 1	- - -
TIN—English Ingots "	0 1 7	- - -
SOLDER—Plumbers' "	0 0 8	- - -
Tinmen's "	0 0 10	- - -
Blowpipe "	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3½d. " "
" " fourths	3d. " "
26 oz. thirds	4½d. " "
" " fourths	4d. " "
32 oz. thirds	5½d. " "
" " fourths	5d. " "
Fluted sheet, 15 oz.	3½d. " "
" 21 "	4½d. " "
½ Hartley's Rolled Plate	3d. " "
½ " " "	3½d. " "
¼ " " "	4d. " "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
" " " in barrels "	0 3 2
" " " in drums "	0 3 4
Boiled " in pipes "	0 3 4
" " " in barrels "	0 3 5
" " " in drums "	0 3 7
Turpentine, in barrels "	0 2 5
" in drums "	0 2 7
Genuine Ground English White Lead ...per ton	27 10 0
Red Lead, Dry "	25 0 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

H. S.—J. C. (Amount should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDEEN.—For the reconstruction of pipe sewer, &c., Park-street, for the Town Council. Mr. Wm. Dyack, Borough Surveyor, Town Hall, Aberdeen :—
A. McKay, Aberdeen £150 12 6

ASHBURTON (Devon).—For additions to Wickeridge House, for Mr. G. E. Allen. Mr. W. Barrons, architect, Totnes :—
W. Atwill, Broadhempston, Totnes* £410

BAKEWELL.—For additions to house at the gasworks, for the Urban District Council. Mr. W. Redfearn, Town Surveyor, Bakewell. Quantities by the Town Surveyor:—

J. Vaines	£368 10	E. & W. Bramwell	£336 15
Toft & Clark	354 0	Allsop & Son, Bakewell*	325 0
G. & W. Toft	343 0		

BRIDLINGTON QUAY.—For erection of house and premises, west side St. John's-avenue (South), for Mr. A. Jennison. Mr. J. Earnshaw, architect, Wellington-road, Bridlington Quay :—

J. Rennard	£456 0 0	Barr & Booth	£349 3 0
G. Walkington	439 14 0	Smallwood & Shaw	337 3 6
E. Corner	439 0 0	A. Gardam	333 0 0
C. Limon	398 0 0	T. Spink*	301 11 0
T. Atkin	379 9 0		
W. Barnes	378 0 0		

[All of Bridlington.]

BRIDLINGTON QUAY.—For the erection of a farmhouse, Bessingby, for Mr. A. G. W. Wright. Mr. J. Earnshaw, architect, Carlton House, Bridlington Quay :—

Walkington & Day	£999 10 0	Barr & Booth	£750 0 0
Smallwood & Shaw	921 10 4	J. Rennard	745 0 0
A. Gardam	896 10 0	J. Lawdon	745 0 0
		E. Wilson*	740 0 0

[All of Bridlington].

BRISTOL.—For the erection of the superstructure of business premises, for Messrs. Lennards, Limited, Parkplace, Clifton. Mr. H. Dare Bryan, architect, 38, College-green, Bristol. Quantities by Messrs. Bernard & Pearson, Bristol :—

	Bath Stone.	Doulting Stone.	Ham Hill Stone.
T. Rowbotham	£54,960	£57,160	£58,710
Perry & Co.	54,300	56,500	58,190
Hayward & Wooster	53,700	56,010	57,100
Parnell & Son	53,407	55,860	57,000
Long & Sons	52,210	54,600	56,590
A. J. Beavan	50,700	53,100	54,900
Stephens, Bastow, & Co.	48,324	50,624	50,624
Cowlin & Son	48,124	50,496	52,079
Shillitoe & Son	42,950	46,000	46,500
Wilkins & Sons, Bristol	41,680‡	44,000	45,600

‡ Reduced to £33,774 and accepted.

BRITON FERRY (Glam.).—For the construction of a brick sewer (700 yards), for the Urban District Council. Mr. H. Alec Clarke, engineer, Council Offices, Briton Ferry. Quantities by the engineer :—

J. Sutherland	£2,397 0 0	T. Waters	£1,475 19 6
J. Williams	1,911 0 0	W. Thompson	1,436 1 1
J. Grove	1,604 18 5	H. Jones, Briton Ferry*	1,434 10 0
L. Gower	1,600 0 0		

[Engineer's estimate, £1,450.]

COLCHESTER.—For sewering, paving, &c., Walsingham-road, for the Corporation. Mr. Herbert Goodyear, Borough Surveyor, Town Hall, Colchester :—

W. Wady	£235 4 4	Burgoyne & Son, Ipswich*	£172 9 9
W. Howard & Son	194 3 8		

CROYDON.—For the erection of schools, Portland-road, South Norwood, for the Croydon School Board, Mr. H. Carter Pegg, architect, 137, Brigstock-road, Thornton Heath :—

Foster Bros.	£25,362	W. Smith & Son	£19,500
S. Redhouse	21,165	Akers & Co.	18,949
Patman & Fotheringham	20,771	J. Smith & Sons.	18,881
		E. J. Saunders Croydon*	17,800

GRAYS (Essex).—For the supply of 700 to 800 tons granite and 660 lin. ft. straight Norway kerb, for the Urban District Council. Mr. A. C. James, surveyor, Council Offices, Grays :—

	Description of Macadam.	Macadam per ton. s. d.	Kerb per ft. s d.
W. Illingworth	Rowley	14 9	—
"	Scotch	12 0	—
W. Griffiths	Guernsey	12 4	1 11
Fry Bros.	"	12 0	—
Road Maintenance Co.	Quartzite	10 9	—
The Quartzite Co., London	"	10 6*	—
Blichfeldt & Co.	—	—	1 9½
Grimley & Co.	Leicestershire	13 6	—
Van Praagh & Co., London	"	14 3	1 9*
G. A. Watson	Hartshill	13 0	—

GREAT YARMOUTH.—For additions to workhouse, Rollesby. Mr. A. S. Hewitt, architect, 23, Regent-street, Great Yarmouth :—

Carter & Wright	£450 0	G. Farman, Caister*	£323 10
J. Moore	349 10		

HASTINGS.—For the construction of an underground public convenience, Silverhill, for the Corporation. Mr. P. H. Palmer, C.E., Town Hall, Hastings :—
E. Gutsell, Silverhill, St. Leonards £347

HOXTON.—For the erection of five warehouses and alterations to two shops in Pitfield-street and Bowling Green-walk, Hoxton, E., for Dr. W. Benjafield. Mr. Henry W. Dobb, architect :—
Lawrence & Son, Waltham Abbey* £5,337

KEIGHLEY.—For the erection of store premises, East-avenue, for the Industrial Co-operative Society, Limited. Mr. J. Haggas, architect, North-street, Keighley :—
Masonry.—H. V. Robinson, Keighley .....
Slating.—Wm. Thornton, Bingley .....
Concrete.—Emmott Bros., Keighley .....
Plumbing.—Crabtree & Wallace, Keighley..
£996 (exclusive of joiner's work).

LANCASTER.—For the erection of business premises, King-street, for Mr. E. Johnson. Mr. J. Parkinson, architect, 67, Church-street, Lancaster. Quantities by the architect :—

Masonry.—R. Thompson*	£629 0 0
Joinery.—W. Shaw & Son*	709 15 0
Slating and Plastering.—T. Cross & Son*	167 7 0
Plumbing and Glazing.—R. S. Wilson*	136 10 0
Painting.—J. Taylor*	37 18 9

[All of Lancaster.]

LEICESTER.—For additional stable-buildings, Narborough-road, for Mr. Andrew Upton. Messrs. Tait & Herbert, architects, Friar-lane, Leicester :—

F. Elliot	£672 10	J. O. Jewsbury	£649 0
J. H. Kellett	667 0	W. Tyrrell*	590 0
F. Stevens	660 0		

[All of Leicester.]

LONDON.—For the erection of a warehouse, at Silvertown for the American Radiator Company. Messrs. Harrington & Ley, architects, 65, Bishopsgate-street, Without, and Corn Exchange, Romford :—
Munday & Sons, Trinity-square* £7,962

LONDON.—For decorations and new balcony, at No. 12, Marble Arch, Hyde Park, for Mr. Thomas Cadarn Reece. Mr. Alfred E. Nightingale, architect, Albert Embankment, London :—
Alfred Brown* £155

LONDON.—For the erection of nurses' home and additions to kitchen at Church-lane, Tooting, for the Guardians of the Wandsworth and Clapham Union. Mr. Cecil A. Sharp, architect, 11, Old Queen-street, Queen Anne's Gate, S.W. :—

Garrett & Son	£3,108 10 0	Akers & Co.	£2,447 0 0
R. A. Jewell	2,788 7 4	Huntley Bros.	2,398 0 0
Cropley Bros.	2,750 0 0	Foster Bros., Norwood Junction*	2,296 0 0
H. Wall	2,659 0 0		
W. H. Lascells	2,593 0 0		

LONDON.—For street improvement works, Church-street, for the Stoke Newington Vestry. Mr. Reginald Brown, C.E., Vestry Offices, Stoke Newington :—

S. Saunders	£545 4 6	W. Griffiths, Bishopsgate-st.*	£418 9 0
Acme Wood Flooring Co.	503 0 0	W. Wadey	410 0 0
Mowlem & Co.	468 14 3		

MIDDLETON (Lancs.).—For paving, flagging, &c., Hanson-street, for the Corporation. Mr. W. Welburn, Borough Surveyor, Town Hall, Middleton. Quantities by the Borough Surveyor :—

Etheridge & Clarke	£284 17 10	Partington & Son, Middleton*	£261 5 2

NAVAN.—For the erection of stabling, &c., Trim Gate-street, for Mr. T. J. McQuillan. Mr. S. Lowe, architect, Navan :—

F. Gogarty	£160 0	J. Navagh, Navan*	£123 14
C. Pigott	130 0		

[Exclusive of fittings, &c.]

NOTTINGHAM.—For the erection of four dwelling-houses and shops, Poplar-street, for the Home Brewery Company, Limited. Mr. Fred. C. Martin, architect, Angel-row, Nottingham :—

C. Wooll	£726 0 0	E. Morris	£680 0 0
G. Walker	683 7 8	T. H. Harper*	580 0 0

PONTEFRACT.—For the execution of street works, Love-lane-terrace, for various owners. Messrs. Garside & Pennington, surveyors, Pontefract. Quantities by Castleford & Selby :—

J. Summers	£481 0 0	W. Waddington	£412 0 0
B. Roberts	459 0 0	Hall & Sons, Bradford*	390 2 5

PORTSMOUTH.—For the erection of power station buildings and chimney-shaft, Vivash-road, Fratton-grove, for the Corporation. Mr. E. Rotter, C.E., Town Hall, Portsmouth. Quantities by Messrs. Rake & Cogswell, Prudential Buildings, Portsmouth :—

Light & Son	£12,200 0 0	J. J. Crockerell	£11,075 0 0
W. W. Learmouth	11,473 0 0	W. W. Evans	10,990 0 0
Clark & Son	11,450 0 0	M. Coltherup	10,826 3 5
T. W. Quick	11,450 0 0	J. W. Perkins, Clive-road, Portsmouth*	10,515 8 0
W. Ward	11,300 0 0		
J. Croad	11,200 0 0		

PRESTON (Lancs.).—For levelling, paving, flagging, &c., Waterloo-terrace, Ashton, for the Corporation :—
J. Moxham, Brackenbury-street, Preston £1,010 15 8

[*See also next page.*

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SHEERNESS.—For the supply of (1) quartzite, 400 yards; (2) broken flints, 300 yards; (3) hoggin, 250 yards: for the Urban District Council. Mr. Thos. F. Berry, surveyor, Council Offices, Sheerness:—

Contract No. 1.

	Per Ton. s.	d.
D. Ward	15	0
Quartzite Company	13	7
J. Bligh	13	0
Road Maintenance and Stone Supply Company, The Crescent, Gravesend*	12	11
W. Illingworth	12	6
J. H. Dickson	12	6

Contract No. 2.

Wills & Packham	5	2
Tuff & Miskin	5	1
Knight & Hodgkin	4	11
Smeed, Dean, & Co., Sittingbourne*	4	9

Contract No. 3.

E. J. & W. Goldsmith	4	6
Tuff & Miskin	3	11
Wills & Packham, Sittingbourne*	3	5

WAKEFIELD.—For the erection of twelve through houses, Ashdown-road, Belle Vue, Sandal, for Mr. W. N. Wynn, C.E., 10, Livingstone-street, Roundhay-road, Leeds:—

Bricklaying, &c.—J. S. Duncan Staerfoot, Barnsley	£1,389 12
Carpentry and Joinery.—G. H. Nettletom, Tenter-lane, Leeds	900 0
Slating.—J. Season, Hunslet-road	117 15
Plastering.—C. Driver, Arundel-street, Wakefield	211 10
Plumbing and Glazing.—J. Stead, Crosslane, Sandal, Wakefield	95 0
Painting.—Baines & Taylor, George-street, Wakefield	43 0

WAKEFIELD (Yorks).—Accepted for the erections of Wesleyan Church and Sunday Schools at Newton Lane End, for the Committee. Messrs. Garside & Pennington, architects, Pontefract, Castleford, and Selby. Quantities by the architects:—

Brickworking.—Armitage, Outwood	£1,470 12
Joinery.—J. W. Harrop, Ossett	629 14
Plumbing.—J. H. Wilson, Outwood	202 0
Plastering.—Lockwood, Castleford	135 15
Slating.—Pickles Bros., Leeds	270 0
Painting.—Geo. Thompson, Leeds	34 0

WALSALL.—For the erection of a house at Palfrey Schools for the School Board. Messrs. Bailey & McConnal, architects, Bridge-street, Walsall:—

T. Hughes	£420 0	Brockhurst & Wood	£387 10
S. Wootton	397 0	W. Lees	355 7
J. Mallin	395 0	J. Wilkes, Walsall*	354 0
T. Mason	393 0		

WALSALL.—For the erection of schools, Wolverhampton-road, for the School Board. Messrs. Bailey & McConnal, architects, Bridge-street, Walsall. Quantities by architects:—

J. Harley	£6,400	M. A. Lynex	£5,850
F. L. Jones	6,330	Brockhurst & Wood	5,815
J. Dallow	6,220	W. Wistance	5,714
G. H. Marshall	6,172	T. Mason	5,700
W. Harvey Gibbs	6,000	S. Wootton, Bloxwich*	5,541
J. Mallin	5,890		
T. Tildesley	5,854		

WESTON-SUPER-MARE.—For the erection of swimming bath, &c., Knightstone, for the Urban District Council. Mr. Hugh Nettleton, surveyor, Town Hall, Weston-super-Mare:—

Hayward & Wooster	£8,992	W. Gibson, Exeter*	£8,553
Krauss & Son	8,886	W. M. Dubin	8,067
H. W. Pollard	8,645		

WORKSOP.—For the erection of electricity supply works, Canal-road, for the Urban District Council:—

Ilett & Sons	£4,494	H. Pickers, Ltd.	£4,104
G. Wright	4,343	W. Hall, Potter-st., Worksop*	3,950
H. Wickers	4,340		

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Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have *Replies addressed to the Office*, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed) 1s.

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The Builder.

VOL. LXXIX., No. 3092. OCTOBER 6, 1900.

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Engineering Æsthetics.

IN a "Note" in another column we have drawn attention to the significance of one of the resolutions passed at a recent conference, at Paris, on the teaching of drawing and its place in general education, to the effect that in technical professional schools engineering students should be encouraged in that kind of study in drawing which would tend to educate them in an appreciation of beauty of form. In France one is not surprised at such an expression of opinion; the perception of the value of the æsthetic element in construction is in the air in that country, in a degree in which it has never been in modern England. But since that "Note" was written we have had the gratification of seeing a prominent article, and a very well-written and thoughtful one, in the pages of the leading English engineering journal, on the æsthetic aspect of engineering construction. The article in the *Engineer* of the 28th ult. is indeed one of a series to be devoted to "The Æsthetic Principles of Naval Architecture," a subject which, though of the greatest interest, does not directly concern us here; but this first article is occupied with a general consideration of the basis of æsthetic principles as applied to structure. The appearance of this article almost simultaneously with our record of the resolution passed at the Paris meeting is a curious coincidence; it is also a gratifying one, as an indication that a side of the subject which has been almost entirely neglected in connexion with modern English engineering is at last beginning to receive some attention.

As far as the article in the *Engineer* goes we are almost entirely in agreement with it; it does not, as we shall show, go far enough to take in all the aims of architecture, which was not perhaps to be expected; but as far as concerns engineering structures it preaches an excellent gospel. The curious point about the matter, however, is, that its conclusions imply the entire condemnation, as far as appearance and æsthetic treatment are concerned, of the majority of the most ornate and costly structures of modern engineering. The author of the article lays stress throughout on the importance of simplicity, consistency, and fitness for the purpose, as the ruling qualities in the treatment of engineering works. "The law of consistency is essentially one of truthfulness. There must be no deception in our structures, no dishonest trickery in our constructions, no optical delusions such as the false representation of the material . . . A plain girder will show the simplest way of connecting its two points of support, and the arched bridge will appeal to us more in particular by its simple solidity and stability. The work or duty in each case is clear. Immediately we try to add parts foreign to the main idea of the structure, or if we try to mix the designs or to combine any two or more of them, then the simplicity or directness is lost, and with it much of the pleasure we found in beholding the structure." This is admirable, and is entirely in accordance with the view we have often expressed, that some of the older engineering structures of modern times are more satisfactory to architects than the more recent ones, precisely on account of this quality of simplicity and absence of any pretending or pretentious features of decoration. But how are we to regard some of these recent engineering designs in the light of this teaching? The design made by the London County Council's Engineer for Vauxhall Bridge was strongly criticised in our columns and by architects elsewhere, and if we remember right, our contemporary the *Engineer* was somewhat indignant with us for what was mistakenly regarded as an attack on the engineering profession in the person of one of its ablest members. How far any modification or improvement of that bridge design has been brought about by the criticism to which it has been subjected we do not as yet know. But it would be impossible to imply a fuller and more entire condemnation of it than is implied in the reasoning laid down in this article in the representative organ of the engineering profession itself. The whole essence of that Vauxhall Bridge design was misrepresentation of the facts of the structure; the employment of an apparent huge column which was not a column; the addition of another absurd and useless column as a mere ornament above it; the use of prominent and violently rusticated arch voussoirs which in reality only bring an unnecessary weight on a structure which would owe none of its stability to them. Could any reasoning, again, more entirely condemn the Tower Bridge, which consists of sham masonry towers standing on sham foundations, and really supported by a steel structure inside of them; towers pretending to carry suspension chains which, if their structure coincided with their outward semblance, they could not possibly carry; towers bedizened outwardly, moreover, with useless and unmeaning "ornamental" features? The author of the article in question refers to the Tower Bridge with the mild condemnation that it "is less fortunate from an æsthetic point of view than it might have been, being partly a suspension and partly a girder bridge"; but that is not the real point, which he seems to miss. The point is that it is actually one construction, but pretends to be another. An architectural critic would add that the so-called ornamental detail is bad of its kind; but we admit that this is a point beyond the proper scope of the *Engineer* article.

This question of detail would affect also one's view of the Eiffel Tower, to which the author of the article refers as an illustration of the beauty of constructive fitness. "The Eiffel Tower should be so proportioned at each height that it may best be able to resist the pressure of the wind and the weight of its own material. Only when it is so designed can the contemplation of the structure afford us pleasure." That is a perfectly sound principle

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as regards the determining of the curve of stability, and is illustrated also in the lines of a lighthouse. But the Eiffel Tower affords pleasure to no artist, despite this, in consequence of a certain commonplace and gewgaw element in its details. And there is another point in the article we are referring to which may have an application to the Eiffel Tower which does not seem to have occurred to the writer. He says "the idea of purpose, where such is found, cannot be separated from that of beauty in the ordinary sense of that word; and it is impossible, if it were desirable, to produce a pleasing structure possessing only abstract beauty and showing no purpose." This we think will be found to be true; even the most non-utilitarian structure, such as a triumphal arch, has an indication of purpose. But what indication of purpose has the Eiffel Tower? All that it represents really is what may be called "brag"—one of the most vulgar feelings of humanity. That perhaps is at the bottom of the sense of vulgarity which all artists connect with it, and in that sense it bears out the observation we have just quoted.

While heartily sympathising with the general healthy, logical, and severe line of the *Engineer* article in regard to engineering æsthetics, it does not, as we have already observed, cover all the ground connected with architecture. The writer observes that there are two kinds of purpose to be considered in relation to the design of a structure; the point is very well put in the following words:—

"There is first the purely utilitarian purpose, which may be said to be accidental, as it has no direct connexion with the object itself, although, of course, it forms in most cases the *raison d'être* of the object or structure. Secondly, there is the purpose of the structure as such, and this is the important one, as far as æsthetic considerations are concerned. In a cathedral the utilitarian or accidental purpose of the structure is the forming of a shelter for a congregation; but the great primary object of the building, as such, is the resisting of the forces of gravity and wind pressure, and the first æsthetic requirement is that the ability to do so is clearly shown. In a bridge the utilitarian purpose is the carrying of a roadway over a river or ravine; but the purpose of the bridge as a structure is to span a certain amount of space by an erection which shall be strong and stable."

Very good as far as the bridge is concerned, but the passage certainly does not cover the subject of the cathedral. It will perhaps fall in with the views of Mr. Prior, whose trenchant paper on church architecture, read at the Church Congress, will be found on another page of this issue; but we can hardly regard such a building as a cathedral as bounded by utilitarian considerations. It has, or should have, an object beyond that—the creation of a new ideal conception, a poem in stone. The requirements of structural stability must, no doubt, be satisfied and expressed; but that is only the beginning, not the end; otherwise we should never have had the glories of our mediæval cathedrals, or the majesty of the Pantheon, or the mystery of the Egyptian temple. We admit that this is beyond the province of the engineer; we only wish it to be recognised that this purely poetic element exists. So again, when our engineering theorist says that "columns and brackets will be graceful when designed so that the minimum of material is doing the maximum of work," we admit that as an admirable and complete analysis for engineering work, but not necessarily for architecture; architectural expression may demand what, from an engineer's point of view, would be waste of material; it is a matter of expression and effect.

In like manner, outside of the constructional engineering design comes the element of decorative detail, and even of such expression as is afforded by mouldings and modelling of lines and surfaces. That is an element not necessary to engineering structure, though it may be added to it; but it is one which demands a special training of eye and perception. The treatment of minor details so as to indicate or embody structural function—so as, in fact, to have a meaning—is a very delicate and refined source of interest in a structure, and must be undertaken with a taste and perception refined by study, or it is better let alone altogether. That is one of the rocks on which engineering designers get wrecked, when they try to go beyond mere utilitarian structure without the refining influence of artistic training.

Artists, however, would not for the most part attack engineering work — certainly architects would not,—if engineers confined themselves to simple structure instead of attempting to introduce extraneous and often irrelevant ornament. And the general tendency of the article in the *Engineer* is quite in that direction. "Although," says the writer, "we cannot always derive much satisfaction from the æsthetic contemplation of engineering structures, there are cases where this is possible—viz, where the systems of the applied forces and of the resisting agencies happen to be of an elementary or primary nature, and where the structure is of some magnitude. Retaining walls, lighthouses, bridges, and ships possess in a peculiar degree the qualities above mentioned, as essential to a better æsthetic appreciation." That is just what we want. Structures on a large scale, designed to resist great forces of Nature, are almost sure to be impressive if left to themselves, and not bedizened with features supposed to be ornamental. Perhaps engineers will be more ready to give heed to advice of that kind when it comes to them from one of their own representative organs.

COMPETITION FOR NEW MUNICIPAL BUILDINGS, WALSALL.

THE five sets of drawings submitted in the second and final stage of this competition are now on view in the present Art Gallery of Walsall.

The site for the new building is a good one, almost square in shape, with streets on all four sides—Leicester-street on the south-west, Lichfield-street on the south-east, Darwall-street on the north-west, and a new street, 40 ft. wide, on the north-east side. The west corner of the site is occupied already by the post-office, the south corner by the county court. The accommodation to be provided by the competitors consists, first, of a large town hall for public entertainments and meetings; secondly, municipal offices for town clerk, borough accountant, borough engineer, gas department, health department, Justice clerk, overseers, electrical engineer; thirdly, council chamber, committee rooms, and mayor's parlour; and, fourthly, space for future extension of municipal offices and for a future art gallery and museum.

In the selected design, which, as we announced last week, is by Mr. J. Gibson, the town hall is arranged so that its principal entrance, with cloakrooms, lavatories, and stairs to galleries, fits in between the post-office and county court on the Leicester-street side of the site, and its axial line runs from Leicester-street to the new street, from which latter is the artistes' entrance to the rear of the town hall. The proposed art gallery and museum is provided for on the frontage of Darwall-street unoccupied by the post-office, whilst the municipal offices are located on the remainder of the site, and utilise the frontages to Lichfield-street and the new street.

The town hall has accommodation on the ground floor for 1,222, in the gallery for 290, and in the orchestra and platform 200, making a total of 1,712. The town hall is symmetrically and prettily planned, but the exits at the principal entrance end are somewhat of the objectionable bottle-neck order, a 10-ft. opening and two 4-ft. openings from the hall leading to a crushroom from which the only obvious departure is by a 10-ft. doorway. It is true that doors are shown leading from the crushroom to the gallery stairs, but we cannot suppose these are other than communication doors, as they open directly on the foot of the gallery stairs, and two streams of the public would thus meet in a confined space. We trust that the author of the selected design will re-study his exits, as the present arrangement invites a catastrophe in the event of a panic. At the other end of the hall the exits are well contrived. The gallery, with a refreshment-room at the rear, is placed over the entrance, cloakrooms, and crushrooms. The orchestra is a semi-circular apse with organ behind. A view of the hall as proposed is given among the plates in the present issue.

The principal entrance to the municipal offices is in Lichfield-street, and leads to the grand stair by which the council chamber on the first and the committee rooms on the second floor are approached. Right and left of the principal entrance are the town clerk's offices and the gas department, the latter extending also to a similar position on the first floor. The municipal offices, occupying the frontages to Lichfield-street and the new street thus leave a large quadrangle at their rear, the centre of which is occupied by the collector's office of the borough accountant's department, which, with its approaches and the lavatory blocks, sub-divides the quadrangle into four courts, the smallest of which is 38 ft. by 28 ft. The frontage to the new street is on the ground floor occupied by the borough accountant's department, justice clerk, and weights and measures offices, with the artistes' entrance already mentioned, which serves also as a secondary entrance to the offices. On the first floor are located the overseers, borough engineer, health department, and part of gas department, whilst the council chamber occupies a quiet position over the rate collector's office in the internal quadrangle. On the second floor are further rooms for the borough engineer, gas department, and electrical engineer, as well as the committee rooms and mayor's parlour. In an attic over the centre of the new street frontage is the caretaker's house.

The elevations and details are conceived

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in that phase of the Later Renaissance which the municipal buildings of Colchester and Cardiff, as well as in designs by Mr. Gibson himself, have established as the up-to-date style for municipal work, and which in Mr. Gibson's hands is vigorous and virile to an eminent degree. The ordonnance of the principal elevation to Lichfield-street is a single order running through two stories on a rusticated basement, of which the windows are plain, semi-circular headed openings. The actual front is symmetrical, but piquancy is given to the design by a boldly designed tower just round the corner in the new street, which in the design of this frontage is balanced by the end pavilion of the future art gallery. Needless to say the drawings are excellent, the ½-in. detail of the principal entrance and the interior outline perspective of the town hall especially being masterpieces of consummate draughtsmanship.

Design No. 2 in general lines has a similar disposition to that of the selected design and differs only in detail and in maturity. The town hall is in a similar position with the entrance from Leicester-street, the municipal offices and council chamber and committee rooms are similarly placed on the site with minor differences of position, and the site for the future art gallery is also identical. The external treatment is also founded on somewhat similar ideas, but lacks the dignity of the selected design by over-exuberance of clever detail. The drawings are good but not equal to Mr. Gibson's, though a perspective by Mr. Raffles Davison gives the design the best possible chance.

Designs No. 3 and No. 4 alike follow a disposition of plan on different lines to the selected and No. 2, allotting the space on the Leicester-street frontage, between the post-office and county court, to the future art gallery, making the approach to the town hall from Lichfield-street, and adjoining the county-court end of that frontage, and its axial line from Lichfield-street to Darwall-street, and the future extension of the municipal offices to Darwall-street. The municipal offices occupy the remainder of the Lichfield-street front and the whole of the new street. Even in the position of the council chamber these two designs are similar, both having it over the principal entrance to the town hall, but with the difference that in No. 3 the council chamber does not actually touch the street front, whilst in No. 4 one end abuts and has one window looking on to Lichfield-street.

In external treatment the similarity between these designs ends. No. 3 is ungrammatical and incoherent; No. 4 is scholarly, dignified, and restrained. Both are based on English rather than Continental Later Renaissance. No. 3 follows somewhat the lines of No. 2 in external grouping, in that the principal front has two dwarf towers at the ends of the façade, whilst No. 4 follows the selected design in having a single lofty tower at the angle of Lichfield-street and the new street.

Thus, whilst designs No. 1 (the selected plan) and No. 2 group together in plan with a distinct superiority of No. 1, and No. 3 and No. 4 also group together with a joint inferiority in type to No. 1 and No. 2, and a very slight superiority of No. 4 over No. 3, in façade treatment we have No. 1 and No. 4 on somewhat similar lines, and No. 2 and No. 3 grouping together in general with faults similar in kind, though not in degree.

No. 5 occupies a place by itself, differing in type of plan and in external composition, which latter is undoubtedly the strong point of the design, and as shown in the perspective presents an admirable grouping. In plan the author has abandoned the part of the site between the post-office and county court, and restricted himself to the remainder, with the municipal offices compactly arranged upon the front half, next Lichfield-street, of his restricted area, the town hall at the rear of this, with its main entrance from the new street, and a future public library and art gallery at the rear, fronting Darwall-street. The result is a workable and reasonable plan of distinct type from the others in this final stage, and possibly not inferior in type to the selected design, which, *qud* plan, maintains its position by the completeness with which it is worked out in detail.

This superiority in plan, combined with the undoubtedly best architectural treatment in elevation and detail both externally and internally, fully justifies the judgment of the assessor, Mr. Macvicar Anderson, in placing this design first amongst an excellent collection of competition drawings—excellent in plan, elevation, detail, and draughtsmanship, in spite of the faults which we have noted in the comparison of the various schemes.

NOTES.

The Palace of Odysseus.

Archæological discovery up to the present day has been more successful in throwing light on the Iliad than the Odyssey. Two sites on the modern Ithaca have been excavated in the hopes of finding the palace of Odysseus—Aetò by Schliemann, Polis by Dr. Dörpfeld last March—both in vain, or at least with negative results. These negative results have, however, borne fruit in so far as they have decided Dr. Dörpfeld to seek the ancient Ithaca elsewhere, *i.e.*, in the modern island of Santa Maura, the ancient Leukas. Classical scholars have long been conscious that the modern Ithaca fitted in but ill with Homer's descriptions. We cannot here detail the discrepancies, but one salient example may be given. Odysseus has flocks and herds on the mainland, and there is constant communication by ferry; the modern Ithaca is twenty miles out to sea. Early next year Dr. Dörpfeld proposes to excavate certain sites in Leukas; funds have been placed at his disposal by a rich Dutchman, Mr. Goekoop. An interesting feature in the archæological tour annually directed by Dr. Dörpfeld will be a visit to Leukas with an exposition of the results of the excavation.

French Views on Teaching Drawing.

We recently gave a short report of the Congress in Paris on the subject of "L'Enseignement du Dessin" (see *Builder* of September 15 last). We have since received a copy of the resolutions adopted by the Congress, some of which are worth notice. Under the head of "Enseignement Général" the following two resolutions were adopted:—

"1. That drawing ought to be compulsory in all schools, and in all examinations and competitions in general education without exception.

2. That in all examinations in general education, an absolute inability to draw should disqualify a candidate."

We presume that "Enseignement Général" may be taken to be the equivalent of what is classified as "Primary Education" in England; and if so, the second resolution quoted is more decisive than anything that has been said or resolved on the subject in this country. Under the head of "Enseignement Populaire de la Composition Décorative" it was resolved that—

"In the elementary teaching of drawing there was opportunity for a gradual introduction of the study of decorative composition."

Following upon this was a resolution that a normal system of instruction for professors of drawing should be established. A still more important resolution was passed in connexion with the question of special technical education, the object of which evidently is to amend some of the deficiencies of education in architects and engineers alike—to supply each with what he is most often deficient in. The purport of the resolution in question was that in technical schools for the teaching of architecture and engineering, the engineers should be required to go through studies "susceptibles de faire comprendre la forme et son rôle dans la création du Beau." If we could only teach the engineers *that*, it would indeed be a step gained, and we should be deeply indebted to the French for leading the way.

Building and Drawing.

In Mr. Prior's very outspoken paper on "Architecture in Relation to Religion," read at the Church Congress and printed on another page of this issue, there is much with which we agree; and at all events it is a wholesome outbreak of criticism from rather a new point of view. But there is one point on which we should certainly like an explanation. Mr. Prior says that architectural competition for churches is a competition not in building capacity, but in the representation of it by drawing, and that "it is a practical futility to institute a competition in one thing—designing on paper, when the thing to be selected is another—the ability of a churchwright." We are not arguing, at the moment, in favour of competition; but we want to know what is the logical outcome of this argument. Mr. Prior has built churches. When he is asked to build a church, does he go on the ground with a staff of workmen and set out a church out of his head and overlook its building, without either making any drawings for his own guidance and that of the workmen, or showing any design to the people for whom the church is to be built? If that is the case, we can at all events understand his position. But if he does show a drawing, a design on paper, to the Church Committee or the clergyman, how can he blame competing architects for doing the same? If one architect may (or must) make a drawing to satisfy his clerical clients, and to show them what the building will be like, why, as a matter of principle, may not twenty or thirty do so?

Christ Hospital.

Whilst it is not expected that the buildings and site of the Bluecoat School will be ready for sale before the close of next year, certain minor portions of the fabric have already been destined for reinstatement at the schools now being erected at Horsham from the designs and plans of Messrs. Aston Webb and Ingress Bell. The Hospital

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Governors have removed the facing bricks, with the façade of coupled pilasters and angle-pediment, its alcove, statue of King Edward VI., and the inscribed stone, from above the main entrance-door in the southern block, which forms one side of what is now known as "the Garden," being the cloister court of Grey Friars monastery. That block, having the Latin School in its upper floor, was built in 1682 by Sir Christopher Wren at the charges of Sir Robert Clayton (Lord Mayor, 1679), who contributed munificently towards the rebuilding of the school after the Great Fire, which also consumed all, the library excepted, of the adjacent Christ Church or Grey Friars. The south side of the block was built upon a thick wall, constructed of chalk, flint, and Kentish rag, which formed the north wall of the nave of Grey Friars. Wren was employed at the Hospital during some years; his other work there comprised the Writing School, 1694, erected at the cost of Sir John Moore (Lord Mayor, 1681), and, it is believed, the old hall, pulled down in 1827, on the west side of "the Garden." Amongst the statues taken to Horsham is that of Moore, carved in wood, and reputedly by Grinling Gibbons. The northern cloister, on the site of Richard Whittington's library, and the range of dormitories to the east, completed in 1836, are by John Shaw the elder, who designed also the west range of wards and dormitories, being upon the site of the old hall. James Lewis, who was appointed architect and surveyor to the Hospital on January 27, 1792, designed in 1793 the Grammar and Mathematical Schools, which have since been practically rebuilt by John Shaw the younger. Within the area known as "Hall-play," which one sees from Newgate-street, is the site of the Little Cloister of Grey Friars. The hall, designed by Shaw, was opened on May 29, 1829. Shaw, who died in 1833, was succeeded at the Hospital by John Shaw the younger, who carried out his father's designs for the new school buildings. The hall, which measures 187 ft. by 51 ft., and is 47 ft. high, is built of Portland stone upon an arcade of granite. In the basement are the kitchen, 67 ft. by 33 ft., larders, cellars, &c. The open-air gymnasium represents the site of the Giltspur-street Compter, built in 1787-91 by George Dance the younger, and pulled down in 1853. The passage known as "Giffs," or "Jiffs," is lighted by six of the seven arches, greatly mutilated, of the south cloister with its buttresses of the Franciscan monastery. Between the rear of the hall and the infirmary (1822) lies the course of the City wall; the playground to the north is still known as "the Ditch."

A Street Improvement Question.

A letter from Mr. C. H. Brodie, printed on another page, calls attention to a small but important street frontage improvement which can now be made at the junction of Shaftesbury-avenue and New Oxford-street, and which seems likely to be left undone for the most absurd of reasons, viz., that each of the authorities which might provide for it asserts that it is the business of the other. Mr. Brodie wrote to the St. Giles' District Board of Works and to the London County Council on the subject, neither of which bodies seem to have questioned the advisability of the alteration of frontage suggested, but each referred him to the other as the proper body to see to it. Surely two such authorities ought to settle such a matter amicably between them, rather than let a street improvement fall between two stools in this way.

Rouen.

Few towns in France are changing more rapidly than Rouen. It may be almost said to have lost its picturesqueness, for within the last few years a large number of the narrow streets have been widened. Street improvements in France mean monotony, for each new street is modelled on the Boulevards of Paris. While we may from an artistic point of view regret these changes, they must be regarded as necessary and inevitable from the point of view of health and sanitation. Yet it is somewhat surprising that more attempts are not made in France to keep to some extent the characteristics of the old towns while widening and rebuilding the streets. In England, both at Chester and Oxford, we have many examples of such attempts being successfully made. But changes such as are occurring at Rouen seem to give permanence to the great mediæval monuments such as the Cathedral and St. Ouen, which stand almost perpetual among the changes in domestic architecture around them. Equally noticeable also is the development of Rouen as a port—docks and shipbuilding yards may now be seen in active use, and steamers of considerable draught discharging cargoes carried from overseas. Fortunately, Rouen—sometimes called the Manchester of France—has not had to make a canal, but the distance—eighty miles from the sea, must always handicap Rouen as a port, in competition with Havre.

Sanitary Condition of Windsor.

The sanitary condition of Windsor has been for many years a constant subject of complaint, and Dr. Bulstrode's report to the Local Government Board on the subject, and on the character of the Town Council's administration, shows that things are still in a very bad state. Windsor is a "water-closet town," but up to a comparatively recent date there were a large number of closets not provided with water, and the unsatisfactory method of hand-flushing was accordingly resorted to. The nature, direction, and soundness of the house drains is usually a matter of pure conjecture. In the poorer parts of the town drain ventilation is often entirely absent, as also are any opportunities for drain inspection. Probably but few of the older drains would withstand the water test, and it does not seem that any decisive effort has been made to ascertain the exact state of affairs in this respect. The sewers are of diverse kinds; some are old brick barrel sewers, others pipe sewers with clay joints. The levels vary considerably, and in certain instances the fall of the sewer is in the opposite direction to the flow of sewage. The ventilation of the sewers is very inadequate. House-refuse is stored partly in ashpits and partly in movable receptacles; but in this matter of storage there is room for much improvement in the poorer parts of Windsor. There are accumulations of heaps of refuse, partly vegetable and partly animal, upon the bare ground; and in times of rain this decomposing refuse is washed into the subsoil in the neighbourhood of inhabited houses, and in times of drought and wind is scattered broadcast. Many of the houses in the poor quarters of the town seem to be in a wretched condition. Dr. Bulstrode says, on this head:—

"It is in reference to the non-weatherproof condition of these houses that the most serious considerations arise. I inspected a very considerable percentage of these houses, with a desire to obtain a good average idea of the state of affairs existing. I was especially invited to enter certain houses, the tenants beckoning to us to inspect their abodes, and to see the conditions under which they were obliged to live. There was distinctly a pathetic side to this inspection of Victoria Cottages, the inmates, seeing members of the Town Council with me, thinking that at last, at any rate, there would be some redress."

This state of things, almost at the doors of one our great Royal residences, seems a national disgrace.

Improvements in Hansom Cabs.

In reference to a note on this subject in our last issue, Mr. Alfred Knight, of Dorchester, writes to us that he has long ago built hansoms with the two improvements we mentioned as so necessary, viz.: a dirt-shield to the wheels and a method of putting the front window under the control of the passenger. It is called the "Allington" cab, and he has sent a number to Bristol, Hull, Warrington, &c., but cannot get them taken up in London. It is the usual story of the absurd conservatism of London, which accepts every existing inconvenience as inevitable, and refuses to look at improvements. It was thus that we had the old unwieldy dirty omnibuses with straw in the bottom still running in London, years after the leading provincial towns had established a far superior pattern of omnibus; it is for the same reason that we have the worst river steamers in the world; that we have four-wheeler cabs which are a disgrace to a capital city, while in Liverpool or Manchester you can hail on the streets a vehicle almost equal to a private brougham. And thus the hansom cab, originally a London invention, remains what it was when first invented, and provincial improvements on it are persistently ignored both by the public and the carriage-builders. That is always the way in London.

Liverpool Architectural Society.

The annual Report of the Liverpool Architectural Society, which is printed in a beautiful type and got up generally in an artistic manner, contains the last President's address, which was printed at the time in our columns. In the general report it is mentioned that during the last Session, out of eleven papers read, seven were contributed by members of the Society which is said to be "a distinct improvement on previous years." The new feature in the shape of having "members evenings" for the reading of papers by young members, the chair being taken on each occasion by a Fellow of the Society having special knowledge of the subject, is said to have proved very successful. This seems to be somewhat on the lines of the Discussion Section of the Architectural Association with its "Special Visitor."

Royal Academy Lectures.

It is announced, in the Royal Academy Prospectus of Lectures for the Session 1900-1901, that lectures on architecture will be given by Professor Aitchison on January 28 and 31, and February 4, 7, 11, and 14; but

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the subject is not announced. Professor Val Prinsep will give six lectures on painting, commencing on January 7; in this case also the subject of the lectures is not announced. No arrangements have been made for the delivery of any lectures on sculpture. Lectures on chemistry will be given by Professor Crouch, and on anatomy by Professor Anderson; but as far as the purely artistic subjects are concerned the Academy lecture system seems to be in rather a slack condition.

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

II.—The Criteria.

The distribution of the examples under notice is shown on the accompanying map (fig. 1), and suggests some comment. They are in the first place confined to England. In the Lowlands of Scotland, though some districts of them received at an early date an Anglian population, the researches of Messrs. McGibbon and Ross* have not revealed a single example with the special Saxon characteristics. In Wales Bloxam claimed an Early Saxon origin for the tower at Priestholme on Puffin Island, but this is clearly Norman, of no earlier date, though of simpler workmanship, than the tower of Penmon Priory Church on the neighbouring coast of Anglesea. Nothing Saxon seems to have been noted elsewhere in the Principality or in Cornwall. The early ecclesiastical buildings in all these parts of Great Britain belong to the types generally termed "Celtic," which are best to be studied in Ireland, and though as archaic and as interesting as the remains of Saxon work are of a different character. There is one building in Ireland which has been claimed as akin to our own Saxon structures, and this is the western part of the priory church at Howth, on Dublin Bay. This structure, however, while it lacks the usual Irish characteristics, does not exhibit any of the special features distinctive of Saxon buildings. Saxon architecture proper is not only confined to England, but, as the map shows, it is more especially represented in the Eastern and Midland counties. Examples, if they exist at all, are very infrequent on the western side of the Pennine chain from Cumberland to the Mersey, in Stafford and Cheshire, and more to the south in the counties of Monmouth, Somerset, Dorset, and Devon. This may, of course, be explained in great part by the late and gradual Teutonising of the western parts of the country; but it is not a little remarkable to find in Shropshire a kind of wedge of Saxon architecture driven, so to say, into the midst of the district in whose early ecclesiology Celtic traditions were predominant. The Saxon examples in this county invite the conjecture that a systematic search in the West of England generally might bring to light a good many more. The south-western counties probably contain more examples than have as yet been noticed.

The suggestion just made has wider bearings. Taking not England as a whole, but the smaller areas of the eight different districts into which for convenience sake the map has been divided, we note a tendency among the examples to fall into groups, while pretty wide regions are, on the other hand, left blank. The explanation partly is that when one example in a certain district is brought to light and commented on, the interest thereby excited leads to the recognition of other examples of a similar style of work in the neighbourhood. A group is in this way formed in one district, while in another the initial discovery still remains to be made, and the ground is in the meantime barren. It would be a mistake, therefore, to attach too much significance to the actual distribution of the monuments on the basis of our present knowledge. These geographical statistics must be regarded as to some extent provisional, and the barren regions should in the meantime be regarded as places where local investigation is especially called for. For the same general reasons it would be a mistake to attach too much importance to the local distribution of features and details. That no pilaster strips and only one doubtful

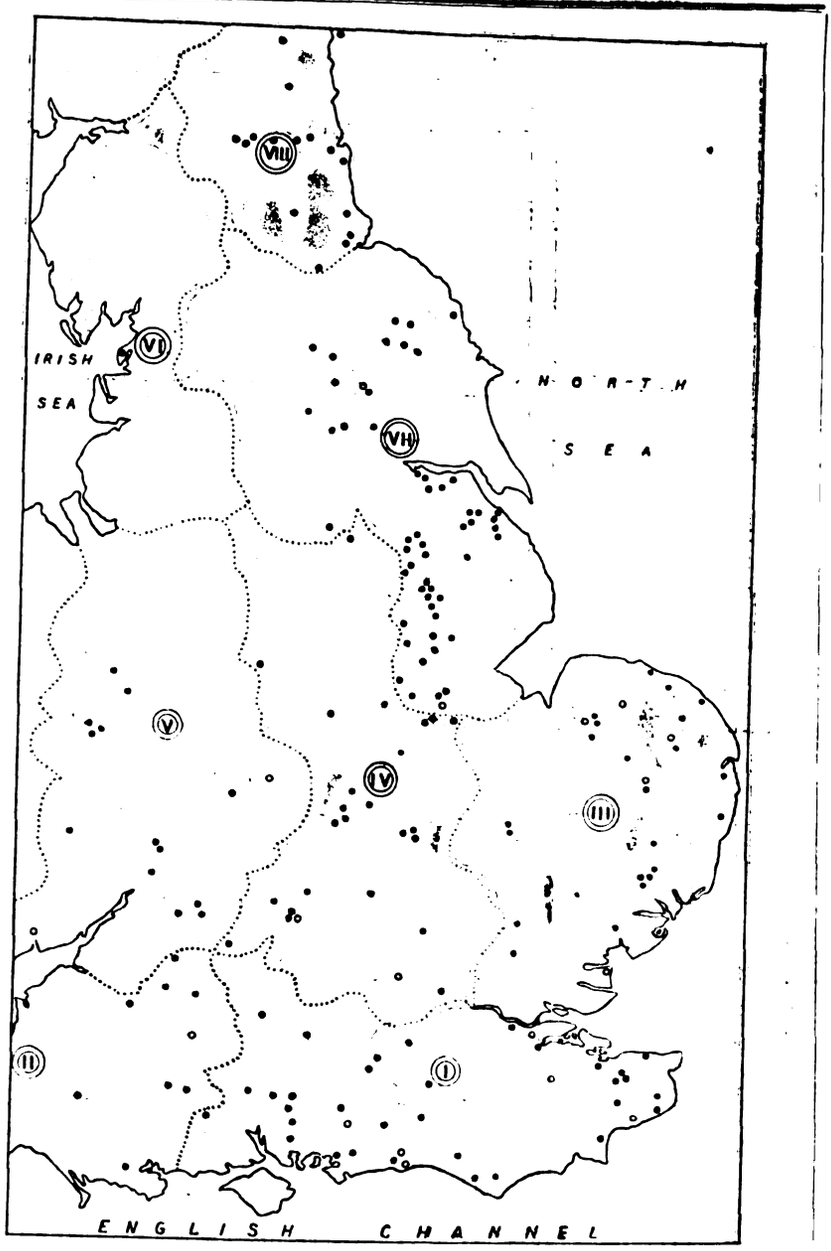

Fig. 1.—Distribution of Saxon Churches.

(Doubtful examples are indicated by open circles. The dotted lines show the boundaries of the districts into which the country is divided for the purpose of the catalogue.)

example of long-and-short work are to be found in Kent, while both occur commonly in the rest of the District I., may be merely an accident, and the same may be said of the comparative rarity of double-splayed windows in Lincolnshire and the North generally, as contrasted with their abundance in East Anglia. Except in the case of the square western towers there are no Saxon features or peculiarities that seem to have any very marked local significance.

With regard, now, to the criteria of pre-Conquest work, in nearly every case the question resolves itself into one between Saxon and Early Norman, and accordingly, characteristics which are found in both Saxon and Norman buildings are not of much help in the discrimination of doubtful examples. Features which do not occur in Norman work on the Continent are the most valuable for the purpose in view, and the appearance of them is enough either to stamp a structure as pre-Conquest, or to prove the survival or occasional recrudescence of native English traditions among Anglo-Norman builders. For example, the peculiar method of treating the quoins of a building in the so-called long-and-short work does not occur in the Duchy, and it is one of the safest tests of Saxon technique that we possess. It is, however, found exceptionally in Norman buildings in this country, and it is important that this fact should be recognised. A Norman doorway at Stow, Lincolnshire, shows it, and it appears also in the Norman entrance tower of Rougemont Castle, Exeter. This helps to remove a difficulty in the dating of the fine cruciform church of Cholsey, Berks, the Early English choir of which has been described as "one of the finest parochial chancels in the kingdom." The building has a massive central tower, in the quoins of which long-and-short work is distinctly apparent. The tower walls below, however, are nearly 6 ft. thick, and are pierced east and west with doubly-recessed arches and with plainer arches north and south, all of decidedly Norman character, which appears also in the other parts of the church. Cholsey is clearly an example of the survival of some of the peculiarities of pre-Conquest masonry in Norman times.

Buildings may be pronounced with greater or less confidence to be pre-Conquest on grounds which may be thus classified:—1, Chronological likelihood; 2, proportions; 3, technique; 4, openings; 5, features and details; 6, ornament. With regard to 1, where there is evidence to show that an arcade has been cut through an earlier wall, and when that arcade is Norman, it seems an obvious inference that the wall belongs to the earlier period. A good deal depends, however, upon the date of the Norman work, for it is quite possible that an early Norman wall may have been cut through in later Norman times, just as, to compare great things with small, the choir of Lanfranc at Canterbury was replaced within the Norman period by the grander structure of Ernulf. This question was posed by the late Professor Freeman in a paper

* "The Ecclesiastical Architecture of Scotland." Edinburgh. 1896-7.

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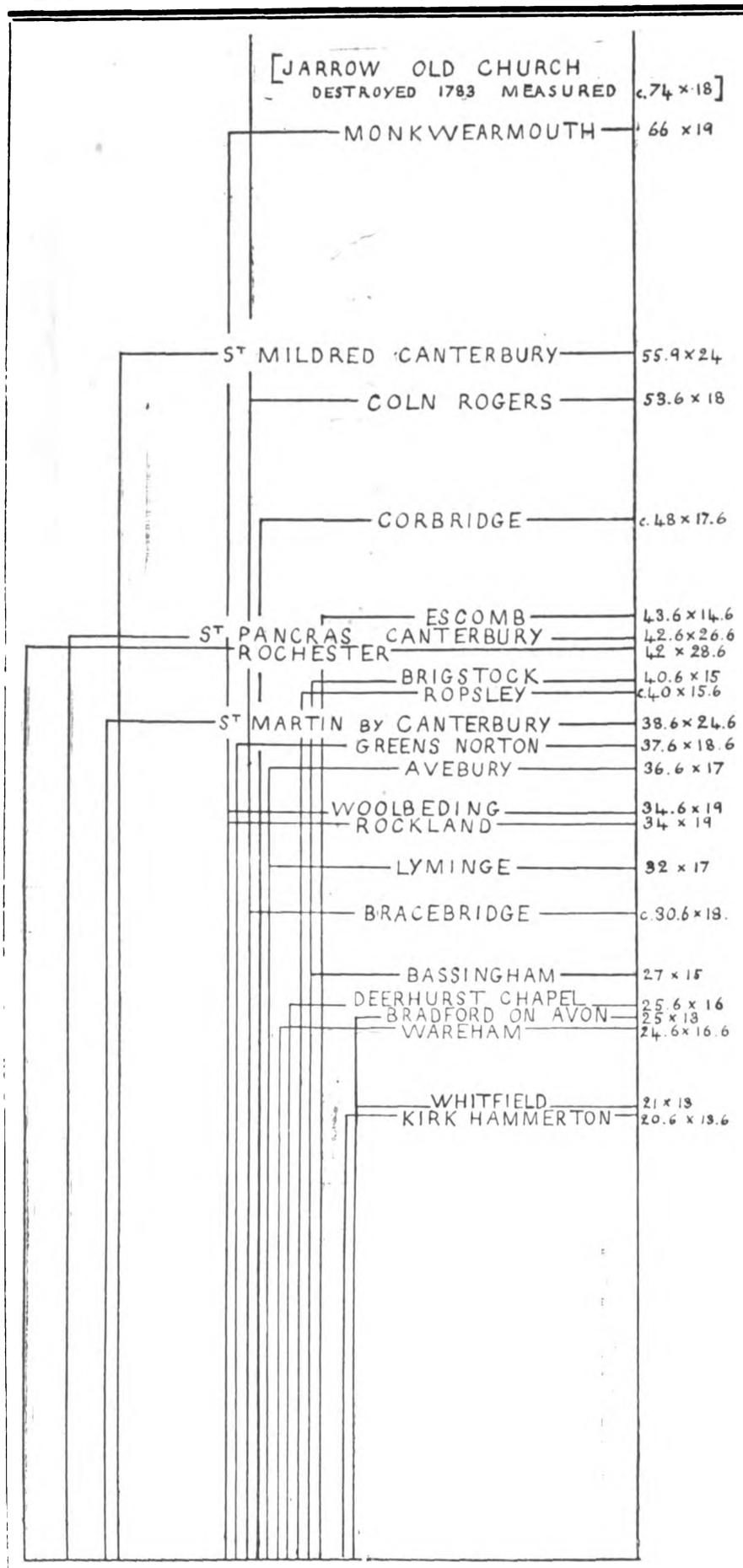

Fig. 2.—Comparative Proportions of the Ground Plans of the Naves of Saxon Churches.

on Iver Church, Bucks,* where it was found that the wall above a Norman arcade of the first part of the twelfth century was of earlier date, and he regarded it as inherently possible that in the same wall there might be two periods of Norman work separated by no long interval of time. This question arises in connexion with more than one example in the list,

* *Archæological Journal*, vii.

We have already seen that the mention of a church at a certain place in Domesday or earlier documents is no safe guide to the date of existing work upon the spot.

(2.) Where there are no features visible, and masonry is concealed by plaster, the proportions of a building are often used as a criterion of its date, and it is of some moment to know how far such evidence can be trusted. It is a commonly accepted principle that a nave exceptionally long or exceptionally high in proportion to its width may, in the absence of definite marks of date, be fairly suspected of a pre-Conquest origin. The Norman church, on the contrary, is regarded as in its normal form comparatively low and wide, and this difference is made to serve as a practical criterion of date. It is one, however, that must be employed with considerable caution. It may be true that the Norman churches of this country are, as a general rule, comparatively low and wide, but at the same time the fact must not be lost sight of that there are aisleless Norman churches, the side walls of which are of remarkable proportionate elevation. Barton Seagrave, Northamptonshire, is a good illustration. Norman towers are generally, but certainly not always, of broad proportions. There is a group of tall and slender ones between Caen and the sea, and there are also English examples, such as Weaverthorpe, on the Yorkshire Wolds. Moreover, pre-Conquest naves are by no means always high, and there may be cited as examples—Kingsbury, Middlesex; Britford, Wilts; St. Michael, St. Albans; St Martin, Canterbury; Coln Rogers, Gloucestershire; Boarhunt, Headbourn Worthy, Corhampton, Little Sombourn, all in Hants, which would never strike an observer as lofty churches. Pre-Conquest naves, moreover, are not always long in proportion to their width, as the accompanying diagram will make clear (fig. 2).

There are there shown the approximate dimensions of the ground plans of more than a score of pre-Conquest churches arranged in such a form that the comparison of their proportions becomes easy. It will be noted that among the examples that have the reputation of being especially early there are two groups, one in Kent—*e.g.*, Rochester and St. Pancras and St. Martin, Canterbury, which are particularly broad in proportion to their length; the other in the north—*e.g.*, Jarrow, Monkwearmouth, and Escomb, which are equally remarkable for their narrowness. There are, however, late churches that accord with each of these schemes; Kirk Hammerton, Wareham, and Deerhurst Chapel with the Kentish group, and Coln Rogers, Brigstock, and Ropsley with those in the north, while there are examples that give all sorts of intermediate proportions. There is, therefore, no one shape of ground plan that is specifically Saxon, while at the same time the elongated ones, to which it would be hard to find a parallel in other countries, are very noteworthy. Jarrow Old Church, if we trust the measurements given in Hutchinson's "History of Durham," must have been of quite extraordinary proportions.

The criterion of proportion is thus of doubtful validity, though in the dearth of other indications it may be of use in setting on foot investigation; the third, that of material and technique, must be used with almost equal caution. Where these are Roman, as is the case in several regions, but more especially in Kent and near the Roman Wall in the north, they may be used as Saxon indications on the general ground that classical remains would be more accessible to the builder in earlier than in later times, but it must not be forgotten that Roman materials were sometimes re-used in Norman days. At the same time, any close imitation of Roman technique or any Roman peculiarity in workmanship, such as the brickwork at St. Martin (chancel) and St. Pancras, Canterbury, the brick and tufa at Stone, near

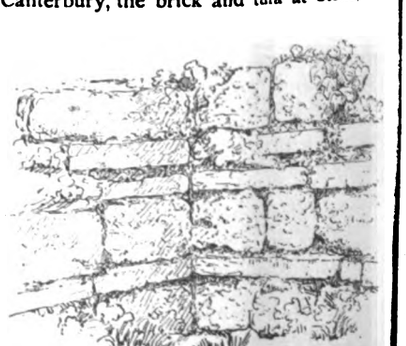

Fig. 3.—Roman Brick Alternating with Tufa and Rag at the External Angle of Nave and Chancel at Stone, near Faversham.

Faversham (fig. 3), the red mortar in the heads of the west windows at St. Martin, or the

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mortising of the jambs and imposts of the southern opening of the nave at Britford,

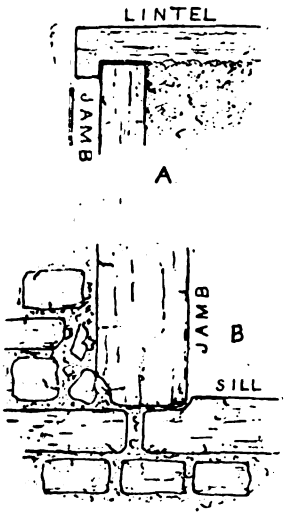

Fig. 4.—Roman and Saxon Mortising.

A. Britford, Wilts; south doorway (Saxon).
B. Doorway at Cilernum, Northumberland (Roman).

Wilts (fig. 4), is very suggestive of a really early date.

One characteristic Saxon method of using up older material is to strengthen the angles of buildings with large squared Roman stones, either set up on end or laid Norman fashion, which form what are called in these papers "big-stone quoins." Such stones need not be always Roman, but are so in a great number of cases, and the particular mode of quoining is doubtless due in the first instance to the fact that such large Roman stones were available. Now it is in connexion with such stones that the question has been raised of Saxon tooling. On many of these big quoin stones, as at Stow, Lincolnshire, and Bosham, Sussex, there is observable diagonal and cross hatching, bolder and less regular than Norman tooling, but this is really the mark of the Roman masons. Stones tooled in just the same fashion may be seen *in situ* in the Roman Wall and stations in Northumberland. Saxon tooling as distinct from Roman and Norman has yet to be established. The characteristic Norman diagonal tooling is to be seen on several pieces of stonework that are pre-Conquest in appearance and surroundings, and its existence there is no necessary proof that the work is not of Saxon date. The crucial instance is the old west door of the nave at Kirkdale, Yorkshire, which can be dated by an inscription at about 1060, and which shows "Norman" tooling on the stones. The undoubtedly Saxon doorway at Sherborne Minster has also this tooling on the jambs.

The re-use as building material of Saxon carved stones in walls of pre-Conquest character, as at Billingham, Durham; Middleton, Yorks; Marton, Lincolnshire, &c., is a pretty clear proof that such walls are late in the style, but not necessarily that they are Norman. The characteristic Norman materials, Caen stone and tufa, are found occasionally in Saxon buildings—the former, *e.g.*, at St. Mary, Dover Castle, the latter at Stone-by-Faversham and Swanscombe Tower, Kent.

In respect of fabric as apart from material, Saxon walls may be either thin or thick. In the north they are almost universally thin, and this is often the case in the south, as at St. Pancras and St. Martin, Canterbury; Whitfield, Kent; St. Martin, Wareham, Dorset; Avebury, Wilts, &c. The numerous towers in the north have, as a rule, walls so thin, that they must have been very well constructed to do their work. At Monkwearmouth, Durham, and also at Bardsey, near Leeds, towers are reared upon walls (apparently of earlier porches) measuring less than 2 ft. in thickness. There are, however, Saxon walls fully 4 ft. thick at the base, as in the nave at Brixworth and the towers at Clapham, Beds, and Earls Barton. The walls at St. Michael, St. Albans, measure about 3 ft. 10 in. One characteristic all Saxon walls have in common, in that they are constructed on the homogeneous, not the core-and-facing, system. Both systems were employed by the Romans. In the parts of the Continent nearest to Britain the Roman core-and-facing technique survived in the early Mediæval structures built with a core and faced either with small squared stones *(petit appareil)*, or else with reticulated and herring-bone work, as in the Classic example at Cravant. The Norman builders, both here and in the Duchy, follow this tradition, and their normal squared-stone facing, or their more ornamental treatment in diamonds and diagonals, are just survivals from early Mediæval and Roman practice. In our own country, where Roman work on both systems is still sufficiently *en évidence*, there are a large number of Roman walls, both in villas in different parts of the country and the stations by the Roman Wall in the North, that are thin and homogeneous in fabric. From these were undoubtedly derived the ordinary thin Saxon walls above noted, for, though not nearly so carefully wrought or of such regular materials as the Roman, they agree in general structure and, above all, in thickness. Norman walls, in accordance with the building tradition at their back, are uniformly of stouter make. When they have their normal or their decorative facing they are, as a rule, readily to be distinguished from Saxon, which only in very exceptional cases exhibit the facing technique. The facing of the pre-Conquest wall at Stone is one exception, though there is some doubt whether the work may not be Romano-British. Other exceptions are the few examples of herring-boning that can be identified as Saxon. Diddlebury, Salop, is perhaps the best accredited specimen. Reticulated work, where the facing is of square stones set cornerwise, occurs nowhere in assured Saxon connexion. There still remain on the one side thick Saxon rubble walls, and on the other sundry Norman walls equally stout and showing no distinctive facing. Between such Early Norman rubble walls and Saxon ones there is really no trustworthy test of distinction, and some have tried to claim as Saxon all early rubble walls which are without the regular Norman facing. This is a tendency to be guarded against.

In the treatment of corners, stones of exceptional size, as noticed above, and long-and-short pieces are characteristically Saxon, but at the same time the usual Norman treatment of quoins, with well-squared stones of moderate size set alternately along the two faces of the corner, occurs constantly in the numerous square western towers of the north-eastern counties, most of which are on other grounds placed on the pre-Conquest side of the list. The absence of a distinctively Saxon treatment of quoins does not, accordingly, bar a claim to Saxon origin.

The "battering" of walls is from time to time advanced as evidence of early date, but walls are apt to be described as battering when they are merely leaning bodily a little out of the perpendicular. The test of measurement is not always easy to apply to the upper parts of walls. Saxon walls are, of course, often reduced in thickness at regular sets-off, and this occurs not only in towers, but in the walls of naves, as at Brixworth, and Wing and Iver, Bucks. In the towers a horizontal string course does not necessarily involve a diminution above.

Lastly, the use of vaulting is a matter to note. The only piece of Saxon vaulting to be seen above ground is the barrel-vault of the porch at Monkwearmouth, a feature that goes far to vindicate for the work the early date claimed for it, for the vault is the same in character as those in the crypts of Wilfrid at Ripon and Hexham. There was or is vaulting in the crypts at Brixworth and Wing, and a more extensive display at Repton, where the vaulting of the crypt, whatever be its date, is very irregular and tentative-looking. It is evident that the Saxons were not expert in this department, in which the Normans were, on the other hand, so skilful, that—as Mr. Bilson has recently shown*—they played a considerable part in that great development of the feature which resulted in Gothic construction.

MARINERS' CHAPEL AND INSTITUTE, GREAT YARMOUTH.—On the 26th ult. the Mariners' Chapel and Institute, which has been erected on the South Quay at Great Yarmouth, was opened. The site is at the corner of the South Quay and Queen's-road. The total cost has been about 4,000*l*. Messrs. Bottle & Olley, of Great Yarmouth, were the architects, and Mr. F. Grimble, of the same town, was the builder. A brief description of the building will be found in our issue for November 4, 1899.

* R.I.B.A. *Transactions*. Third Series, vol. vi, Nos. 9 and 10.

ARCHITECTURE IN RELATION TO RELIGION.*

I TRUST that the speakers, who have so ably represented painting and sculpture, will not suspect me of disrespect to their arts when I pointedly speak of architecture as the *practical* art. Architecture has found practice in church building, for the Church has not been able to say to the builder, "I have no need of thee." And I take this practical quality of architecture as my text—upon this platform let the art of building come into relation with religion.

I had the advantage this summer of hearing two great speakers of our Church refer to the connexions of religion and architecture. The Archbishop of Canterbury eloquently described the effect of great church building—how its contemplation lifted the heart of the worshipper; what suggestions of reverence grew out of its ordered immensity, the still voice of its perpetual preaching. Far be it from me to deprecate this conception of architecture, or to minimise what is a genuine practical quality of its expression. The Bishop of London, who followed him, went, however, further; he suggested that architecture found its ideal in church-work, because that alone could lift it above the drudgery and meanness of every-day needs. And, further, that it was by their association of painting and sculpture in their buildings that architects must make good their claim to be artists. Now this was sad hearing for architects: my art of architecture was put in a false position—false historically, if I might say so to a historian—for never in history has architecture been an art save by its own quality of practical building. And neither to the Church on the one hand, nor to painting and sculpture on the other, has it owed this quality. And depressing, too, was the Bishop's suggestion in its bearing on the work of to-day. His words were perhaps half ironical but the suggestion made, that architecture can be an art outside its practical use, is what perpetuates its degradation. While it is taken that the Church can supply an ideal or style to building, and sculpture and painting can make its decoration—that, so that is made art, which without these is only practical ugliness—so long as this idea is abroad must the Church miss the meaning of architecture, and make no good use of it.

While it may be a question whether art can come into definite relation with religion, it can be no question that such relationship must base itself on real expressions, not on false and make-believe. Yet if we look at the building work of to-day, one can only observe that church architecture is of it all the least real, the least progressive, and the least conscious of practical purpose. The amount of money and design that has been put into church building during the last fifty years has been very large, yet certainly more than half of this has been work of supererogation in adding the decorations and ornaments of Gothic and other copied styles outside the practical necessities of accommodation. Yet no life of architecture, despite the expense and pains given, has been realised. Church building has set no example; it has kept itself from no abuses; it has created no hope among artists—and little reverence. Is not this because it has missed the practical purpose of building, which alone makes architecture art? To turn to particulars, in how many cases has church building sought the aid of architectural competition? There is nothing to be said against competition in the abstract, as one of the seeming laws of our existence. But an architectural competition is not one in real work—in building capacity, but in the presentment of it, the drawing of design. I am not concerned here with the abuses of honesty, which have made architectural competitions a by-word, but with the practical futility of instituting a competition in one thing—the designing on paper, when the thing to be selected is another—the ability of a church-wright. That there is a practical failure in the method of architectural competition has been acknowledged these thirty years. It clearly proposes a false standard to its competitors—that of pleasing by representation, not by work. So far as they are architects, workers at building, they are degraded by forcing themselves under such a standard. Nor has the Church disguised its opinion of those thus invited to degrade themselves. The conditions of church

* Speech at the Church Congress, Newcastle-on-Tyne, by Mr. E. S. Prior.

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competitions which have come under my eye are such that they express contempt: they have all the unfairness of the usurer's bond, giving nothing, and taking all things—that legal security which the commercial sweater exacts from the victims of necessity. Under such conditions a church competition lately in the south of England proposed to spend 5,000*l*. It obtained 150 competitors, and since six weeks of work would be necessary for each church design, 900 weeks, or about forty years, of useless, unpaid work were spent—useless, for of what avail to this or any other church were the 149 rejected designs, and the out-of-pocket expenses of the candidates exceeded probably the proposed outlay on the church.

Of course the Church does not realise this view of its competition procedure. It is only doing what others do; it is only taking what it can get. There was no compulsion on the architects to compete. So the usurer says, "The borrower signed the bond of his own freewill." But the art of architecture does realise the waste, the low ideal, the practical futility of architectural competitions, and refuses to appear in competitive churches. Let it be that money payment is never the payment of art—that the exercise of a man's faculties in a noble purpose is its own reward, that church design is such a purpose, and so is never wasted. So doubtless the Church thinks, but then let the Church honour this exercise. Let us see how it is now.

It has been too seldom that the proposer of church building—rejecting the evils of competition and the status of professional business—has proceeded on the common-sense selection of an artist whose art he perceives to be one of a personal ability in building. Still, not seldom have parson and architect with one soul desired and spent themselves on the best expression of church building that lay within their means—with such in its truest sense, "laborare est orare." But there succeeds to this inheritance another incumbent. Is there any security that he will honour the good work done? It is notorious that the incoming parson has no scruples as to the art of the church to which he succeeds. He can transform it and ruin it as he chooses; feeling quite unbound by his predecessor's selection of architect; handing the building over to commercial firms or others to add furniture, glass, screens, which, by the nature of their make, must be an insult to the real work of an artist. I know a case where the patrons of a living being the rectors had the scruple that what was well begun should not be ruined by irresponsible additions. They forbade the introduction of manifestly vulgar and manifestly unsuitable fittings into their chancel. But the incumbent was wishful for what was denied him, and went on a journey. The prohibited articles were smuggled into the church in his absence, so that he might have, but not know, and on his return plead six months' use. Now in thus getting furniture for his church, by what in plain language was a trick, he was applauded by his brethren, and the reason is clear. The patrons' control was considered unreasonable, for the architectural *art* of a church is in no honour compared with the ecclesiastical *style* of its fittings. However contemptible the art of such things, they were offered as gifts to the church, their donor had paid money for them, and this moneys-worth of ecclesiastical style could not be refused. Such donations are the passport to the title of good Churchmen. I am not speaking without authority, for in the last six weeks has not a Dean publicly declared that only subscribers to its decoration can be regarded as having any interest in a cathedral? And how often do we not hear it said by our clerical friends? "Yes, we in the charge of our churches know the value, and wish the religious expression of real art. But what are we to do? Our people will have what they can see in the shop-window, or pick out from the tradesman's catalogue. We know such things are contemptible, but can we refuse them?" No, you cannot refuse if you do not feel that religion is hurt by a false art of church building and church fitting; if you think it no great matter that the artist cannot enter a church except with repulsion, that he must hide out of sight of the chancel, and come to the altar with averted eyes. Yet they are a larger body than I think the Church understands, who are sensitive—whose consciences are troubled when they see the decorations of a church to be very much those of the restaurant and music-hall—redolent of money and display, but with neither heart, truth, nor faith in them.

Ecclesiastical styles have made the cloak that has hidden the want of reality in our art, but that cloak is slipping away and showing what is beneath. Sixty years ago, in the fervour of the Gothic revival, while it was believed that the *forms* of ecclesiastical architecture made religious art, and when in this conviction was done earnest work by Pugin, Street, Burges, and Butterfield, then churches could be built and decorated in Gothic style expressing this conviction, and not merely as business forms. But how is it now? The life of Revival Gothic is manifestly over. Its forms are an avowed professional stock-in-trade, and can be manufactured at so much the foot by any and every firm of tradesmen; but the earnestness, the self-respect of architects will not have such things. For it is perceived that the truth of art cannot be expressed in copies, in stereotype, in what can be stamped out by a machine—human or mechanical—but can come only by the emotion of the artist, and in the experimental creation that emotion fructifies. We have made a dead Gothic—have made caricatures—because by the nature of things living art was impossible to us. And caricatures, when seen to be such, what can they be in a church but offensive? The reproduction of Romanesque, Gothic, and Renaissance church-building, the nearer it gets to the originals, the more exact it is, the more machine-like—by that very quality has become the more false in spirit, the fouler to the taste, the less fitted for religious use.

It is in our old churches that "restoration" has made this offence the greatest. And I speak here not only of the actual removal, but of the swamping of the true religious work of our forefathers—the contempt of it which our church additions show—so that in the last fifty years there has been a wiping-out of that practical living work of the Gothic centuries, and of the seventeenth and eighteenth, too, which in every church of our land forged a "Catena sanctorum"—surely of value to the English church—but now broken, its real links taken away, and base metal substituted, so that there is scarcely a church left to us in which seven-eighths are not substitutions. The accomplished author of "Walks in Rome" speaks of what was till lately the best preserved Saxon church in England, but now, he says, a "mere rebuilding," with "all that vulgar tiles, revolting glass, and coarse woodwork can give liberally bestowed." Of how many thousands of our churches must not this be said? Is there no other use of our old architecture possible but to make it a block upon which to exhibit the failure of Modern Gothic? When Edmund Street's nave to Bristol and Sir A. Blomfield's nave to Southwark are seen to be graceless works that do no honour to the old, is it proposed to add the same sham dead thing to Hexham?

It can be no practical use of our present-day art of architecture to bid it be untrue to itself and think not of its real function of building, but only how it can caper, as it were, for hire and gesticulate in mimicry of artists long dead; now with cusps and crockets, and now with pilasters and friezes; with traceried reredos or canopied baldachin; now with winged archangels and haloëd saints, and now with *amorini* and cherubs, in pretence of emotions which it feels not and cannot feel, because they do not grow out of its present needs. I believe that there are among Churchmen, lay and clerical alike, many—I had almost said all, who have thought on the matter—with the feeling that there should be building by the Church other than these forgeries of ancient church decorations—this burying of the history of the English Church, its love and its art, under the ashes of "restoration."

I believe the haphazard system by which our churches get building and decoration is the reason that this feeling has not prevailed to produce a true Church art of practical building. A definite authority in the Church, advisatory and suggestive, with at least such standing as would have enabled it to review all church building and all church decoration, would have done a great deal to prevent the abuses of open church competitions, of disregard and contempt of existing church fabric, whether new or old; would have set at least a value on real art, by stating knowledge of its existence, so that it could not be removed or disfigured, as a matter of course, to make way for the rich man's gift.

But the real hope for architecture—that it may again arise in the service of religion—is not in any established authority, but in a change of feeling; in the growing conviction that church building should meet the practical necessities of accommodation, with the common-sense materials of good building, and not with any copying of ancient models. For revivals, restorations, are mimicking forms, but denying the spirit; the hypocrisy of art, and the hypocrisy of art is offence to religion. What was bidden to the feast would not come, for it was busy with ecclesiastical style, professional success, and commercial profit. Art must be compelled to come in out of the highways and hedges of plain practical building and the plain true love of the artist.

ARCHÆOLOGICAL SOCIETIES.

Surrey Archæological Society.—A Saturday afternoon visit was paid by this Society on September 22 to Waverley Abbey. Assembling at the railway station at Farnham, upwards of ninety members and friends drove to Waverley Abbey to inspect the excavations which were proceeding, through the kind permission of the late Mrs. Anderson and Mr. Rupert D. Anderson, and also Viscount Llandaff (who now occupies Waverley Hall and who was present). The visitors were received by the Rev. T. S. Cooper and Mr. M. S. Giuseppi, Hon. Secretary, and also Mr. Harold Brakspear, who described the progress that had been made with the excavations since the Society's last visit, July 28, 1898. He commenced by giving a short outline of the history of the Abbey, with which our readers are familiar; that it was a Cistercian Abbey, founded in 1128 by William Giffard, Bishop of Winchester, who brought monks from the Abbey of Aumône (Elemosina) in Normandy. Mr. Brakspear then pointed out the sites of the several sacred buildings and the subsequent additions and alterations, and the recent discoveries that had been made of various thirteenth century tiles and other relics. Large quantities of freestone had been removed from the Abbey for building cottages in the neighbourhood. The dining-room or refectory of the lay brethren was visited; this is in an excellent state of preservation, and possesses some groined arches similar to those in the Temple Church, London. The object of these excavations is to obtain a complete ground plan of the Abbey.

East Riding Antiquarian Society.—The annual meeting of the above Society was held on the 1st inst. at Howden. The choir of the church of Howden has undergone further ravages, and a portion of the windows in the chapter-house has lately fallen, and one of the first acts of the Society was to pass a resolution, moved by Lord Hawkesbury, approving of the effort to be made to prevent further decay. The members were received by the Rev. W. Hutchinson, who gave an outline of the history of the church, which was built towards the close of the thirteenth century by a Bishop of Durham, who had his palace close by. In the evening the annual dinner was held at the Wellington Hotel, Lord Hawkesbury presiding. Afterwards the annual business meeting was held. All the officers were re-elected. The treasurer's balance-sheet showed a balance in favour of the Society of 5*l*. 5s., and the secretary's report showed a membership of 172. Papers were read by Mr. J. R. Mortimer on "Subsequent Excavations at Danes Graves," and by Mr. J. R. Boyle, F.S.A., on "Place-names."—*Leeds Mercury.*

Barnsley Hall Lunatic Asylum, Worcestershire.—At a recent meeting of the Worcestershire County Council the Visiting Committee of this asylum reported that they had approved the report and designs of the architect for the erection of the new asylum. They recommended the splitting-up of the estate into ten to eighty acre holdings, to be let until the land is required for building. The architect's report stated that he proposed buildings for 570 patients, with administrative buildings for an asylum of 850 patients. His approximate estimate of the cost of the buildings proposed to be erected in the first instance was 205,400*l*., which worked out at an average of 360*l*. per bed, a rather high figure, due to the fact that the administration block would suffice for a larger number of patients. The extensions to accommodate 280 patients more would make the total cost about 240,500*l*., which figure showed an average cost of 200*l*. a bed, bearing a favourable comparison with the cost of several of the latest buildings for which tenders have been obtained. The County Council adopted the report. Mr. G. T. Hine, of Westminster, is the architect.

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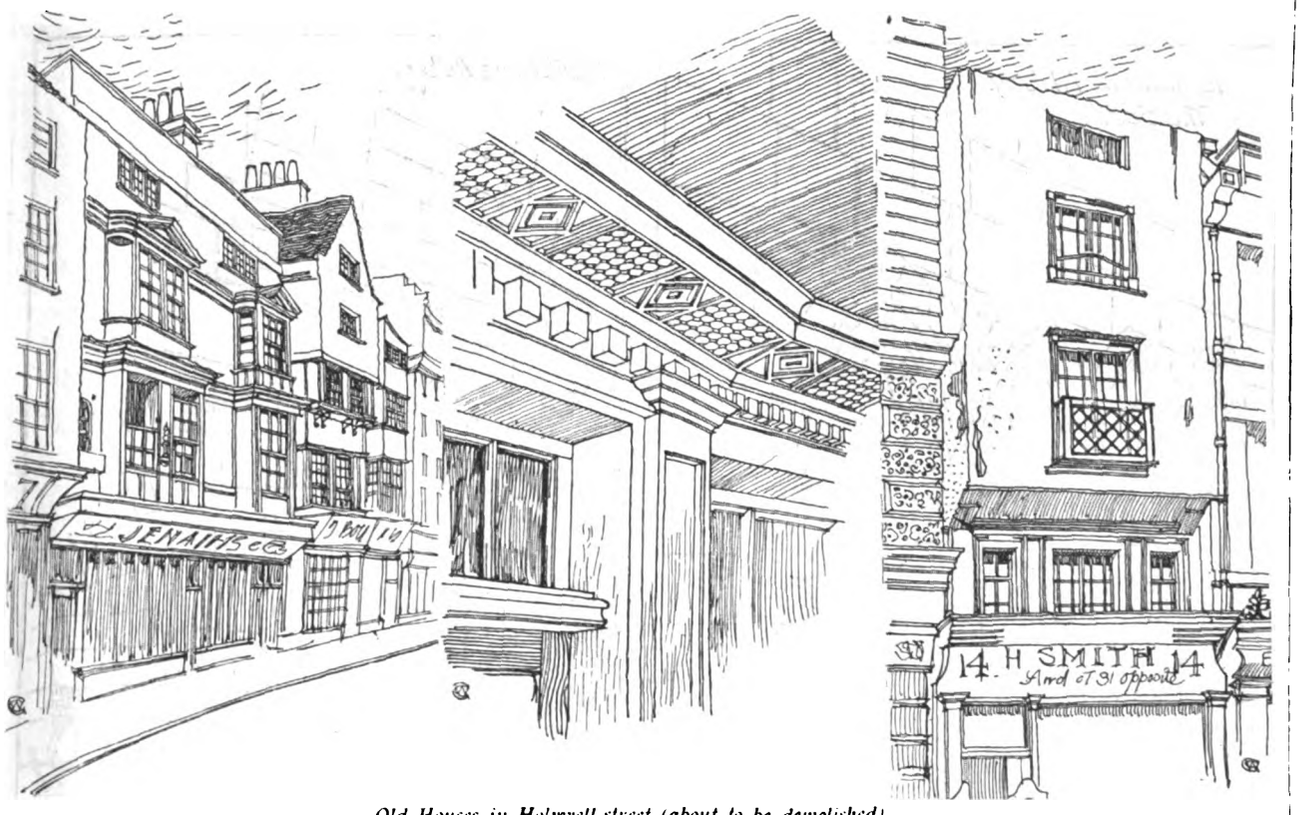


Old Houses in Holywell-street (about to be demolished).

OLD HOUSES IN HOLYWELL-STREET.

THE first step in the much-needed Strand improvement is accomplished in the broad roadway now open between St. Clement Danes and St. Mary-le-Strand churches. This piece of the Strand was formerly one of the narrowest main thoroughfares in London. Holywell-street may be the next clearance in the scheme. It may possibly stand a few more years, as the Act of Parliament under which the work is being executed allows the County Council a liberal time limit for the completion of the alterations.

Of Holywell-street itself there seems to be little history. Jack Sheppard, the notorious apprentice, is said to have been reared here. The "Holy Well of St. Clement" is close by, though the exact position is unknown. The street is one of the most picturesque and insanitary remaining in London; the three sketches we give illustrate respectively a picturesque group of old houses on the south side, a detail from a shop and a good house spoilt by a modern shop front, both on the north side of the street.

Correspondence.

To the Editor of THE BUILDER.

SHAFTESBURY AVENUE AND NEW OXFORD STREET.

SIR,—An opportunity now occurs — and seems likely to be missed—for an improvement at the junction of the above thoroughfares.

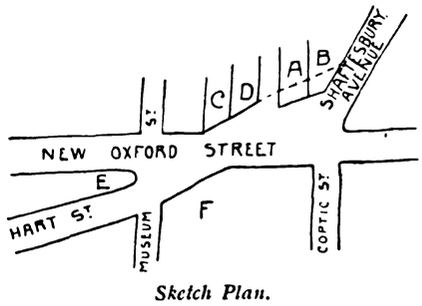
On the south side at the junction enters Hyde-street, and at the western corner of this is a public-house which is, I am informed, about to be rebuilt. Adjoining it is a vacant site where stood, until a few months ago, the Bloomsbury Distillery.

This public-house and a part of the distillery site stand considerably in advance of the line of frontage of the buildings to the east—on the other side of Hyde-street—these buildings being occupied by Messrs. Marshall & Elvy and the London and North-Western Railway Company respectively.

In June last I wrote to the St. Giles District Board of Works (the Local Authority) and the London County Council pointing out the advisability of bringing the frontage line of the new buildings to the west of Hyde-street back to the line of those on the east of that street. Each of these bodies informed me that it was, in their opinion, a matter for the attention of the other, and there I believe the matter still rests. One would have thought that these bodies would have combined to effect an improvement at a none too beautiful spot, rather than try to shuffle out of it on a plea that it was—although desirable—the duty of the other to carry it out.

Should the new buildings be erected on the present frontage lines the opportunity for improvement will have gone, probably for ever. Is it too late, even now, for the matter to be arranged? And may one hope that in future the authorities concerned will work with, and not against, each other in matters of this kind?

By the time the new Borough of Holborn is got into working order the new buildings may be in hand or finished. That body would have the power (financially) to carry out such a piece of street alignment, a power which probably the existing Local Board does not possess.



Sketch Plan.

A. Public-house; B. Vacant site; C. London and North-Western Railway Office; D. Messrs. Marshall & Elvy; E. Vienna Café; F. Mudie's Library.

A glance at the sketch plan here given will show what I suggest, the dotted line showing what should obviously be the new frontage line.

C. H. BRODIE.

INTERNATIONAL HEALTH CONGRESS, PARIS.

SIR,—My attention has only just been drawn to the report in your issue of August 25 last in reference to the paper which I had the honour to read at the Paris International Congress for Hygiene and Demography, from which it might appear that Section 3 for engineers and architects passed a resolution against the disconnecting trap for house drains. As this is not so, I shall be glad if you will allow me a little space in your paper to put this matter in its true position

Whereas M. Lacau, an architect of Paris, and M. Louis Masson, the Engineering Superintendent of the Paris Sewers, spoke against the insertion of the disconnecting trap, I expressed the opinion that this sanitary apparatus had proved very successful in the past, and should not be abandoned except under very special circumstances.

The by-laws of Paris referring to the drainage of houses, which were issued on August 8, 1894, distinctly prescribed the disconnecting trap, but as on appeal the Council of State ruled, on May 1, 1896, that these by-laws were *ultra vires*, and that the Municipal Authorities had no right to insist on special apparatus, the latter issued on May 9, 1896, a new set of by-laws, which generally prescribe siphon traps, without mentioning special ones, so that the disconnecting trap is neither specially prescribed nor specially forbidden.

In a discussion which followed the reading of the papers a good many different opinions were expressed, but in the end no resolution was agreed to concerning the use of disconnecting traps; on the contrary, eventually a resolution to this effect was adopted—that sewer gas is to be excluded from our houses.

Although this is not equivalent to passing a resolution in favour of the disconnecting trap, I venture to think it goes a long way towards it, and there can be no doubt that the opinions on the Continent against disconnecting traps are gradually passing away, as the actual facts become known. There is, perhaps, nobody who would willingly do away with a sanitary apparatus that has demonstrated its advantage by the number of its applications, which I should say reach now into many millions.

H. ALFRED ROECHLING.

Leicester, October 2.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At the meeting of this Society, held at the Royal United Service Institution, Whitehall, on Monday evening, October 1, Mr. Henry O'Connor, President, in the chair, a paper was read on "Paper-making Machinery," by Mr. Robert Henderson. In the course of it the author pointed out the general considerations affecting the design of mills, showed the absolute necessity of an abundant supply of water, as pure as could be obtained, and remarked that the quantity required in the process of manufacture might vary from 110,000 to 180,000 gallons per ton of paper made, according to quality. He described the construction and arrangement of a modern paper mill generally.

MISSION CHURCH, BIRMINGHAM.—A mission church was opened at Lozells, Birmingham, on the 20th ult. Messrs. Harley & Sons, of Smethwick, were the builders, and Mr. Daniel Arkell, was the architect.

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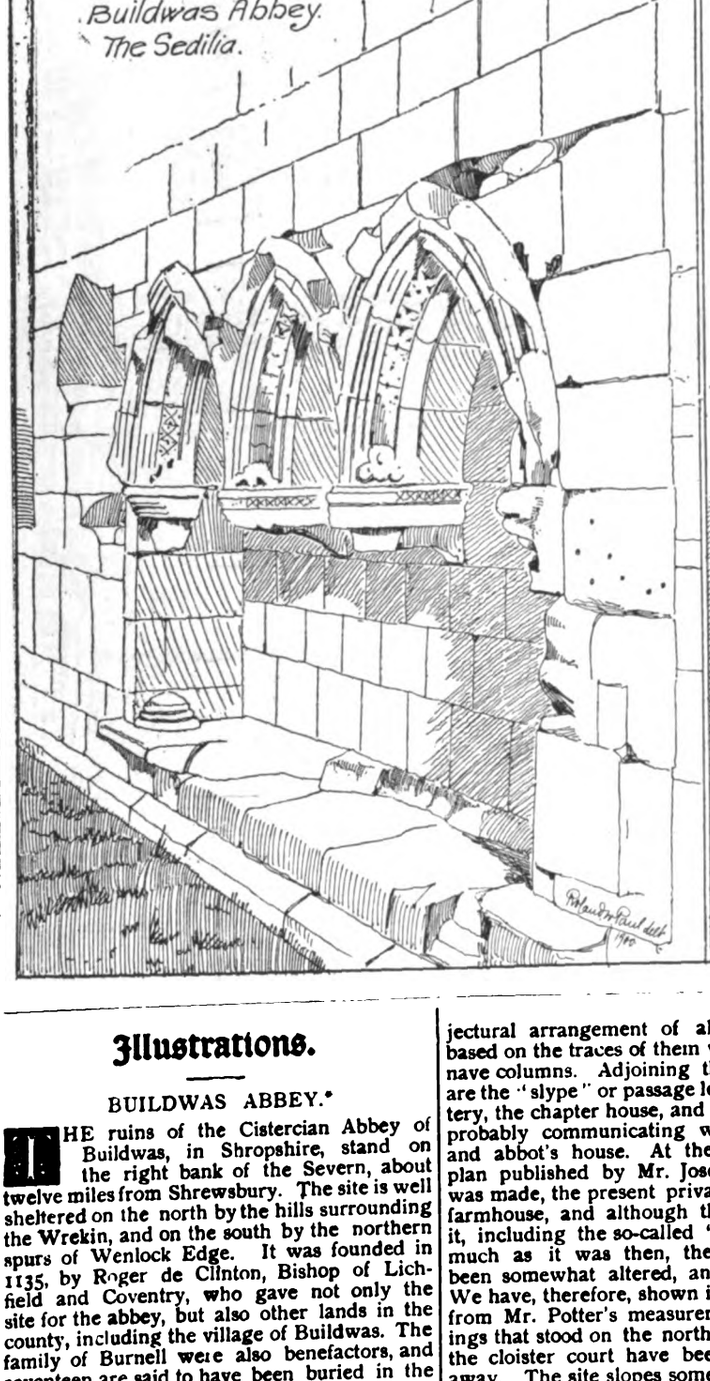

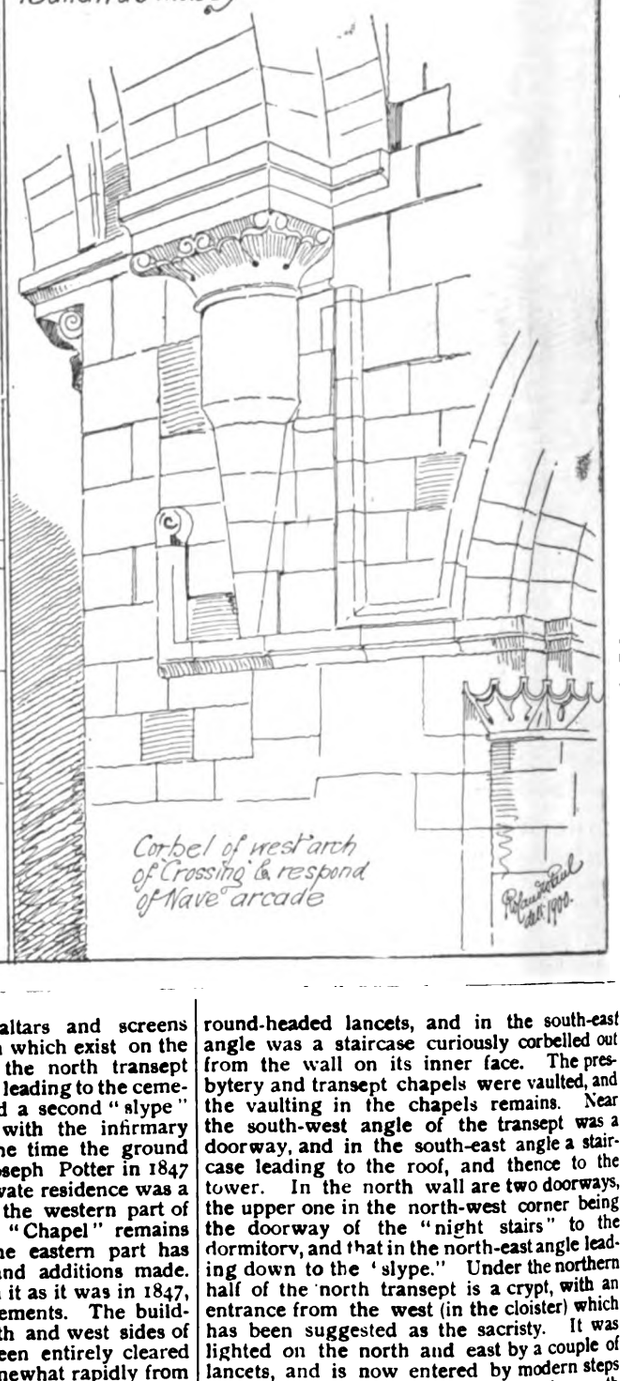

Illustrations.

BUILDWAS ABBEY.*

THE ruins of the Cistercian Abbey of Buildwas, in Shropshire, stand on the right bank of the Severn, about twelve miles from Shrewsbury. The site is well sheltered on the north by the hills surrounding the Wrekin, and on the south by the northern spurs of Wenlock Edge. It was founded in 1135, by Roger de Clinton, Bishop of Lichfield and Coventry, who gave not only the site for the abbey, but also other lands in the county, including the village of Buildwas. The family of Burnell were also benefactors, and seventeen are said to have been buried in the church.† There are two tombs of the Leighton family—now in Leighton Church, formerly at Buildwas—three effigies in all, Sir Titus de Leighton and Sir William and his wife Margaret. Among other benefactors to the abbey were Bishops of Lichfield, William Fitz-Alan, Governor of Salop, Gilbert de Lacy, and Sir Richard Corbett.‡ There were twelve monks at the suppression, and the site was granted 29 Henry VIII. to Edward, Lord Powis, from whom it passed to the Moseleys, the present owners.

The present remains are nearly all of one date—Transitional Norman—and therefore the original church founded by Roger de Clinton. With the exception of the outer walls of the nave aisles the main walls of the church remain in a fairly perfect state, and of the monastic buildings (which were, as at Tintern and Dore, on the north side of the church) two passages or "slypes," with the chapter-house between them, remain on the east side of the cloister court, and beyond are some remains of an extensive range of buildings, probably incorporating the abbot's house and the infirmary, now forming part of a private residence of the Moseley family.

The ground plan given of the Abbey shows the present state of the church, with the conjectural arrangement of altars and screens based on the traces of them which exist on the nave columns. Adjoining the north transept are the "slype" or passage leading to the cemetery, the chapter house, and a second "slype" probably communicating with the infirmary and abbot's house. At the time the ground plan published by Mr. Joseph Potter in 1847 was made, the present private residence was a farmhouse, and although the western part of it, including the so-called "Chapel" remains much as it was then, the eastern part has been somewhat altered, and additions made. We have, therefore, shown it as it was in 1847, from Mr. Potter's measurements. The buildings that stood on the north and west sides of the cloister court have been entirely cleared away. The site slopes somewhat rapidly from the church to the river, but no traces of foundations are visible. At the north-west angle of the church are the remains of a window jamb and wall. It appears to be the southern end of the cellarium, which not only projected beyond the west front but overlapped the north aisle of the nave. In all probability there was a "lane" or open court between the cellarium and the cloister court, as existed at Dore and Byland.*

The architecture of the church is of the simplest possible character, but the detail is good, and where carving is found it is excellently executed. The nave is of seven bays, with circular columns standing on square plinths and supporting slightly pointed arches of two orders. The first pair of columns west of the "crossing" are octagonal. There was no triforium. The clearstory consisted of a single round-headed lancet in each bay with a continuous string course below. There are no vaulting shafts, and it is evident that both nave and aisles were covered with timber roofs. Pointed arches of three orders lead from the aisles to the transept, each of which has two eastern chapels. The aisleless presbytery is of two bays only, one bay projecting beyond the transept chapels. The "crossing" has a low central tower over it, the north and south arches being supported by columns, the east and west arches corbelled back to the wall. In each face of the tower were two small round-headed lancets, and in the south-east angle was a staircase curiously corbelled out from the wall on its inner face. The presbytery and transept chapels were vaulted, and the vaulting in the chapels remains. Near the south-west angle of the transept was a doorway, and in the south-east angle a staircase leading to the roof, and thence to the tower. In the north wall are two doorways, the upper one in the north-west corner being the doorway of the "night stairs" to the dormitory, and that in the north-east angle leading down to the 'slype." Under the northern half of the north transept is a crypt, with an entrance from the west (in the cloister) which has been suggested as the sacristy. It was lighted on the north and east by a couple of lancets, and is now entered by modern steps at its east end. The chapels of the north transept are not rectangular, the outer wall bending slightly north-east. At the north-east angle are traces of a wall, and there are considerable indications of some building having been destroyed at this point.

One of the chief points of interest in the church are the considerable traces it still bears of its interior ritual arrangement. In nearly all the columns of the nave are traces of the side screens which divided the nave from its side aisles, and which still remain at Tintern, and were found during the excavations at Abbey Dore. The presbytery at Buildwas retains its original form, and is short, and the ritual choir of the monks occupied the first bay of the nave, their stalls standing against the screen walls and the western piers of the crossing. Stone screens also stood under the crossing, with probably doorways near the eastern pair of piers, forming the upper entrances to the choir. The plinth of the south-east tower pier has been cut away.

Between the first pair of nave columns—octagonal in shape—was the "pulpitum," and the plinth of the columns on the north side has been cut away to receive it. The wall was, apparently, like the side screen walls, 2 ft. in width, and had a central doorway. A second screen crossed the church between the next pair of columns with the nave altar against its west front, flanked by doorways.* In addition

* For the list of Abbeys which have appeared, and for future arrangements, see front page of cover.

† Potter, Buildwas Abbey.

‡ *Ibid.*

* See *Builder*, April 4, 1896, and October 3, 1896.

* See ground plan of Abbey Dore, *Builder*, April 4, 1896.

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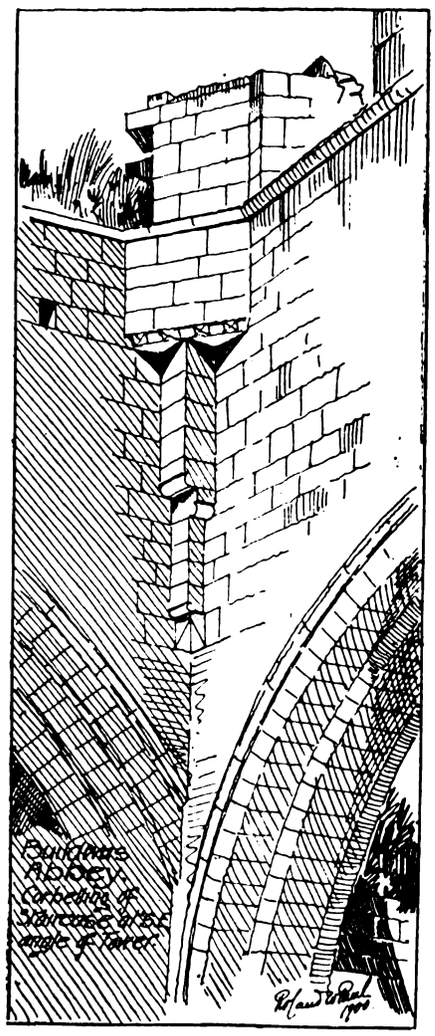


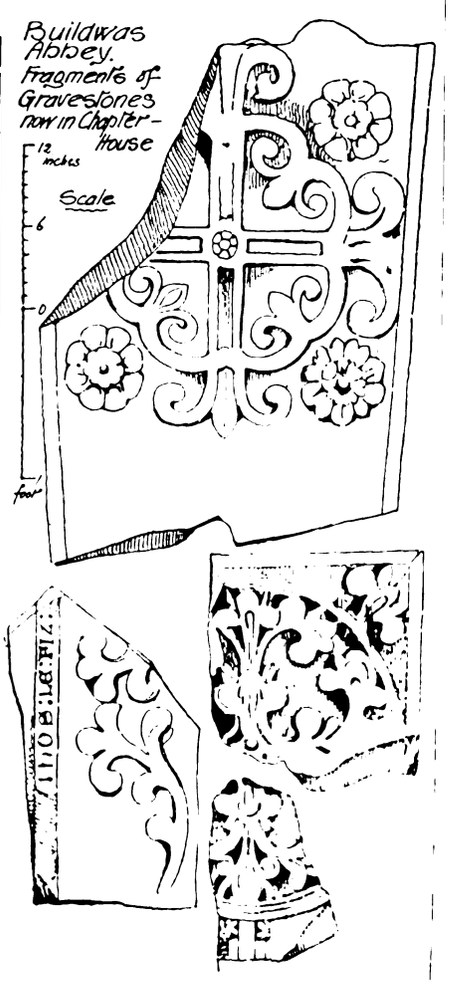
to these screen walls there are several traces in the columns on the sides towards the aisle of screens crossing the latter at intervals. On the south side there appear to have been three such screens, and on the north side two. These are shown on the plan. Screens were also placed in the arches leading from the aisles to the transepts, and the two outer chapels of the transepts have been similarly enclosed. Against the inner face of the west wall of the nave below the windows are a series of holes for beams, and with these correspond holes in the westernmost pair of columns. Some wooden erection—possibly a gallery—was evidently placed here, but for what purpose is not clear.

The church appears to have been lighted entirely by round-headed lancets. The eastern face of the presbytery had two tiers of triplets; although the intermediate cill has been broken away, the springers of the arches of the lower tier are still visible (see sketch). On the south side of the presbytery are piscina, aumbry, and three sedilia, the latter an insertion of Early English date, with delicate mouldings and dog-tooth ornaments on the arches and caps. There are traces of a piscina in each of the transept chapels. Attention should be given to the corbels of the east and west arches of the "crossing," and the way in which the labels of the nave, arcade, and abacus of the cap are stopped.

The west front, north side, and east end are now thickly covered with ivy. The general view has, therefore, been taken from the south side looking across the church into the north transept. In the columns of the nave are seen the marks of the screens already described, the various irregular holes in the south arcade for the woodwork of the aisle roof, and the places for wooden plugs for fixing the stalls against the wall below the west arch of the "crossing." Through the arches at the east end of the nave and in the transept are seen the arches of the north transept chapels and the north-east angle of the presbytery, while behind the nave arcade are the doorways to the "slypes" and one of two windows flanking the doorway to the Chapter House.

The Chapter House is a rectangle, a little over 40 ft. in length by 30 ft. in breadth, divided into nine compartments by four slender columns, two being circular and two octagonal in section. At the west end is a doorway of three orders flanked by windows; at the east end are three lancets, and on either side in the easternmost bays are two others. The Chapter House stands between two vaulted passages, or "slypes," that between it and the church probably led to the monastic cemetery, while that to the north led to the buildings situated immediately north of it, and probably included the Abbot's House and the infirmary.

North of the "slype" is what appears to have been a vaulted space 40 ft. long and 27 ft. wide, its east wall pierced by three pointed arches of an unequal span. It had a doorway in its south wall leading to the "slype," and another in the opposite wall leading to the buildings on its north side. On the east the southern arch led into a building one story in height (running east and west), the gable of which is to be seen against the wall, and the other two arches opened apparently into a court 26 ft. in width (north and south) and of uncertain length. The north wall of this court was formed by what apparently was the wall of a large building with two aisles, with an arcade of seven bays dividing them. So far all the buildings described have been Transitional Norman, but this building is Early English, with most acutely-pointed arches and moulded capitals. It measured, when complete, 100 ft. in length, and had an entrance in its eastern wall. This wall is in line with the west wall of the present house (which forms the eastern boundary of the court already referred to). The house is, or was in Potter's time, L-shaped in plan, the south wall having blocked-up Early English windows, and some of the other outer walls apparently ancient; but the whole building, even in his time, was a medley, and largely post-Reformation, with fragments of earlier work from destroyed buildings worked into it.



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At its south-west angle is a building, post-Reformation in date, locally known as the "Chapel." In the south wall is a blocked doorway with early carving over it, and the probability is that the whole of the south side of this "Chapel" is original work, and is a continuation of the wall of the building of one story on the south side of the open court. To the south is a square apartment, but the age of this and the wall connecting it with the north-eastern angle of the Chapter House is uncertain.

The few fragments of monuments found have been placed in the Chapter House. The chief are the three here illustrated—portions of gravestones with floriated crosses of thirteenth-century date. One has the fragment of a marginal inscription in Lombardic characters still remaining :—

IHOS : LE : FIZ :

In the floor of the Abbey House are a large number of encaustic paving tiles. One bears the arms of Dispencer, and there are several with figure subjects.

At a short distance south-west of the church are fragments of wall, which appear to indicate the site of the gatehouse and a portion of the outer boundary of the abbey precincts.

A photograph of the interior of the church, looking east, was reproduced in the *Builder*, August 15, 1891, in illustration of the Architectural Association's visit to Shrewsbury, which, together with the general view now published, will give a fairly complete record of the general design and the traces of the screen walls already described.

The dedication of the church was to St. Mary and St. Chad. The abbeys of St. Mary, Dublin, and Ystrat Marchel (Montgomeryshire) were subject to Buildwas.

DECORATIVE PAINTING : "THE ASSUMPTION."

Over the High Altar of the Church of the Holy Rosary, in Marylebone-road, there have been recently painted, by Mr. N. H. J. Westlake, three subjects illustrating the dedication of the church. The "Assumption" and "Coronation" are two; the third represents the Virgin revealing the Method of the Rosary to St. Dominic.

We gave some notice of these paintings when they were first executed, a few months ago. The figures in the three subjects are of life-size, and are accompanied in the scheme of decoration by other figures of lesser scale, *e.g.*, in the panels of the roof, which contain a series of angels holding the versicles of the "Pange Lingua."

As a subject for artistic treatment an "Assumption" differs from an "Ascension," in that in the latter case our Lord is represented as rising by His own power, in the former the Virgin is "assumed" by a superior power. The subject is of great antiquity, both in the Eastern and Western Churches. In the former it is usually associated with the death of the Virgin, whose dead body lies on a couch below, whilst her soul is carried above in the arms of our Lord. In the Western Church the rising figure is often represented, by the great Masters, as over the tomb, which is full of flowers. In the fifteenth century in England it was a common subject in stained glass, and there is a fine window illustrating the subject at Fairford.

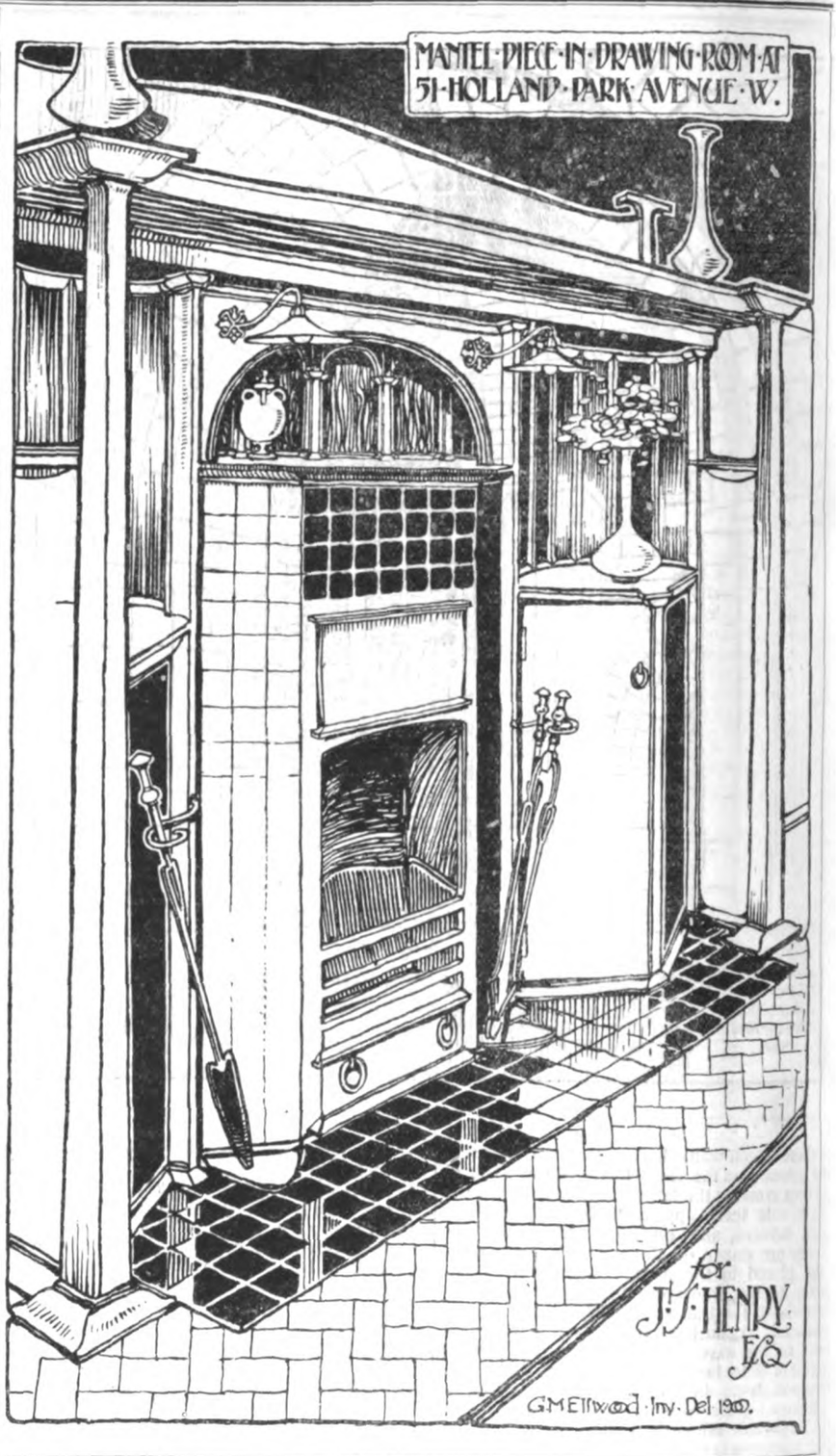
Mr. Westlake's picture omits the accessories of the tomb, and only shows the figure of the Virgin surrounded by adoring angels.

WALSALL TOWN HALL: INTERIOR OF HALL AS PROPOSED.

The view here given represents the interior of the Walsall Town Hall, as proposed in the design by Mr. J. G. Gibson, to which the first premium has been awarded in the competition, and which is to be carried out without further delay.

The drawing here illustrated was not submitted in the competition, because washed drawings were excluded, but it shows the manner in which the interior of the hall is to be treated. The actual competition drawings, or a portion of them, we shall be able to illustrate shortly.

The London Sketch Club.—The private view of the fifth exhibition of sketches by the members of the London Sketch Club will be held on Saturday, the 13th instant, at the Modern Gallery, 175, Bond-street, W., and the exhibition will be open to the public from the 15th to the 27th inst. inclusive.



DESIGN FOR DRAWING-ROOM MANTELPIECE.

This design, by Mr. G. M. Ellwood, is reproduced from a small black-and-white drawing which was hung in the last Royal Academy exhibition.

It is an interesting example of design which is elegant without losing simplicity.

COMPETITIONS.

Cardiff Borough Asylum.—The assessor in the preliminary competition, Mr. G. T. Hine, has selected six architects to engage in the final competition; viz., Messrs. Wills & Anderson (Swansea), J. Kirkland (Clapham Park), Greenaway & Newberry (Westminster), Law & Allen (Arundel-street, Strand), Hooley & Sander (Nottingham), Oatley & Skinner (Bristol). According to the report in the *Western Mail* the assessor stated to the committee that he had examined the whole of the fifty-one sets of designs, and had selected six of the designs which showed the greatest merit, and were most likely to meet with the approval of the Commissioners in Lunacy. Two of the authors had gone to work on very modern lines, and he thought it would be worth while considering whether they should not, in issuing the new instructions, allow architects to work on those lines. The general principle he referred to was the inclusion of a detached hospital for the reception of patients, so that in being first admitted they would not go to the asylum at all, but to the hospital, where cases would be examined and diagnosed, and if there was any chance of a cure the patient would stay there until he was cured, and would never enter the asylum. To have been placed in an asylum was taken to be a stigma, and if they did as he suggested they would go a long way towards curing lunacy. The six estimates varied from 195,000*l.* to 226,000*l.* for 800 patients, and from 224,000*l.* to 296,000*l.* for 1,250 patients. The estimates were, if anything, under the mark.

Memorial to Robert Pollok, near Glasgow.—A memorial to Robert Pollok, which has been erected at the point where the Old and the New Kilmarnock Roads unite a few hundred yards from Logan's Well, ten miles south of Glasgow, was unveiled on the 24th ult. The memorial is built of grey granite, and on the front there is a panel of the poet in bronze. The work was executed by Mr. A. M'F. Shannon, Glasgow.

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The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

13. Testing Electric Wiring—Rules and Regulations in Force — Measuring Leakage.

When a house has been wired for the electric light it is necessary to make certain electrical tests to find whether the mains are properly insulated from one another and from earth. When the supply is got from a public company, the company's inspector always tests the insulation resistance of the house wiring from earth before he connects it to the supply mains. We have seen already when considering systems of distribution that the pressure of one of the supply mains may be considerably higher than the declared pressure at the consumer's terminals. For example, if the public service is a three-wire 200 volt service then the pressure of the positive outer to earth is often greater than 300 volts. Unless, therefore, the insulation resistance of the network of wires, switchboards, fuse-blocks, &c., throughout the house be fairly high, there may be a continual leakage of electric current going on which is not only annoying to the company but may, owing to the fire risk, be a source of danger to the householder.

It must be remembered that this insulation resistance to earth is only a partial test of the quality of the wiring. If the house be damp, then the insulation resistance will probably come out low, no matter how carefully the wiring has been done. On the other hand, if the house be dry, then the insulation resistance may come out very high, even although the materials used be of poor quality and the joints be made in the most careless manner. For this reason, perhaps, contractors are in the habit of speaking slightingly of insulation tests, although it is absolutely necessary that such tests be made. Another reason why insulation tests are not more highly appreciated is because few people know how to make them properly, and no clear instructions on this point are given in any code of rules.

The forty-first of the Board of Trade Regulations for the security of the public from bad and inefficient supply of the electric light is as follows :—

"The undertakers shall not connect the wires and fittings on a consumer's premises with their mains unless they are reasonably satisfied that the connexion would not cause a leakage from those wires and fittings exceeding one ten thousandth part of the maximum supply current to the premises ; and where the undertakers decline to make such connexion they shall serve upon the consumer a notice stating their reason for so declining."

This is usually taken to mean that if V be the declared pressure at the consumer's terminals, and R be the insulation resistance to earth of the house wiring, then $\frac{V}{R}$ must be less than the ten thousandth part of the maximum supply current. $\frac{V}{R}$ is, however, a purely imaginary current. To make this clear we must consider the elementary theory of the subject.

Suppose that the house is wired on the two-wire system, then one of the house mains is connected to one of the mains of the supply company and the other is connected to another main. The house mains are thus kept at a constant difference of pressure from one another, and also at constant differences of pressure from the earth. For example, the difference of pressure between the mains may be 200 volts, the pressure between earth and one of the mains may be 300 volts, and between earth and the other main may be 100 volts. In practice we shall have a series of paths along which leakage is taking place. We shall have leakage across switches, for example, from one main to the other, even although these switches are absolutely insulated from earth, the driving pressure in this case being 200 volts. Again, we shall have leakage across the insulation of the mains to earth, the driving pressure in one case being 300 volts and in the other 100 volts. In order then to get an accurate idea of the fire risk, we must measure the leakage currents flowing through these various paths, and we must also take into account the voltage driving these currents. Suppose that we had leakage currents of one-tenth of an ampere each, flowing from the high-pressure main (300 volts) direct to earth, from the high-pressure main to the low-pressure main across the switches, and from the low-pressure main direct to earth, then the watts expended in the high-pressure leak would be 30, in the leak between the mains 20, and in the leak in the low-pressure main 10. Now these watts measure the risk of fire much more accurately than the insulation resistances do, hence the leakage watts are what we ought to take into account. In order to find the leakage watts or the leakage currents, however, we must first find the various insulation resistances.

Let x and y denote the "fault" resistances of the two mains A and B respectively (fig. 1).

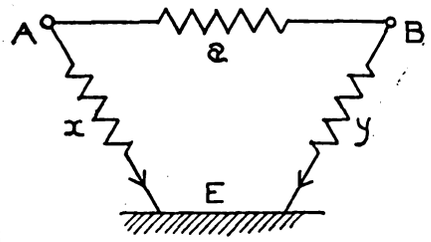

Fig. 1.

By the fault resistance of a main and all conductors in metallic connexion with it we mean the insulation resistance of that main to earth if the other main and all conductors connected to it were removed. The insulation resistance of the network to earth is $\frac{x\,y}{x+y}$, and this is what supply companies ordinarily measure. The leakage current to earth from the high pressure main will be $\frac{300}{x}$, and from the other main it will be $\frac{100}{x}$. The leakage watts in the two cases will be $300\cdot\frac{300}{x}$, and $100\cdot\frac{100}{x}$ respectively. In addition, we shall have leakage currents between the mains that never pass through earth at all. Let a be the resistance of this path, then the leakage current and watts will be $\frac{200}{a}$ and $200\cdot\frac{200}{a}$ respectively.

BOOKS RECEIVED.

The Book of Sun-dials.—By Mrs. Alfred Gatty. Enlarged and re-edited by H. K. F. Eden and Eleanor Lloyd. (G. Bell & Sons.)

Archæological Survey of Egypt. Eighth Memoir. The Mastaba of Ptahhetep. By N. de G. Davies. (Kegan Paul & Co.)

Injectors, their Theory, Construction, and Working. Second edition. By W. W. F. Pullen. (John Heywood.)

Defects in Plumbing and Drainage Work. By Francis Vacher. New and revised edition. (John Heywood).

GENERAL BUILDING NEWS.

Mission Church, Sparkbrook, Worcestershire.—The foundation-stone was laid recently of a Mission Church in Walford-road, Sparkbrook. Only a portion of the church is now being erected. When completed the building will accommodate over 700 persons. Mr. W. Hawley Lloyd is the architect, and Messrs. J. Monat & Son are the builders.

Wesleyan Chapel, St. Leonards-on-Sea.—Memorial-stones were laid on the 26th ult. of a Wesleyan chapel at St. Leonards-on-Sea. The building will be 76 ft. in length and 47 ft. in width, and will accommodate about 600 persons. Mr. James Weir is the architect, and the builder is Mr. W. G. Morgan. The contract price is over 4,500*l.*

Boulevard Congregational Church, Nottingham.—The Congregational church which has been erected on the Gregory Boulevard, Nottingham, was opened on the 27th ult. The building is of Bulwell stone. Beneath the church is a Sunday-school room. The cost has been about 4,500*l.* Mr. H. Gill was the architect, and Mr. W. Maule the builder.

Restoration of St. Paul's Church, Bristol.—A scheme is on foot to restore and re-seat St. Paul's Church, Portland-square, Bristol. According to a local newspaper, it is proposed to re-floor and re-seat the whole of the nave and aisles, to remove the side galleries, reconstruct the west end gallery, provide new heating apparatus, and decorate the interior of the church. It is estimated that the cost will be about 1,400*l.* Mr. G. H. Oatley is the architect.

Primitive Methodist Church, West Bromwich.—On the 26th ult. a new church erected in the Lyng, West Bromwich, was opened. It is designed to accommodate some 650 people, and cost 5,300*l.* Mr. A. Long was the architect.

Holy Trinity Church, Melrose, N.B.—The new chancel of this church, together with the north and south transepts, which have just been built at a cost exceeding 2,500*l.*, was recently consecrated by the Bishop of Edinburgh. The old church now forms the nave, and the chancel is the same breadth as the nave. The transepts are divided from the church by tracery arches, supported by a single column. The architects are Messrs. Hay & Henderson, of Edinburgh.

National School, Dundonald, Ayrshire.—The foundation-stone of a National School was laid at Dundonald on the 22nd ult. Mr. Adam Burrows is the builder, and Mr. Frazer is the architect.

Technical School, Bootle.—The new Municipal Technical School at Bootle was opened on the 27th ult. The building occupies a site at the corner of Balliol-road and Pembroke-road, the principal frontage being to the former thoroughfare. The school is grouped round a large quadrangular court. The front and sides of the quadrangle are two stories in height. The entrance is central in the main front to Balliol-road, and leads into a hall, round which are grouped the administrative offices, and from which lead the main corridors serving the whole school. The assembly hall for lecture and examination purposes is directly opposite the entrance. The west wing is occupied by the women's manual training department, consisting of rooms for a laundry class and a cookery class. The east wing, in addition to three ordinary classrooms for thirty, forty, and thirty-six students respectively, contains the physical department. The latter consists of a laboratory accommodating about forty students, and lecture theatre for the same number, with preparation and dark room. Special precautions have been taken to render this portion of the building as far as possible free from vibrations, &c. The workshops occupy the north side, and include a carpenter's shop, a metal-working shop, and a plumber's shop. The power for driving the necessary machinery in these shops will be derived from an eight h.p. electric motor, the current being obtained from the Corporation mains. In the basement is a boiler for general heating purposes, and a smaller vertical boiler for supplying hot water to the chemical and physical departments, and also the lavatories and sinks throughout the building. Two stone staircases in the front or main corridor lead from the ground to the first floor. The main front in Balliol-road is occupied by the Art School, and contains elementary and advanced rooms, modelling-room, library, and art master's room. These rooms have north lights. The west wing is devoted to the chemical department, consisting of a laboratory with balance-room, lecture theatre for forty students, and a preparation-room. The east wing contains three class-rooms, accommodating respectively thirty, forty-two, and forty-eight students, and an engineering drawing classroom for forty students. The heating of the building is effected with low pressure hot water radiators. The fresh air is admitted to the rooms partially through radiators, and also through special wall inlets. The vitiated air is extracted at the ceiling level, and is conveyed along ducts to the main upcast shafts, in which are fitted electric exhaust fans. The building is lighted throughout with electric light, the installation having been made by Messrs. Brook, Hirst, & Co., of Chester. The materials used for the building were Ruabon and red bricks, with Knowsley stone dressings, the roof being covered with Westmoreland green slates. Messrs. Best & Callon were the architects, and Mr. Corkhill, of Liverpool, was the contractor. The contract amounted to 20,065*l.*

Workhouse, Southmead, near Bristol.—The foundation-stone was recently laid of the workhouse which is being erected at Southmead for the Barton Regis Union. The site is on the Southmead-road, and contains 13½ acres. The buildings are divided into five blocks. There are boardroom and clerk's offices, male and female tramp wards, with porter's lodge, stoneyard, &c., master's and matron's department, and a married couples' block. At the rear of the pavilions are the laundry, workshops, boiler-house, &c. The infirmary ward has accommodation for twelve males and twelve females, in three separate divisions. There is also a mortuary and stables. The buildings have been designed by Messrs. W. H. Thorp, of Leeds, and A. P. I. Cotterell, of Bristol. The contractors are Messrs. Forse & Sons, of Bristol, and the boundary walls are being erected by Messrs. W. & J. Bennett, of Bristol.

Aston Union Cottage Homes.—These homes were formally opened on September 26. They are planned so as to suggest the idea of a self-contained village. The entrance is from Fentham-road, Gravelly Hill, by a pair of recessed wrought-iron gates leading to an avenue or carriage-way 30 ft. in width, on each side of which is a large front-garden to every block of building. The aspect of the avenue is due north and south, so that sun shines on the homes and all buildings the whole of the day. On passing through the entrance-gates, on the left is the porter's lodge and probationary ward for eight boys and eight girls, with dispensary, consulting-room, lavatory, and baths, day-rooms and dormitories, &c., for each sex. Close to the

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entrance is a weighing machine for the purpose of testing all bulky goods which go into the houses. On the left are homes for girls, on the right those for boys; in the centre, for purpose of central convenience and inspection, is the superintendent's house. At the end of the avenue is the infirmary, on its left the church and schools, and on its right the workshops, laundry, washhouses, and swimming-bath. Opposite the superintendent's house in the centre of the avenue is a clock-tower, specially designed by the architects and the gift of Mr. W. J. Adams, Chairman of the Building Committee. The homes are designed to accommodate twelve or sixteen of each sex; in some cases they are double or semi-detached. Each home contains spacious entrance-hall, 12 ft. wide dayroom, kitchen, and dining-room, scullery, larder, pantry, cleaning and boot room, bathroom, lavatory, and dormitories, with accommodation for foster-parents. At the rear of each home is an asphalt playground. At the rear of the superintendent's house is a tennis-lawn or bowling-green for the use of the superintendent and foster-parents. There is a church to seat 400 people. The east and west windows were presented by the architects and builders respectively. The infirmary is on the pavilion system, and is fitted up with every modern requirement. It has convenience for twelve boys and twelve girls, with wards for eight, and a separation ward for four, to each sex, with nurses' duty-rooms between. There are dayrooms for each sex, and also bathrooms, with nurses' rooms, kitchen, stores, scullery, &c. This building is elevated and terraced all round. A mortuary at the rear completes the building. The workshops are arranged round an oblong paved yard, and comprise washhouses, drying-closets, laundry, engine and boiler house, cart-shed, carpenters', fitters', shoemakers', and tailors' shops. Under this yard is a tank for collecting the rain water for economic reasons. Adjoining is a swimming-bath, 50 ft. by 20 ft. The buildings are designed with a view to obtain, as far as possible, with the assistance of foliage a village-like appearance, but with as little woodwork as possible, so as to reduce the cost of maintenance in the future to a minimum. The architects, whose plans were chosen in open competition, are Messrs. Franklin, Cross, & J. R. Nichols, of Birmingham, and the builders Messrs. Wm. Lee & Son, of Aston. The cost of the buildings is about 50,000*l.*, and of the entire scheme about 61,000*l.*

Holy Trinity Church, Llandrindod Wells.—The rapidly increasing numbers of summer visitors demands a further enlargement of this church, and a scheme is on foot by which accommodation for 1,600 persons will be provided. It is proposed to build double north and south aisles, a north chapel, and to lengthen the present chancel. On the south side of the chancel a vestry with sacristy over is contemplated. The nave roof is to be raised so as to dominate the new aisles, and a parish room is suggested under the outer north aisle. A tower and spire about 135 ft. high in the south-west angle of the church, with a baptistry within the piers, will complete the building. About 15,000*l.* is required for the whole of the work, and the north aisles will probably be commenced forthwith. The architect is Mr. R. Wellings Thomas, of Llandrindod Wells. An alternative scheme, as regards the south aisles, is to take down the present south nave arcade and rebuild it so as to widen the nave considerably, and only build one south aisle, rather larger than the north aisle. The present north and south aisles are very small.

Primitive Methodist Chapel, Burton-on-Trent.—This chapel, situated in Welmore-road, is about to be enlarged and altered. It will be increased in length, and at the back there will be a new block of classrooms, with vestry, copper-house, and lavatory accommodation for the schools. The front will be entirely remodelled, and will have a new entrance porch with a large four-light window above and two-light windows on each side. The walls are to be faced with red bricks, having stone windows, gable, and coping. The architect is Mr. Thomas Jenkins, of Burton-on-Trent.

Church Hall, Builth Wells.—A new church hall, erected at Builth Wells, was opened on the 26th ult. The building, adjoining the north-west corner of the churchyard, and bounded on the north and west by Park-road and Church-street, is designed with free Gothic treatment, ornamented by square-headed windows, transoms and mullions; the walls being dressed with Llanelwedd stone. The cost of the building was about 950*l.* The builder was Mr. J. M. Jones; the painting, staining, and varnishing were finished by Mr. W. E. Dixon, of Builth; and the gas-piping and fitting, &c., by Mr. S. G. Tulk. The architect was Mr. Teller Smith, of Builth Wells.

Business Premises, Dublin. — One of the largest establishments in the United Kingdom for the manufacture of ice and the provision of cold storage has recently been finished in Mill-street, Dublin, at a cost of 20,000*l.* The factory is now in working order, cooling 56,000 cubic feet and manufacturing 175 tons of ice weekly. The storage capacity for ice reaches 3,000 tons. The works are on the site of what was known as the Warrenmount Mills. The architect was Mr. F. W Higginbotham, and the contractor Mr. H. J. Monks, of Dublin. The electric lighting was carried out by Messrs. Handley & Shanks, of the same city,

A Year's Building in Glasgow.—In his valedictory address on the 27th ult. to the Glasgow Dean of Guild Court, Sir James Bell, Bart., the Lord Dean of Guild, reviewed the work for the year ending August 31 last. According to the *North British Mail*, he stated that from 1890 until 1897-98 there was a steady increase of linings granted for houses and shops. The demand for this class of buildings seemed to have been very great up to the year 1897-98, but since then there had been a steady decline of roughly nearly 300,000*l.* per annum. Last year they had in valuation only about half what they had in 1897-98. Under the heading of public buildings an increase was shown in the number of linings from five to eight, but a fall in the money valuation of from 144,400*l.* to 42,500*l.* Churches, halls, and schools showed an increase in both numbers and valuation. Twelve linings last year, with a valuation of 88,080*l.*, against fourteen linings this year, with a valuation of 100,050*l.* A feature of last season's work was the great increase in the valuation of warehouses, shops, and workshops, the number last year being 113, against 115 this year; while the money valuation increased from 516 490*l.* last year to 757,870*l.* this year. Additions and alterations to properties, while 104 fewer in number than the previous year, showed about 3,000*l.* more in valuation, which was fully accounted for by the increased price of material and wages paid. During the past year twenty new streets were granted linings of 5,722 lineal yards. Taking the total number of linings granted last year, the numbers were 536, with a valuation of 1,000,428*l.* In regard to the building of houses and shops, the Queen's Park district showed the greatest activity, the number of linings granted there being thirty-two, with a valuation of 233,050*l.* In this division only three houses were of one apartment, 107 of two apartments, 105 of three apartments, ninety-eight of four apartments, sixty-one of five apartments, and fifty-nine of six and upwards. The Eastern Division came next in the number of linings and valuation. The linings were seventeen in number, with a valuation of 126,867, but in this division there were 132 of one, 300 of two, 121 of three, and only twenty-eight of four rooms and upwards. Maryhill Division was third in the list, with a valuation of 109,700*l.* for fourteen linings, that included forty-two one-roomed houses, 101 two-roomed houses, twelve of three rooms, twenty-two of five, and forty-six of six rooms and upwards. The St. Rollox Division, the fourth in the list, showed a large number of one-roomed houses. The linings were ten in number, with a valuation of 49,850*l.* These covered 272 houses of one apartment, 412 of two apartments, fifty-five of three apartments, and only six of four rooms and upwards. In the Central Division there were only two linings granted for shops and houses, with a valuation of 40,400*l.* In the Western Division two, with a valuation of 44,000*l.* In the Northern, four, with a valuation of 30,500*l.* A very large proportion of the additions and alterations, with a total of 298 linings and a valuation of 344,641*l.*, has been occasioned through the coming into force of the various Health Acts of the City of Glasgow.

SANITARY AND ENGINEERING NEWS.

Sewerage Works, Morecambe.—The foundation-stone of the central pumping station in connexion with the sewerage scheme now being carried out at Morecambe was laid on the 26th ult. The contractors for the works are Messrs. J. Schofield, Son, & Co., of Leeds, and Mr. Tempest, who is executing about 870 yards of tidal storage culverts. Messrs. Beesley, Son, & Nicholls are the engineers.

Water Supply, St. Helens, Lancashire.—On the 27th ult. the foundation-stone was laid of a pumping station, which is being erected at Melling, near Ormskirk, in connexion with the water supply of St. Helens. The building and the engines were designed by Mr. J. J. Lackland, the Water Engineer to the borough. Two boreholes of 500 ft. deep have been made by Messrs. Timmins & Sons, of Runcorn, and the water will be pumped from the wells through an 18-in. main to the 21-in. main at Kirkby, two miles away, and thus on to St. Helens. The pumping engine is to be of 200 h.-p., the steam being generated by high-pressure Lancashire boilers, and is being constructed by Messrs. Robinson & Cook, of St. Helens.

Water Supply of Windsor.—In a recent report to the Local Government Board, by Dr. H. T. Bulstrode, it is stated the shallow wells at Windsor, referred to in the report of Sir John Simon as existing in the borough at the date of the typhoid epidemic in 1858, have now, through the praiseworthy action of the Town Council, almost entirely disappeared, and the district is at present supplied from the waterworks belonging to the Corporation and situated at Eton. These waterworks were acquired by the Corporation from the Windsor and Eton Waterworks Company, under the powers conferred by the provisions of the "Windsor Corporation Water Act, 1884." The water is derived from wells situated near to Eton College, most of them on an island known as Tangier Island. Three of the four wells now in use are cut off from the mainland by means of a stream or streams. These wells are 26 ft. to 28 ft. in depth, the greater portion of this depth being sunk in the river gravel, which hereabouts overlies the chalk. This gravel, which is of a somewhat fine character, is said to be 20 to 24 ft. in depth. Each well is some 8 ft. in diameter, and is lined internally by cast-iron cylinders. These cylinders, with the exception of the uppermost, are all perforated in such a manner as to allow of, or rather to encourage, the gravel-water entering the wells. Owing to the increased demand for water, an attempt was made a few years ago to bore down into the chalk at the bottom of well No. 2, but, although 135 ft. 6 in. of chalk was perforated, the additional yield of water was practically *nil*, a fact which would in itself appear to militate against the probability of there being fissures in the chalk hereabouts. In consequence of the failure to procure an additional supply from this source well No. 4 was sunk, and the total supply is now sufficient for the present needs of the district. Above the level of the uppermost iron cylinder, which is not perforated, and which reaches to within a few feet of the surface, the walls are lined with bricks set in cement, but in well No. 3 there is a considerable area covered with concrete. The top of the wells has been raised above the level of the surrounding ground in order to prevent the entrance of river water during times of exceptional flood in the Thames valley; for instance, in 1894 the water actually overflowed into certain of the wells. There is no provision for storage, the water being pumped direct into the mains, nor is any filtration considered necessary. The Resident Engineer has advised the provision of a storage tower, and he points out that there is no storage available in the event of fire. The pumping power is furnished partly by a water wheel, partly by turbines, and partly by steam-engines. These latter are only used when the head of water in the river is insufficient to drive the turbines. Up to last summer there appears to have been some difficulty in maintaining sufficient pressure in the higher mains during periods of excessive street watering or other exceptional demands, and during last summer the higher parts of the town were at times not adequately supplied during the presence of an exhibition which made large demands on the supply. This disadvantage has been now overcome by the provision of a new and powerful engine. The Corporation now supply a population of about 20,000 in Windsor, Eton, and Clewer, the daily supply being at the rate of about 35 gallons per head. Windsor Castle is in the main supplied by its own waterworks, which are situated near Romney Lock, but the Dean's and Canon's residences and the Horseshoe Cloisters, which form part of the Castle, are supplied by the Corporation.

Waterworks, Aboyne, Aberdeen.—The works in connexion with the water-supply and drainage for the south side of Aboyne were opened on the 29th ult. The water-supply comes from the Greenloch Springs, which are situated at the back of the Brackloch Craig. From the collecting-tank near the springs the water is conveyed for over a mile in fireclay pipes, following the contour of the hill to a cistern behind Birsemore Hill. This cistern has a capacity of 30,000 gallons. From it the water is conveyed in iron pipes to the various holdings, a distance of over two miles. From the Greenloch Springs to the houses there is a fall of between 500 ft. and 600 ft., and from the cistern to the houses a fall of about 300 ft. The sewerage works are also complete. The contractors were Mr. Wm. Pirie, Aberdeen; and Messrs. Sellar & Co., Aberdeen (cement work). Mr. George Chalmers, Aberdeen, was clerk of works; and Mr. George Bennett Mitchell was the engineer.

FOREIGN.

United States.—The output of all the Portland cement mills in the United States is now estimated at over 4,000,000 barrels per annum. It is said that during the last twenty years English brands generally have lost in favour, whilst at the same time the popularity of German cements, and one or two of French and Belgian make, has steadily increased. Of last year's importations, a little over 2,000,000 barrels, more than half was of German origin, English cement forming only one-tenth of the entire amount.——The rule is to be enforced requiring that all buildings in New York which exceed 150 ft. in height are to be equipped with stand-pipes, and the couplings will have to be of the standard used by the fire department. It is estimated that 60 per cent. of the high buildings do not conform to this rule.——The American School for Oriental Study and Research in Palestine is to commence its work in a few weeks, starting at Jerusalem. The object of the school is to afford advanced students, from American institutions of learning, the opportunity of prosecuting investigations relative to history (both sacred and secular), archæology, and kindred subjects, and especially to explore and excavate historic sites. The idea is to follow at Jerusalem the examples already set by the schools at Athens and Rome.

Australia.—Considerable dissatisfaction has been created amongst Melbourne architects in regard to the competition for the Central Railway Station there. At the end of May, 1899, it was decided, on the recommendation of the Victorian Railways Standing Committee, to call for competitive designs

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for the proposed station, and premiums of 500*l.*, 200*l.*, and 100*l.* were offered for the three best designs for a building and roof, the total cost of which was not to exceed 102,000*l.* As the time fixed for sending in the plans was short, a number of architects at once set to work to try to complete within the time, only to find that, when approaching completion, the period within which the plans could be sent was extended by some months. This was resented, principally on the ground that it gave time for other competitors to join in. An expert board was appointed to select the prize designs, and the awards were duly made, without the Standing Committee being given an opportunity of discussing the merits of the awards. This was at the beginning of June last. The competitors were under the impression that the committee was finally to decide which was the most suitable design. Although some months have elapsed, the premiums were not paid when the last mail advices left Melbourne, as neither the railway department nor the Committee cared to accept any responsibility in the matter. The estimated cost of the building, following the three selected designs, is 102,000*l.*, 116,247*l.*, and 86,120*l.* respectively, but if stone be employed the cost will be considerably enhanced. Several Victorian architects appear to be under the impression that the conditions laid down originally as to cost have been disregarded in making the awards.——Competitive designs for the Hobart post and telegraph office have arrived in Melbourne, and were to be adjudicated upon by Messrs. Percy Oakden, Anketell Henderson and Thomas Watts.——The question of erecting new law courts in Chancery-lane, Sydney, on the site now occupied by the Equity and District Courts is being considered by the Minister for Justice.——The plans of the new town hall at Eaglehawk, Victoria, have been approved by the Borough Council. Messrs. Wilkinson & Permewan are the architects.——The death is announced of Mr. Lloyd Tayler, F.R.I.B.A., president of the Royal Victorian Institute of Architects. Amongst the numerous buildings in Australia of which he was the architect may be mentioned the residence of the late Hon. James Service, at St. Kilda; warehouse for Messrs. James Service & Co.; the Exchange, Melbourne; the Australian Club; the National Bank and the Commercial Bank in the same city; and the Bank of South Australia, Adelaide. His design was selected for the Parliament Houses, Adelaide, which are now being erected. He was a commissioner of the Melbourne International Exhibition, 1879-80; and in 1881 he was appointed hon. secretary for Victoria, of the Institute of British Architects, an office he held at the time of his death.

RANGOON.—The Government propose to build new Courts of Justice, and it is intended to ask architects to submit designs in competition. As far as can be learnt nothing, however, will be done for the next year or so.——The Strand Hotel, which was described in these columns more than a year ago, is now completed, and was recently opened. The building has cost about Rs. 3,50,000, without furniture or electric light and fans. Messrs. Swan & Maclaren, of Singapore, were the architects, the building operations being carried out by the owner, and the electric light, &c., by Messrs. Bagnall & Hilles, of Singapore and Yokohama.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The Lilleshall Company, Limited, have removed their offices from 12, Lime-street, to 71, Finsbury-pavement, Moorgate-street, E.C. Their new telephone number is "1,091 London Wall."

SCHOOL OF ART WOOD-CARVING.—The School of Art Wood-Carving, Imperial Institute, South Kensington, has been reopened after the usual summer vacation, and we are requested to state that some of the free studentships maintained by means of funds granted to the school by the Drapers' and the Clothworkers' Company are vacant. The evening class is for the present closed, but to meet the requirements of those professionally engaged during the week a special Saturday afternoon class is held. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

THE PLUMBERS' COMPANY.—At the quarterly meeting of the Court, held at the Guildhall on the 20th ult., Mr. Charles Hudson was sworn into the office of Master, and Mr. Alderman Richard Hind and Alderman Sir John Knill, Bart., into the offices of Warden and Renter Warden respectively for the year ensuing. Dr. F. J. Waldo, Medical Officer of Health for Temple and St. George's, Southwark, and Dr. Reginald Dudfield, Medical Officer of Health, Paddington, were admitted to the Freedom and Livery of the Company. A copy of a memorial to the Rt. Hon. A. J. Balfour was laid before the Court calling attention to the desirability of the Government dealing with the registration of qualified plumbers in the interest of the public health. It was reported that the following resolutions were passed at the Tenth International Congress of Hygiene and Demography held in Paris:—"1. That all plumbers' work, as much in the supply of drinking water as in the removal of soil or slop water, should be the object of particular attention. The pipes for the distribution of water, as well as the hydraulic apparatus (reservoirs, syphons, &c.), and the down pipes for slop water should be completely protected from frost. 2. That a professional education, with a test examination before obtaining a diploma, should be demanded of 'sanitary plumbers' with a view to spreading among plumbers a knowledge of hygiene and of rational and economic construction in their work."

HOUSING REFORM CONFERENCE IN NEWCASTLE.—A conference of local authorities, co-operators, trade unionists, and members of friendly societies was held in the meeting-room of the Co-operative Wholesale Society, West Blandford-street, Newcastle, on the 29th ult., for the purpose of considering the possibilities of practical action in regard to the urban and rural housing reform. In the absence of Mr. Thomas Burt, M.P., Mr. Davidson, of Bedlington, presided. The chairman stated that the meeting was of an altogether non-political character. Councillor Thompson (Richmond) moved the following resolution:—"That this Conference, recognising the terrible evils arising from bad housing conditions (*a*) urges Local Authorities in all districts where overcrowding and high rents prevail to vigorously use the powers they already possess, under the 'Housing of the Working Classes Act, 1890,' to borrow money for the purpose of acquiring land and erecting comfortable cottages and tenements thereon, and in this way not only securing an increased supply of suitable houses for the people, but also rendering possible the compulsory clearance of slum areas. (*b*) Whilst fully recognising the value of the work already performed by Co-operative Societies in supplying houses to their members, also urges societies in districts where housing conditions are below a right standard to earnestly consider the advisability of using capital in the erection of good houses, such houses to be let to members at the lowest possible rents, consistent with a fair return on the capital invested, and brought into effective competition with bad houses at high rents, thus enabling the Co-operative movement to accomplish, in this respect, a similar work to that which it has already performed in the provision of pure food at fair prices." This was seconded by Councillor John Johnson, and, after a long discussion, was carried unanimously. The following resolution was then moved by Councillor Millington and seconded by Mrs. Bell:—"That, in view of the fact that Local Authorities, co-operative societies, and other organisations desirous of supplying good houses for the working classes experience great difficulty in obtaining suitable land for building purposes, except at exorbitant and inflated values, this Conference is of opinion that Local Authorities should be empowered to compulsorily acquire (and hold) land, at a price based on its assessment to local and national taxation, such land to be either used under Part III. of the Act of 1890, or let with security of tenure, on terms which shall encourage the building of suitable cottages, and render impossible either the overcrowding of people in houses or the overcrowding of houses on land." After discussion, the resolution was passed. A resolution to the following effect was then passed:—"That this Conference, recognising that the relief of the pressure on housing accommodation in many industrial centres and the development of more healthy housing areas is largely dependent on the increase, quickening, and cheapening of the means of travel by tram and rail, urges—(*a*) The more thorough use of the powers already possessed by the Board of Trade (under the Cheap Trains Act, 1883) to secure the provision of an adequate supply of workmen's trains. (*b*) The rapid development of municipal electric trams and light railways. (*c*) The passing of legislation to secure a uniform system of cheap fares over areas surrounding large centres of population." After another resolution, to the effect that in the opinion of the Conference the period for repayment of loans for housing purposes should be extended to seventy years for buildings and one hundred years for land, and that a copy of the resolution be forwarded to the Local Government Board, had been carried, the proceedings concluded.

ODESSA TIMBER TRADE.—It appears from the annual report of the Committee of the Odessa Department of Trade and Manufactures that the export of timber, especially for building purposes, has considerably decreased, the quantity in 1899 being only 20,700 tons (exclusively of transit trade), whereas it amounted in 1898 to 36,509 tons. Boards are shipped to the United Kingdom, France, Egypt, Holland, and Belgium; beams and logs to the United Kingdom and France. There is a large transit trade in timber from Austria-Hungary through Russia to the Far East, France, and Holland for Germany. The figures given are 92,020 tons in 1899 and 110,774 tons in 1898.

EXPORTS OF GERMAN TIMBER.—Mr. Consul Hunt reports to the British Foreign Office that the timber exported from Dantzig in 1889 amounted to 308,000 tons, the largest quantity ever shipped from that port, as against 265,000 tons in 1898, an increase of 43,000 tons. The local sawmills were kept very busy, working both for shipment and the large requirements of the Dantzig building trade. The increased volume of trade all over the world in 1899 also favourably affected the Dantzig timber trade, although prices did not rise so rapidly as they did in 1898. Every description of pine and fir wood was in request at rising prices. Oak did not sell so well on account of its high price. There were either floated down the River Vistula, or reached Dantzig by railway in 1899, 717,160 cubic metres of wood, value 21,878,000 marks, as against, in 1898, 665,055 cubic metres, value 20,219,500 marks. The receipts for the year under notice, the largest ever reported, exceed those of the year preceding, also a record year, by about 8 per cent., both in quantity and value.—Mr. Vice-Consul Hay, reporting on the trade of Königsberg, says that the principal kinds of timber exported from that port last year were:—Round timber, 26,500 tons; boards of all kinds, 87,000 tons; sleepers, 72,000 tons; mining timber and props, 21,000 tons. Of these 28,000 tons went to the United Kingdom, 4,800 tons to Belgium, 4,200 tons to Holland, and 1,500 tons to Denmark, the remaining 168,000 tons going to various parts of Germany.—From Memel Mr. Vice-Consul Pietsch reports that in 1899 business in wood took a favourable course. For some articles prices reached a height never known before, consequently the results were profitable in spite of the very high purchase prices paid by the shippers. The total value of the shipments of wood amounted to 960,720*l.* Business in fir timber and lathes has fallen off again. In the beginning of the year oak staves were unsaleable, and only 192*l.* 10*s.* to 195*l.* could be obtained per mille. Fir sleepers were sold during the year at rising prices. In sawn wood the stocks were large and the profit good. On the whole prices took an upward tendency. The export of red wood planks was small, but whitewood planks sold well. Whitewood deals also found ready buyers at remunerative prices. The export consisted of 76,800 loads, value 213,960*l.*, as against 74,480 loads, value 193,335*l.*, in 1898.

DRINKING FOUNTAIN, INVERURIE, N.B.—A drinking fountain and horse-trough combined has been erected at Inverurie as a memorial of the Diamond Jubilee. The work is of Rubislaw granite, with the exception of the basin, which is of Hill o' Fare granite. The memorial was designed by Councillor Boddie, Aberdeen.

APPOINTMENT.—The Department of Science and Art have appointed Mr. Robert Gibson, C.E. and architect, Dundee, to prepare plans and furnish reports regarding the structural arrangements and equipment of the principal technical schools and colleges throughout the country. Mr. Gibson, who has been selected for the work on account of his familiarity with the Department's requirements, is not required to give up any present appointment. The physical laboratory of Dundee High School and the textile room of the Technical Institute are included with the large London Polytechnics among the typical schools selected by the Department.—*Dundee Advertiser.*

DEMOLITION OF UNHEALTHY AREAS IN LEEDS.—The Leeds City Council have under consideration a scheme drawn up by the Sanitary Committee by which it is proposed to deal with a large lot of property as an insanitary area. The *Yorkshire Post* states that the lot comprises about 311,318 square yards, and, according to the estimate of Mr. T. Hewson, the City Engineer, the gross cost of the scheme will be 523,034*l.* Of this amount, however, it is calculated that over 225,000*l.* may be realised by the sale of surplus land, leaving the net cost of the whole scheme at 298,034*l.* Parliament is to be asked to sanction the proposal in accordance with the provisions of "the Housing of the Working Classes Act, 1890," the Medical Officer of Health having made the requisite official representation in reference to the area.

CAPITAL AND LABOUR.

LABOUR MARKET IN THE COLONIES.—The October circular of the Emigrants' Information Office states that in New South Wales, at the Broken Hill mines, there is a good demand for carpenters and masons, engine-drivers, firemen and cleaners, boilermakers, blacksmiths, toolsmiths, fitters, and a very good demand for good hard-ground miners. In Victoria there is a good demand, which is likely to continue, for a limited number of thoroughly skilled plumbers on the Melbourne drainage works, and for ironworkers. The Chief Inspector of Factories, in his annual report just issued, states that there was an increase of 3,702 persons employed in factories and workrooms in 1899 as compared with the numbers in 1898. In South Australia and Tasmania the supply of labour is mostly equal to the demand. In Western Australia the supply of men at Coolgardie in the building and other trades, of miners, and unskilled labourers is greater than the demand. At Northam there is a demand for all kinds of labour except miners. At Perth the building and other trades have improved, but the supply is about equal to the demand. The last reports show that there was plenty of work in New Zealand. At Auckland and Napier the building trades have been busy; at Wellington the building and engineering trades; as also at Nelson. At Christchurch the building trades have been particularly busy, bricklayers having been in special demand; men in the engineering trades have also been fully employed. At Dunedin, carpenters, bricklayers, and stonemasons have been fully employed, but painters and plasterers have been slack. At Invercargill, the building trades—in which competent carpenters have been specially

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wanted—and the engineering trades have been busy. Persons are warned against going to South Africa in search of work so long as the war lasts. They will not be allowed to proceed up country. There are large numbers of persons there at the present time who are out of employment.

LEGAL.

WHAT IS AN ADDITION?

At the Lambeth Police-court on Tuesday afternoon, Mr. J. T. Thompson, of Addington-square, Camberwell, was summoned by Mr. Ellis Marsland, District Surveyor for Camberwell, for beginning to execute work in respect of which he ought to have served a building notice before serving such notice. There was a second summons against the defendant for failing to comply with a notice of irregularity served upon him by the District Surveyor.

Mr. Marsland stated that on April 4 he found that an addition had been made to Mr. Thompson's premises without notice. The work was then practically completed. The addition consisted of a dressing-room opening out from a bedroom on the first floor. A doorway had been formed in the wall of the bedroom, and adjoining the dressing-room there was a bathroom.

Mr. Hopkins: Do you mean that a new room had been built?

Mr. Marsland: Yes, sir. At the side an enclosure had been formed with old sashes and matchboarding, and the roof was of wood and not covered with slates, tiles, or metal.

The defendant said Mr. Marsland had accepted a notice since.

Mr. Marsland said he had received something which Mr. Thompson called a notice. On June 13 he met Mr. Thompson after a good deal of correspondence, and pointed out the irregularities. The defendant promised to amend them. Afterwards Mr. Thompson resolutely refused to admit that this was an addition to the premises. The addition was not enclosed by walls, as directed by the Act.

The defendant gave an explanation of the matter, but at the close of his statement Mr. Hopkins said he must confess that he did not understand it. His worship added that he would visit the premises and see what had been done.

The case was then adjourned until the 23rd inst.

GREENHOUSE OR KITCHEN?

Mr. Hopkins, sitting at the Lambeth Police-court on Tuesday, heard a summons taken out by Mr. Ellis Marsland, District Surveyor for Camberwell, against Mr. Robert A. H. Baylis, of Crystal Palace-road, East Dulwich, for beginning to execute certain work without giving notice. There was a second summons against the defendant for failing to comply with a notice of irregularity. Mr. Marsland stated that on July 18 last he received from the defendant's firm—Messrs. Baylis & Francis—a post-card saying:—"Please take notice we are constructing a greenhouse in rear of 24, Barry-road, about 10 ft. square." On August 28 he went to the premises, and discovered that an addition had been made, consisting of a kitchen and scullery combined, but having the semblance of an attached conservatory.—Mr. Hopkins: How do you mean having a semblance?—Mr. Marsland produced a photograph of the structure, and said it had been built across the casement window of a living room, thereby depriving it of access to the air, as provided for in Section 70 of the London Building Act. The addition contained a slop sink, a gas cooking-stove, and various articles of kitchen furniture. The defendant was the builder. On August 28 he wrote to the defendant pointing out that he had received no notice of the work, and that what had been done was irregular. He met the defendant on the ground the next day, and pointed out how the irregularities could be remedied. He afterwards served the defendant with a notice of irregularity, but up to the present the work had not been amended, nor had the defendant given a proper notice of the work. He therefore asked for an order requiring the defendant to amend the irregularities.—The defendant said he claimed to have built what he was instructed to build—a conservatory. If his client chose to put a gas-stove and furniture there, he was not responsible for her action. He gave Mr. Marsland the notice which that gentleman had read. He did not think that it could be claimed that a conservatory was anything but a conservatory. It was built as such, as his contract and specification showed.—Mrs. C. K. Watkin, the owner of No. 24, Barry-road, said she asked the defendant if he could provide her with a place outside which she could use as a scullery, and in which she could place a gas-stove. She did not ask the defendant to build a conservatory, but he said it would have to be built as a conservatory because of the County Council requirements.—At the request of defendant, the witness produced the specification of the work.—The defendant gave evidence on his own behalf. He said he built the structure to the orders of Mrs. Watkin, who said she wished to have a conservatory placed between the back addition to the party wall of the premises and to lean against the back sitting-room. She said she wished to have a sink put in a corner and water laid on so that she could occasionally draw water from there without disturbing her lodger. He sent in a specification and showed her a rough sketch plan. The structure was completed on July 30. Until he heard from Mr. Marsland he did not know that the lady had a gas-stove in the place or that furniture had been placed in it.—Answering a question by the magistrate, Mr. Marsland said there could be no doubt that if the things now in it were cleared out, the place would be a conservatory.—Mr. Hopkins: The fact is that you object to the purpose for which it is being used.—Mr. Marsland said that was so.—Mr. Hopkins said he could not make any order upon the summons, which would be dismissed.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

11,092.—A Pendulum for Levels, &c.: *S. T. Tall and T. W. Box.*—Upon pivot screws within a rectangular casing swings a pendulum, whose end, shaped as an index, may be observed through the glass of a round-headed slot, and the angle of inclination is read off upon a scale on the edge of the slot. When the instrument is not being used a screw retains the pendulum against an india-rubber pad, and the instrument may be affixed to a rule by means of screw-holes formed in accurately-determined places in the case.

11,100.—Dredging by Siphonical Action: *F. D. Chesterton.*—For dredging and draining operations a siphon is laid across a support with its one leg in the place to be drained and its other leg outside; the liquid flowing out of the siphon turns a motor, which works an agitator placed within the end of the siphon's longer leg by means of bands carried over pulleys at the bend of the siphon. The action of the siphon may be started with a pump placed in its end, or in any other suitable manner.

11,142.—Method of Moulding Bricks: *H. Alexander and J. Holding.*—A flat ring, which is fastened with counter-sunk screws, holds the mould lining plates or rectangular lining frames, which are supported with lugs within recesses in the table, and the lining is formed of soft iron or mild steel case-hardened in the centre so as to provide for an even wearing, or steel strips welded to an iron or soft steel backing may form a hard face; the frames or plates may also be packed in bone-dust or some carbonaceous material and sand, the receptacle being heated in a furnace, for graduating the hardness of the lining accordingly with the wear upon the different parts.

11,145. — An Apparatus for Closing and Opening Skylights: *S. Hoggard.*—The mechanism comprises a vertically sliding-rod and a cord that passes around pulleys mounted upon the rod and upon a fixed casing respectively. Upon the rod are threaded clutch plates or washers that will hold the opened skylight in any desired position and become fastened obliquely when the cord has been freed; to the casing is pivoted between the plates a releasing lever to which the cord's end is secured, the plates fitting between notches cut in the casing. When the cord has been freed the plates are forced into an inclined position by means of springs that are threaded upon the rod and press against them, to the skylight is attached an arm or bracket, having pivot or screw holes that will allow for adjustment, and joined with a link to the rod which is joined to the link with a hooked spring pin so that it may be easily detached by pressing the pin backwards; the rod is prevented from sliding through the casing by its collar.

11,167.—Fireproof Safes, &c.: *G. Niewiazowski.*—A fireproof material that will expand when it is heated is made for the greater part of water-glass, spirit varnish, and a binding cement composed of alumina, graphite, baryta, &c., fashioned in slabs joined by fusion, and filled into the safe, or employed as a plastic material to be laid between pasteboard and pressed together; around the composition, and between it and the outer walls, are inserted wood gratings or frames; it also is laid around the inner walls or wooden linings, and is covered with a thin wooden sheathing at the door-joints; if heated with fire the composition will fill the spaces between the woodwork, or the spaces that may remain when the woodwork is consumed; its expansion thereupon closes hermetically and protects the safe's inner lining or walls.

11,182.—Construction of Ceilings and Walls *A. Rincklake.*—Underneath a sheet of woven jute which is fastened on to the joists or beams is stretched a network of hemp, string, or flax, and to the under surface of the jute is applied, through the interstices of the net, cement or gypsum plaster; in the case of walls the net is stretched vertically and on to both sides is applied a sheeting of jute which has been dipped in gypsum or cement; then one of the sides is plastered over and to the other side are fastened battens or fillets. Over the battens is stretched a second vertical net, a sheet of jute is next cemented to the net, and plaster is laid over the outside; the transmission of sound will be prevented by the jute sheeting, and between the battens are left air-spaces for isolation purposes.

11,208.—A Method of Glazing Roofs: *J. R. Scholefield.*—Water resulting from condensation is carried away by grooves that are formed in the astragals or glazing-bars, which take packing-cords composed of some flexible material, whilst caps of sheet-metal that are secured with screws to the bars and have grooves for packing-cord retain the glass sheets in their positions; the edges of the glass are pressed by the edges of the cap, whose elasticity will allow the glass to contract and expand.

11,210.—Construction of Tunnels: *T. H. Murphy.*—For the tunnel's outside lining are built up wooden segment-shaped blocks that will interlock together with some waterproof substance in the joints. Lagging or sheathing spiked on to blocks may be used to tie the rings together. The lining will act as an abutment for the rams of the shield, and as a protector for the concrete inner lining whilst it becomes set. For an anchorage for the inner lining projecting bolts and plates are employed.

11,237.—Brick Facing, Bevelling, Polishing, &c.: *W. Caplen & F. Caplen.*—The rubbing-stone is mounted upon bearings that are arranged beneath a table, the table's upper side is made of wood, and adjustable guides, to which clamping-screws are attached, are placed thereupon.

11,270.—Metallic Bricks: *J. Grayson & W. J. Spratly.*—Tapered walls and partitions are fashioned in the metal bricks which are after the kind specified in No. 16,027 of 1897, and their dove-tailed recesses, which take wooden plugs, have wedge-shaped ribs or tapered blades that will cause the plugs to expand when they are forced downwards.

11,297.—Roofing Tiles and Plates: *F. J. Berner.*—The tile's lower edge is turned over in order that it shall engage with the correspondingly folded edge of the tile next below it, which is hung and fastened with an angular and hooked strip rectangular in shape. The strip is affixed to the framework of the wall or roof, and interlocked in the upper hooked edge of a three-sided tile. Between the tile's interlocking edges are wedged strips and keys, which are folded over, the lower folded edges being cut away so as to take the keys.

11,302. — Removal of Pitch from Paving-blocks, Stones, &c.: *R. Whitfield.*—By one form of the invention whereby the blocks are heated by a furnace which has a vessel to hold the melted pitch, the products of combustion are caused to pass from the fire-box through the flues and a space around the receiving chamber, the blocks being carried upon an endless chain which circulates through the central upper flue, and is moved with hand-power. Escape of hot gases is prevented by means of flaps which a set of brackets raise in turn. The apparatus is described as being adapted for use as an ordinary cauldron for heating pitch.

11,333.—Treatment of Wood: *H. T. Simpson.*—For rendering wood non-inflammable, waterproof, and non-corrosive, it is subjected to repeated immersions in a solution of salts that is forced into a receiver under pressures varying from 250 to 300 lbs. per square inch. After an ebullition of the solution in the wood has been effected by the admission of live steam, the solution is drawn off before exhaustion of the receiver; the salts should consist of phosphate of ammonia, sulphates of ammonia, and sulphates of zinc or magnesia, and can be mixed with colouring matter, or the colouring matter (without the salts) can be forced into the wood by the process described.

11,330.—Shelving for Shops, &c.: *T. Halstrom.*—Recesses and strips at intervals are provided as supports for the standards at front and back, the extended horizontal flanges of other L-shaped supports are notched for engagement with the edges of the strips, and one recess is cut more deeply than is the other so that the supports can be readily inserted into their places, the flanges support the shelves, and the supports, being held in position by the shelves, tie the standards together. In another form of construction the supports have a T section, the horizontal flanges being turned over or notched for engagement with the strips.

11,372. — A Window-sash Fastener: *J. Hudswell.*—At the side or the middle of the top rail of the lower sash is a hinged plate whereof a portion is attached to the rail, the other portion is movable and can be thrown over the upper sash's bottom rail, through a lug upon the plate's fixed part and through a screwed lug upon its other part a thumb-screw passes into a plain eyelet upon the upper sash's bottom rail so as to keep the window closed; when the screw is liberated from the eyelet one can raise the lower sash until a projection upon the sash stile or upon the middle dividing bar stops the movable part of the hinged plate, and the window can be quite opened by a withdrawal of the screw in order that the movable part shall be turned so as to clear the stop.

11,425. — Paperhangings, Wall Coverings, &c.: *H. Bremer.*—A backing or underlayer for paper-hangings, wall coverings, linoleum, mattings, and so on, is made by finely dividing cork chips, waste cork, &c., and mixing the product with some binding agent, for instance, lactein, casein, or an india-rubber, a resinous, or other preparation. The inventor claims for the backing certain moisture-proof, sound-proof, and draught-proof qualities, and that it will constitute a bad conductor of heat.

11,431.—An Appliance for Use with Street Lamps: *G. Livesey.*—The inventor's object is to minimise the shadows which are cast by the framed

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lanterns of incandescent lamps; he has devised a lantern with a circular cross-section which he mounts upon three supports that are placed at unequal distances from one another, the distances being so arranged in relation to the pavement and the kerb that they shall present a clear front to the road and cause the shadows to be cast as far as possible from the road.

11,490.—MANUFACTURE OF EARTHENWARE PIPES: *W. Möbius*.—In the process of moulding several pipes are formed inside one another at one and the same time; the innermost pipe is moulded between a bell and a rounded knife, two outer pipes are simultaneously moulded round about the casings of the inside pipe and the next adjacent pipe, which serve as cores; the pipes will leave the press together and the moulding process will continue whilst they are being cut into lengths at a single stroke of the cutter.

11,536.—AN ARTIFICIAL PAVING-STONE: *T. H. M'Lean*.—A thick slurry, to be moulded into bricks or slabs, is made of an admixture of Portland cement, water, and pulverised burned clay or ballast; the moulding apparatus comprises the well of a hydraulic press, whose cover is raised and lowered with an auxiliary press; the cover is supported by columns in which are slots, through which pass sliding bars that hold the closed cover down, the covers under surface being grooved that water may escape from the press; when the slurry has been put into the mould a sheet of woven fabric and a sheet of felt are laid over it; a ram for removal of the finished block, a travelling hopper upon rails, a mixing platform, and a tipping measuring contrivance are also included in the machine.

11,577.—CONSTRUCTION OF ROOFS: *E. L. Pease*.—The tie-rods and struts are so arranged on the outside that they shall keep the head-way or span clear within, a split tubular rafter secures a strut, and a tie-rod is fastened on to a lug of a T-shaped bar, which is attached with bolts to a split tubular standard—that form of the invention will serve for truncated roofs, as well as roofs whose rafters are extended so as to meet at the ridge; in another form the horizontal tubular members will extend over the rafters to which they are joined with links or struts, or for curved roofs (tie-rods being discarded), split bow- or arch-shaped tubes compose the principals, the flanged edges of the curved roofing-plates being placed in the tubular rafters and being locked with transverse stretchers or struts.

MEETINGS.

FRIDAY, OCTOBER 5.

The Architectural Association. — Annual General Meeting. Address by the President, Mr. W. Howard Seth Smith, and distribution of prizes. 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector, Outdoor." 8 p.m.

Civil and Mechanical Engineers' Society.—President's address by Prof. R. H. Smith. 8 p.m.

SATURDAY, OCTOBER 6.

British Institute of Certified Carpenters.—Meeting at Carpenters' Hall. 6 p.m.

Northern Architectural Association.—Visit to Co-operative Societies' Building, Blandford-street, Newcastle.

MONDAY, OCTOBER 8

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector, Indoor." 8 p.m.

Liverpool Architectural Society.—Ordinary meeting. Opening address by the President, Professor F. M. Simpson. 6 p.m.

TUESDAY, OCTOBER 9.

Architectural Association.—Preliminary meeting of the School of Design. Addresses by Messrs. Aston Webb, A.R.A., and Beresford Pite. 7 p.m.

WEDNESDAY, OCTOBER 10.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector, Offensive Trades and Trade Nuisances, &c." 8 p.m.

THURSDAY, OCTOBER 11.

Carpenters' Hall, London Wall (Lectures on Sanitary Building Construction). Mr. A. Wynter Blyth on "Sanitary Appliances." 7.30 p.m.

FRIDAY, OCTOBER 12.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. H. R. Kenwood, on "Infectious Diseases." 8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 4.—By W. S. MILLER & Co. (at Brecon).

Cwmwysg, Brecon.—Blaenusk and Pentrebach Farms, 91 a. 1 r. 30 p., f. £5,000
Moiety of Brynmaendu Farm, 36 a. 3 r. 39 p., f. 150
September 24.—By HIGGINS & SON.
St. John's Wood.—14 and 15, Henstridge-place, u.t. 34 yrs., g.r. 10*l.*, r. 76*l.* 680
15, Elm Tree-rd., u.t. 17 yrs., g.r. nil, e.r. 100*l.* 810
26, Abercorn-pl., u.t. 49 yrs., g.r. 9*l.*, r. 75*l.* 690
32 and 33, Acacia-rd., f., e.r. 110*l.* 1,825
Regent's Park.—17, Culworth-st., u.t. 27 yrs., g.r. 8*l.*, e.r. 45*l.* 370
By Messrs. RUTTER.
Wethersfield, Essex.—The Waver Farm, 107 a. 1 r. 35 p., f. 1,275
New Barns Farm, 131 a. 3 r. 32 p., f. 1,300
Wright's Farm, 142 a. 0 r. 34 p., f. 1,225
Wetheringsett, Suffolk.—The Green Farm, 133 a. 0 r. 20 p., f. and c. £1,000
September 25.—By DAVID BURNETT & Co.
Finsbury Park.—315, Seven Sisters-rd., u.t. 64 yrs., g.r. 15*l.* 15s., r. 65*l.* 550
Fulham.—88, Harwood-rd., u.t. 87 yrs., g.r. 7*l.* 8s., r. 38*l.* 400
By HARMAN BROS.
Norwood.—Harrington-rd., f.g.r. 14*l.*, reversion in 82 yrs. 330
Love-lane, f.g.r.'s 21*l.*, reversion in 82 yrs. 500
By OGDEN, SONS, & OLLEY.
Wimbledon.—45, High-st., f., r. 45*l.* 1,220
By RUTLEY, SON, & VINE.
Wembley, Middlesex.—Station-grove, Isca, f., r. 26*l.* 315
5, Grove Villas, u.t. 98 yrs., g.r. 4*l.* 10s. 200
By FREDERICK WARMAN.
Holloway.—28, Hornsey-st., u.t. 58 yrs., g.r. 6*l.* 10s., r. 36*l.* 365
By WRIFORD & DIXONS.
Corringham, Essex.—Brick House Farm, 82 a. 0 r. 17 p., f. 1,550
The Tilbury Brickfields, 18 a. 1 r. 12 p., f. 1,250
Enclosures of land, 36 a. 2 r. 18 p., f. 260
By SCHOFIELD, EVANS, & Co. (at Masons' Hall Tavern).
Romford, Essex.—High-st., the Golden Lion Hotel, f., with goodwill 23,000
September 26.—By FRANK JOLLY & Co.
Bethnal Green.—59 and 61, Grove-rd., u.t. 68 yrs., g.r. 15*l.*, r. 85*l.* 930
By R. TIDEY & SON.
De Beauvoir Town.—36, Southgate-rd., u.t. 18½ yrs., g.r. 5s., r. 40*l.* 300
By WAGSTAFF & SONS.
Barnsbury.—2, Arundel-place, f., e.r. 60*l.* 850
By Messrs. SPELMAN (at Norwich).
Norwich.—27 and 28, Tombland, f., r. 160*l.* 3,400
By MORRIS & PLACE (at Nottingham).
Elton, Notts.—The Elton Manor Estate, 1,075 a. 2 r. 39 p., f. 27,000
By DICKINSON & RIGGALL (at Louth).
North Somercoates, &c., Lincs.—A freehold estate, area 611 a. 1 r. 31 p. 18,500
By WILLSON & PHILLIPS (at Southend).
Southend-on-Sea, Essex.—Salisbury-avenue, 15 plots of building land, f. 1,150
By BALCH & BALCH (at Camden Town).
Kentish Town.—20, Healey-st., u.t. 57 yrs., g.r. 7*l.*, r. 40*l.* 445
Holloway.—68, Bickerton-rd., u.t. 76 yrs., g.r. 6*l.* 10s., r. 42*l.* 355
September 27.—By CURTIS & HENSON.
Islington.—13, White Horse Yard, c., r. 30*l.* 290
By J. G. DEAN & Co.
Clapham.—132, Salcott-rd., u.t. 81½ yrs., g.r. 6*l.* 10s., e.r. 36*l.* 350
Wandsworth.—7, Bennerley-rd., f., e.r. 30*l.* 435
By C. C. & T. MOORE.
Mile End.—15, Hunt-st., area 1,360 ft., f. 1,000
155, Devonshire-st., and 144, Globe-rd., u.t. 12¾ yrs., g.r. 6*l.* 10s. 260
Finsbury Park.—23a, Woodsrock-rd., u.t. 66½ yrs., g.r. 7*l.*, e.r. 45*l.* 425
By J. A. & W. THARP.
Bromley-by-Bow.—3 and 5, Boyce-st., u.t. 63 yrs., g.r. 5*l.* 145
Bow.—16 to 32 (even), Coborn-rd., u.t. 16½ yrs., g.r. 30*l.* 1,440
Hackney.—32, 34, and 36, Morning-lane, c., r. 115*l.* 1,630
Penge.—63 to 73 (odd), Maple-rd., f. 1,520
By STIMSON & SONS.
Yiewsley, Middx.—Trout-lane, Yiewsley Lodge and 1¼ acre, f. 1,500
Trout-lane, enclosure of land, 2 a. 2 r. 29 p., f. 500
Trout-lane, six freehold houses and five cottages 1,450
High-street, The Laurels, f., r. 26*l.* 300
Hillingdon, Middx.—The Greenway, Cleveland House, u.t. 54 yrs., g.r. 6*l.* 10s., r. 47*l.* 5s. .. 500
Villier-st., the Load of Hay p.-h., u.t. 54 yrs., g.r. 5*l.*, r. 15*l.* 650
1 and 2, Villier-st., u.t. 54 yrs., g.r. 2*l.* 260
Kensington.—8, Hyde Park-gate, u.t. 43½ yrs., g.r. 25*l.*, r. 260*l.* 4,000
Brompton.—34, Brompton-sq., u.t. 15 yrs., g.r. 15*l.*, r. 140*l.* 1,070
1, Rutland-st., f., r. 36*l.* 670
Hampstead-rd.—No. 249, u.t. 8 yrs., g.r. 9*l.* 10s., r. 65*l.* 235
Blackfriars.—89, Stamford-st., u.t. 9 yrs., g.r. 20*l.*, e.r. 180*l.* 200
New Cross.—92, Woodpecker-rd., u.t. 58 yrs., g.r. 6*l.*, r. 36*l.* 335
Islington.—259, Essex-rd., u.t. 45 yrs., g.r. 6*l.* 6s., e.r. 55*l.* 545
31, Clarence-st., u.t. 36 yrs., g.r. 6*l.*, r. 40*l.* 390
By WALTER HALL.
Caledonian-rd.—4, Bryan-pl., u.t. 43 yrs., g.r. 5*l.* 18, Bryan-st., u.t. 43 yrs., g.r. 5*l.* 315
St. Pancras.—10 and 11, Burton-st., u.t. 6 yrs., g.r. 18*l.* 18s. 315
54 and 55, Drummond-cres., u.t. 18 yrs., g.r. 10*l.* 145
King's Cross.—55 and 57, Winchester-st., u.t. 33 yrs., g.r. 24*l.* 315
Camden Town.—5 and 13, Camden-st., u.t. 10 yrs., g.r. 60*l.* 570
30, Eversholt-st., u.t. 42½ yrs., g.r. 4*l.*, r. 72*l.* .. 540
By GRIMLEY & SON (at Birmingham).
Ribbesford, Worcester.—The Ribbesford Estate, 1,541 a. 1 r. 23 p., f. 23,000
September 28.—By C. RAWLEY CROSS & Co.
Paddington.—1 to 13 and 14, Blomfield-mews, u.t. 42 yrs., g.r. 32*l.* 8s., r. 106*l.* 500
Shepherd's Bush.—75, 77, and 79, Bolingbroke-rd., u.t. 94 yrs., g.r. 19*l.* 10s. 830
By C. W. DAVIES & SON.
Kentish Town.—110 and 119, Carlton-rd., u.t. 50 yrs., g.r. 12*l.*, r. 72*l.* 745
Highbury.—49, Ronalds-rd., u.t. 85 yrs., g.r. 7*l.* 18s. 8d., r. 48*l.* 415
By F. MILLER & REID.
Barnes.—3a, Barnes-ter., f., r. 30*l.* 600
By J. R. THORNTON.
Penge.—5 to 11, Pembroke-ter., u.t. 86 yrs., g.r. 35*l.*, r. 225*l.* 2,100
By A. J. SHEFFIELD.
St. George's East.—17 and 17a, Old Gravel-lane, with warehouses, &c., in rear, u.t. 73 yrs., g.r. 60*l.*, e.r. 320*l.* 12s. 1,000
East Ham.—1 to 11 (odd), Brighton-rd., f., (including equity) £1,090
37 to 57 (odd), Brighton-rd., f., including equity) 1,790
Plaistow.—2, 4, 6, and 8, Victoria-pl., u.t. 53 yrs., g.r. 12*l.* 425

***Contractions used in these lists.*—F.g.r.** for freehold ground-rent; **l.g.r.** for leasehold ground-rent; **i.g.r.** for improved ground-rent; **g.r.** for ground-rent; **r.** for rent; **f.** for freehold; **c.** for copyhold; **l.** for leasehold; **e.r.** for estimated rental; **u.t.** for unexpired term; **p.a.** for per annum; **yrs.** for years; **st.** for street; **rd.** for road; **sq.** for square; **pl.** for place; **ter.** for terrace; **cres.** for crescent; **yd.** for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 15 0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 11 0	,,	,, ,
Smooth Bright Facing Stocks..	2 18 0	,,	,, ,,
Shippers	2 2 0	,,	,, ,,
Flettons	1 9 6	,,	at railway depôt.
Red Wire Cuts ..	1 15 0	,,	,, ,,
Best Fareham Red	3 11 6	,,	,, ,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,, ,,
Do., Bullnose	4 12 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 6	,,	,, ,,
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	13 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.		
Thames and Pit Sand	8 0	per yard,	delivered.
Thames Ballast	6 9	,,	,,
Best Portland Cement	37 6	per ton	,,
Best Ground Blue Lias Lime..	24 0	,,	,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

		s. d.		
Ancaster in blocks		2 0	per ft. cube, deld. rly. depôt	
Bath	,, ...	1 7	,,	,,
Beer	,, ...	1 6½	,,	,,
Grinshill	,, ...	1 10	,,	,,
Brown Portland in blocks		2 2	,,	,,
Darley Dale	,,	2 1½	,,	,,
Red Corsehill	,,	2 5	,,	,,
Red Mansfield	,,	2 4½	,,	,,
Hard York	,,	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)		2 7	per ft. super. at rly. depôt.	
,, ,,	6 in. Rubbed Ditto..	2 10½	,,	,,
,, ,,	3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,,	3 in. self-faced Ditto	0 9	,,	,,

SLATES.

in. in.	£ s. d.		
20×10 best blue Bangor..	11 5 0	per 1000 of 1200	at rly. dep.
,, best seconds ,,	10 15 0	,,	,,
16×8 best ,,	6 2 6	,,	,,
20×10 best blue Portmadoc	10 18 0	,,	,,
16×8 best blue Portmadoc	6 0 0	,,	,,
20×10 best Eureka unfading green....	11 2 6	,,	,,
16×8 ,, ,,	6 15 0	,,	,,
20×10 Permanent green and Sedan green	10 0 0	,,	,,
16×8 ,, ,,	5 12 6	,,	,,

TILES.

	s. d.		
Best plain red roofing tiles..	41 6	per 1,000	at rly. depôt.
Hip and valley tiles....	3 7	per doz.	
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles....	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles.....	4 0	per doz.	,, ,,
Valley tiles.....	3 9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes).	50 9	per 1,000	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles.....	3 8	,,	,, ,,

[*See also page 301.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Plans and Sections for Laying-out Pleasure Grounds	Old Swindon U.D.C.	50*l.*	Oct. 22

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Additions to Gasworks, Hollinwood	Oldham Corporation	A. Andrews, Greaves-street, Oldham	Oct. 9
Landing Stage, Northam	Southampton Corporation	W. B. G. Bennett, Engineer, Municipal Offices	do.
Register House, Edinburgh	Office of Works	Secretary, H.M. Office of Works, Storey's Gate, S.W.	do.
Building Works, Greenhill	Harrow U.D.C.	R. Thornton, Council Offices, Harrow	do.
House, Wharfedale		H. & E. Marten, Architects, 7, Charles-street, Bradford	do.
House, Stables, &c., West-street, Bridlington	Mr. W. Webster	J. Earnshaw, Architect, Bridlington	do.
Post Office, Clonmel, Ireland		H. Williams, Office of Public Works, Dublin	do.
Additions to Leece Croft Mills, Kendal	Messrs. Barron & Hoggarth	S. Shaw, Architect, Kendal	Oct. 10
Street Works, Moorland-road and Wharf-road	Hemel Hempstead Corporation	W. R. Locke, Borough Surveyor, Town Hall	do.
Lavatory Building, &c., Stockport-road	Levenshulme U.D.C.	J. Jepson, Surveyor, Tiviot Dale, Stockport	do.
Public Offices, City Chambers	Edinburgh Corporation	R. Morham, City Chambers, Edinburgh	do.
Sewers, &c., Fatfield	Chester-le-Street R.D.C.	J. H. Mole, Surveyor, Chester-le-Street	do.
House, Duke-street, Londonderry	Mr. P. Doherty	D. Conroy, Architect, 2, Bishop-street, Londonderry	do.
Additions to Workhouse	St. Albans Guardians	H. E. Hansell, Architect, St. Albans	do.
Park Lodge	Hoylake & West Kirby U.D.C.	T. Foster, Surveyor, Council Offices, Hoylake	do.
Water Supply Works, Washington, co. Durham	Chester-le-Street R.D.C.	J. H. Mole, Surveyor, Chester-le-Street	do.
Railway Siding (1,100 yards), near Morpeth	Netherton Colliery Owners	Manager, Netherton Colliery, near Morpeth	Oct. 11
Additions to Schools, Rowland's Gill	Winlaton School Board	Liddle & Brown, Architects, Mosley-street, Newcastle-on-Tyne	do.
Sewers, &c., St. Ann's Well-road	Nottingham Corporation	A. Brown, Civil Engineer, Guildhall, Nottingham	do.
*Workmen's Dwellings	Twickenham U.D.C.	Surveyor, Council Town Hall, Twickenham	do.
*Cottages, Parker-road, Grays	Gray's Thurrock U.D.C.	Surveyor, Council Offices, Grays	do.
Sewerage Works, &c., St. Helens, Cumberland		J. S. Moffatt, Architect, 53, Church-street, Whitehaven	Oct. 12
Two Houses and Three Shops, Great Yarmouth	Mr. H. R. Atkins	C. G. Baker, Architect, Town Hall Chambers, Great Yarmouth	do.
Stores, Water-street, Lancaster	Mr. J. Whittaker	J. Parkinson, Architect, 67, Church-street, Lancaster	do.
Two Houses, Warwick-road, Carlisle		H. H. Hodgkinson, Architect, Carlisle	do.
Water Supply Works, Balmore and Torrance	Stirlingshire County Council	Kyle & Frew, Engineers, 140, West George-street, Glasgow	do.
*Repairs, &c., to Winter Garden	Cheltenham Corporation	Borough Surveyor, Municipal Offices, Cheltenham	Oct. 13
Shop and Premises, Ebrington-street, Plymouth		F. A. Clark, Architect, New Town Chambers, Plymouth	do.
Widening Bridge, Tirphil	Bedwellty U.D.C.	J. H. Lewis, Civil Engineer, Blackwood, Mon.	do.
Sanitary Annex	Ashby-de-la-Zouch Guardians	Everard & Pick, Architects, 6, Millstone-lane, Leicester	do.
Greenhouse, &c., Jubilee Park	Middleton (Lancs.) Corporation	F. Entwistle, Town Hall, Middleton	do.
Shop and House, Limavady-road, Londonderry	Mr. S. Elder	J. G. Ferguson & Son, Architects, 20, Pump-street, Londonderry	do.
Public Library, Dumfries, N.B.		John Grierson, 57, Buccleuch-street, Dumfries	Oct. 15
Alterations to Police Court	Halesowen R.D.C.	W. Whitworth, Surveyor, Halesowen	do.
Footbridge, &c., Kebroyd	Barkisland U.D.C.	Surveyor, Council's Offices	do.
Six Houses, Pontefract		W. Hurst, Architect, Pontefract	do.
Granite (1,000 tons)	Guildford Town Council	C. G. Mason, Civil Engineer, Tuns Gate, Guildford	do.
Mortuary, Livingstone-street	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	do.
*Making-up Roads	Beckenham U.D.C.	Surveyor, Council Offices, Beckenham, Kent	do.
*Making-up Bromley Gardens	Beckenham and Bromley U.D.C.	do.	do.
*Sewerage Works	Acton District Council	Surveyor, Council Offices, 242, High-street, Acton	Oct. 16
Concreting at Baths, New Islington	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
Additions to Workhouse, West End-lane	Barnet Guardians	W. H. Mansbridge, Architect, 40, High-street, Barnet	do.
Schools, East Hyde	Luton School Board	J. R. Brown & Son, Castle-street, Luton	do.
Reservoir, &c., near Wellingborough	Wilby Parish Council	G. F. Bearn, Surveyor, Market-square, Wellingborough	do.
*Chimney Shaft, &c.	Whitechapel Board of Works	M. W. Jameson, Engineer, 15, Great Alie-street, Whitechapel	do.
*Kerbing, Tarpaving, &c. Oaksford Avenue, Sydenham	Lewisham Board of Works	Surveyor, Town Hall, Catford, S.E.	do.
*Kerbing, Tarpaving, &c. Whitburn-road, Lewisham	do.	do	do.
*Making-up Mayfield Avenue	Chiswick U.D.C.	Surveyor, Council Offices, Sutton Ct., Sutton Court-rd., Chiswick	Oct. 17
Road Diversion, Alltwen	Glamorgan County Council	T. M. Franklen, County Offices, Cardiff	do.
Sewerage Works, Alperton	Wembley U.D.C.	W. Bagshaw, Public Offices, Wembley	do.
Waterworks (18 miles)	Axbridge (Somerset) R.D.C.	A. Powell, Civil Engineer, 3, Unity-street, Bristol	Oct. 18
*Materials	Great Western Railway	Stores Superintendent, Great Western Railway Office, Swindon	Oct. 22
Widening Railway, Dunrod to Wemyss Bay	Caledonian Railway Company	J. Blackburn, 302, Buchanan-street, Glasgow	do.
Steel Rails (3,000 tons)	Glasgow Corporation	J. Young, 88, Renfield-street, Glasgow	Oct. 23
Stabling, &c., Staveley	Derbyshire County Council	J. S. Storey, County Surveyor, St. Mary's Gate, Derby	Oct. 24
*Two Shops in South End, Croydon		F. & W. Stocker, Architect, Queen-street, Cheapside, E.C.	do.
*Hospital	Fylde, Preston, &c. Jt. Hos. Com.	See Advertisement	Oct. 26
Drainage Works, Aughnacloy, Ireland		G. P. Halton, Civil Engineer, Church-street, Dungannon	Oct. 27
*Making-up Roads	Windsor R.D.C.	See Advertisement	Oct. 29
*Sewering, Levelling, Paving, &c.	Hornsey U.D.C.	Engineer, Council Office, Southwood-lane, Highgate, N.	do.
Schools, Moughley Lisnaskea, Ireland		B. L. Winslow, Lisnaskea	Nov. 1
Harbour Works, Dundrum Bay	Down County Council	County Surveyor, Court House, Downpatrick, co. Down	do.
Six Cottages, Pool Bank Quarries, near Leeds		B. Whittaker & Sons, Ltd., Horsforth, near Leeds	No date
Extension of Brook-street, Ilkley		Empsall & Clarkson, Architects, 7, Exchange, Bradford	do.
Road Works, Ilkley-in-Wharfdale		do.	do.
Repairs, &c., to Cottages, New-road, Barnet		H. Harwood, 71, New-road, Barnet	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Clerk of Works	Cardiff Corporation	250*l.* per annum	Oct. 17
*Clerk of Works	Beckenham U.D.C.	3*l.* 3s. per week	Oct. 18
*Deputy Borough Engineer	Salford Corporation	250*l.* per annum	Oct. 25

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xix. & xxi.

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PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
" " 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
" " " 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
" " " 3 in. by 9 in.	13 0 0	14 0 0
" " battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 3 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cub:	0 2 6	0 2 8
Small " "	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
¼ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders " "	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	12 0 0	- - -

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	10 0 0	10 12 0
Staffordshire Crown Bars, good merchant quality	12 5 0	12 15 0
Staffordshire "Marked Bars"	13 5 0	- - -
Hoop Iron, basis price	11 5 0	11 15 0
" " galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 10 0	- - -
" " to 24 g.	12 15 0	- - -
" " to 26 g.	13 15 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 15 0	- - -
" " 22 g. and 24 g.	15 5 0	- - -
" " 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 10 0	- - -
" " 22 g. and 24 g.	19 0 0	- - -
" " 26 g.	20 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft 20 g.	14 0 0	14 15 0
" " 20 g. and 24 g.	14 15 0	15 10 0
Cut nails, 3 in. to 6 in. (Under 3 in. usual trade extras.)	11 10 0	- - -
LEAD—Sheet, English, 3 lbs. & up.	20 0 0	- - -
Pipe in coils	20 10 0	- - -
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -

PRICES CURRENT (*Continued*).

	£ s. d.	£ s. d.
COPPER—		
Strong Sheet per lb.	0 1 1	- - -
Thin "	0 1 3	- - -
Copper nails "	0 1 3	- - -
BRASS—		
Strong Sheet "	0 0 11	- - -
Thin "	0 1 1	- - -
TIN—English Ingots "	0 1 7	- - -
SOLDER—Plumbers' "	0 0 8	- - -
Tinmen's "	0 0 10	- - -
Blowpipe "	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3½d. " "
" " fourths	3d. " "
26 oz. thirds	4¼d. " "
" " fourths	4d. " "
32 oz. thirds	5¼d. " "
" " fourths	5d. " "
Fluted sheet, 15 oz.	3¾d. " "
" " 21 "	4¼d. " "
½ Hartley's Rolled Plate	3d. " "
⅝ " " "	3¼d. " "
¾ " " "	4d. " "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
" " " in barrels "	0 3 2
" " " in drums "	0 3 4
Boiled " " in pipes "	0 3 4
" " " in barrels "	0 3 5
" " " in drums "	0 3 7
Turpentine, in barrels "	0 2 5
" in drums "	0 2 7
Genuine Ground English White Lead per ton	27 10 0
Red Lead, Dry "	25 0 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish or outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot unaertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

*** Denotes *accepted*. † Denotes *provisionally accepted*.**

ABERDEEN.—Accepted for additions to Ferryhill Public Schools, for the School Board. Mr. J. A. O. Allen, architect, 22, Union-terrace, Aberdeen:—

Masonry.—G. Hall
Carpentry.—Clark & Donaldson
Slating. A. Martin
Plastering.—Sellar & Co.
Plumbing.—A. Fiddes
Painting and Glazing.—B. Main
} £1,674 12 11

[All of Aberdeen.]

BROMLEY (Kent).—For sewering, paving, &c., Scott's-road, for the Urban District Council:—

H. Struter	£550 0	R. Stockwell	£407 6 8
George Wilson	563 15	A. C. Soan, Streatham*	389 2 7
Mowlem & Co.	421 0		
Lawrence & Thacker	414 18		

BURTON-ON-TRENT.—For the erection of shop premises, Balfour-street, for the Burton-on-Trent Artisans' Dwellings Company, Limited. Mr. Thomas Jenkins, architect, 35, High-street, Burton-on-Trent:—

No. 4 Contract.

H. Edwards* £745

BURTON-ON-TRENT.—For the erection of premises, High-street, for the Young Men's Christian Association. Mr. Thomas Jenkins, architect, 35, High-street, Burton-on-Trent. Quantities by the architect:—

J. T. Varlow	£4,753 13 2	G. Hodges	£3,830 0 0
H. Edwards	4,275 0 0	R. Kershaw*	3,775 0 0
Lowe & Sons	3,963 0 0		

BURTON-ON-TRENT.—For additions to the White Hart Hotel, High-street, for Messrs. Bass, Ratcliff, & Gretton, Limited. Mr. Thomas Jenkins, architect, 35, High-street, Burton-on-Trent. Quantities by the architect:—

J. Hunter, Limited	£950	G. Hodges	£820
Lowe & Sons	826	H. Edwards*	788

CHAPEL ALLERTON (Leeds).—Accepted for the erection of a home for children, with house, office, &c., for the Leeds Union Guardians. Mr. Percy Robinson, architect, Albion-street, Leeds. Quantities by the architect:—

Bricklaying and Masonry.—J. T. Wright	£3,250 0 0
Joinery and Carpentry.—Ledgard & Sons	1,640 0 0
Plumbing and Glazing.—J. Linley	699 0 0
Plastering.—H. Pearson	291 17 0
Painting.—J. Butler	136 0 0
Tiling.—J. Season	405 2 0
Ironfounding.—Whitehead Bros.	212 4 0
Concreting.—A. & S. Wheeler	300 0 0

[All of Leeds.]

CHINGFORD.—For the erection of six houses, Beresford-road, on the Chingford Rise Estate. Mr. W. I. Chambers, architect, Savoy House, London:—

S. Horwood, Brixton Hill	£3,991
I. Weibking & Son, Southgate-road, N.	3,600
E. Turner, Hounslow	3,475
C. Watts, Putney	3,168
Dockeril & Son, Brompton	3,102
J. P. Groome, New North-road	2,880

[Architect's estimate, £3,125.]

CHINGFORD.—For the erection of six houses, Buxton-road, on the Chingford Rise Estate. Mr. W. I. Chambers, architect, Savoy House, London:—

S. Horwood	£3,453	Huntingford & Goddard	£2,920
Weibking & Son	3,300	Dockeril & Son	2,916
C. Turner	2,930	J. P. Groome	2,880

[Architect's estimate, £2,920.]

EXMOUTH.—For the erection of a Baptist church, Victoria-road. Mr. P. Kerley, architect, Exmouth:—

Dart	£1,700 0	Stokes	£1,030 0
Abell	1,264 0	Lacey	925 0
Grace	1,031 0	Hayman, Exmouth*	868 17

FOLKESTONE.—For alterations to the Mechanics Arms, for Messrs. Thos. Phillips & Co., Limited, West Malling, Kent. Mr. A. H. Steele, architect, Folkestone-road, Dover. Quantities by the architect:—

Morrison	£955 10 0	Nicholls, Folkestone*	£848 16 4
Castle & Son	950 0 0		
Francis	854 0 0		

HARROW.—For the supply of 1,300 tons broken granite, &c., for the Urban District Council. Mr. J. P. Bennetts, Surveyor, Council Offices, Harrow:—

Rowley Regis Granite Co., Rowley Regis, Staffs*:—
2-in. Granite 13s. 0d. per ton.
1½-in. " 13s. 6d. " "
Chippings 9s. 10d. " "

HODDESDON (Herts).—For the construction of 270 yards of 12-in. pipe sewer, with manholes, &c., for the Urban District Council. Mr. T. Salkield, Surveyor, Lord-street, Hoddesdon:—

T. Adams	£449	M.S. Kitteringham, Waltham Cross*	£295
G. Bell	318		

KIRBY (Essex).—For the erection of schools to accommodate 250 children, for the School Board of Kirby, near Colchester. Mr. C. E. Butcher, architect, Queen-street, Colchester:—

A. Coe, Ipswich	£2,751
C. Oxley, Walton-on-the-Naze	2,691
H. W. Gladwell, Walton-on-the-Naze	2,664
F. J. Ward, Colchester	2,600
A. Diss, Colchester	2,495
H. J. Linzell, Newmarket	2,315
Dupont & Co., Colchester	2,279
Saunders & Sons, Dedham, Colchester	2,275
E. West, Chelmsford	2,225
J. McKay, Clacton-on-Sea	2,130

LEICESTER.—For the construction of sewers, &c., for the Corporation. Mr. E. G. Mawbley, C.E., Town Hall, Leicester:—

Barnes & Co.	£14,550 0 0	T. Philbrick	£10,199 16 2
E. Tempest	11,180 14 4	Johnson & Langley, Leicester*	9,991 5 11
Bentley & Loch	10,625 3 0		

[*See also next page.*

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LONDON.—For the erection of five shops, High-street, Lewisham, S.E., for Messrs. Belcham. Mr. Alfred Roberts, architect, 18, Nelson-street, Greenwich :—

W. Mills	£5,425	H. L. Holloway	£5,090
H. Groves	5,398	T. D. Leng	4,880
W. Martin	5,381	Kennard Bros.	4,753
Jerrard & Son	5,233	J. Watt*	4,130

LONDON.—For the erection of nineteen houses, Boreham-road, Wood Green, for Mr. R. T. Baker. Mr. W. I. Chambers, architect, Savoy House, London :—

C. Watts, Putney* £6,365

LONDON.—For the erection of a studio and re-decorating the house, 13, Blomfield-road, Maida Vale. Mr. W. I. Chambers, architect, Savoy House, London :—

Dockeril & Son, Brompton* £1,062 10

LONDONDERRY.—For laying a main sewer, Lovers' Glen and Duncreggan Valley, for the County Borough Council. Mr. W. J. Robinson, City Surveyor. Quantities by the Surveyor :—

McKee & Son £1,129
R. Colhoun, Strand, Londonderry* 895

MINEHEAD (Somerset).—For improvements to the sea-front for the Urban District Council. Mr. F. W. Roberts, engineer, Taunton. Quantities by the engineer :—

S. Saunders	£7,299 0 0	Morse Bros.	£4,603 0 0
R. H. B. Neal	5,843 0 0	J. Burgess	4,555 0 0
Grounds & Newton	5,820 6 0	E. Powell	3,993 9 9
J. Dickson	4,980 18 9	E. H. Page, Cardiff*	3,504 5 4

NORTHFLEET (Kent).—For the erection of six cottages, Springfield Estate, for the Kent and Essex House Investment Company, Limited. Mr. G. W. Cobham, Surveyor, 1, Edwin-street, Gravesend.

J. M. Dering	£1,670 0	J. Wilford	£1,290 0
Beal & Hubbard	1,395 0	S. Horwood	1,260 0
W. H. Black	1,300 10	W. E. Thomas	1,174 0
W. Andrews	1,290 0	A. E. Tong, Gravesend*	1,160 0

PENARTH.—For the supply of 900 tons basalt, for the Urban District Council. Mr. E. J. Evans, C.E., District Council Offices, Penarth :—

A. & F. Manuelle	£513 15	St. Keverne Stone Co.	£401 5
Wainwright & Co.	506 5	Runnalls, Penzance*	382 10
London Basalt Stone Co.	495 0		

SOUTHAMPTON.—For shop front and fittings, High-street, Shirley, Southampton, for the International Tea Company's Stores, Limited, Mitre-square, London. Mr. A. W. Galbraith, architect, Above Bar, Southampton :—

Jenkins & Son	£493	Playfair & Toole	£420
Oak & Sons	450	Wright & Son	401
Doggrell & Son	420	Bagshaw & Son*	397

TUNBRIDGE WELLS.—For the erection of technical institute and school of art, for the Corporation. Mr. H. T. Hare, architect, 13, Hart-street, Bloomsbury-square, W.C. Quantities by Messrs. Fleetwood, Son, & Eversden, and Mr. Norton :—

Martin & Co.	£13,475 0 0	J. Jarvis	£11,795 0 0
Cook & Sons	12,558 5 1	Crates & Son	11,600 0 0
Willcock & Co.	12,458 0 0	Davis & Leaney, Goudhurst*	11,434 0 0
Strange & Sons	11,837 0 0		

C. B. N. SNEWIN

MAHOGANY, WAINSCOT, WALNUT, TEAK, VENEER, and TIMBER MERCHANT,

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THE LARGEST STOCK OF ALL KINDS OF WOODS IN EVERY THICKNESS, DRY, AND FIT FOR IMMEDIATE USE.

Telephone, No. 274 Holborn. Tele. Address: "SNEWIN: London."

TWICKENHAM.—For the execution of street improvement works, Colne-road, &c., for the Urban District Council. Mr. F. W. Pearce, Surveyor, Town Hall, Twickenham :—

	May-road.	Seymour-gardens.	Alexandra-road.	Morley-road.
	£	£	£	£
Wimpey & Co.	743	718 0	632	348
S. Kavanagh	725	678 0	587	328
R. Ballard	675	677 0	557	318
Lawrence & Thacker	640	664 0	550	295
R. W. Swaker	—	555 15*	525	300
Mowlem & Co.	654*	598 0	424*	234*

PUBLISHER'S NOTICES.

Telegraphic Address, "THE BUILDER, LONDON."

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c. &c.

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Each additional line ..... 1s. 0d.

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FOUR lines (about thirty words) or under ..... 2s. 6d.
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PREPAYMENT IS ABSOLUTELY NECESSARY.

**** Stamps *must not* be sent, but all sums should be remitted by Postal Orders, payable to DOUGLAS FOURDRINIER, and addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Out-side Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have *Replies addressed to the Office*, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed) 1s.

W. H. Lascelles & Co.,

121, BUNHILL ROW, LONDON, E.C.

Telephone No. 1365, London Wall.

HIGH-CLASS JOINERY,
LASCELLES' CONCRETE

Architects' Designs are carried out with the greatest care.

CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS,
Bank, Office, & Shop Fittings,
CHURCH BENCHES & PULPITS.

ESTIMATES GIVEN ON APPLICATION.

WOODFORD (Essex).—Accepted for the supply of broken granite (1,500 tons to 2,000 tons), for the Urban District Council :—

	Per ton. s. d.
C. M. Manuelle, 12, Lime-street, E.C.—	
Quenast, 1½ in.	12 4
,, 2 in.	12 1
W. Griffiths, Hamilton House, Bishopsgate-street Without—	
Quenast, 1½ in.	13 0
,, 2 in.	12 6

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 26s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

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THE BATH STONE FIRMS, Ltd.
BATH.
FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
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The Builder.

VOL. LXXIX., No. 3010. OCTOBER 13, 1900.

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Architecture in Sydney.

FOR several years since 1893, when Bank failures seriously affected the whole progress of Australia, building work, as might be expected, has been very slack in Sydney as well as in the other Australian capitals. But during the last two years, and especially the last twelve months, a decided improvement is manifest, and matters architectural are almost resuming their normal condition of steady progress. There is not the undue inflation of the ten or fifteen years preceding 1893, and it is to be hoped that it will not be repeated, as it is certain to be followed by a reaction more or less severe. The advance in general prosperity is evidenced by the increased number of new buildings in the capital city, and this is all the more satisfactory, as the greater part of the interior of the Colony has been suffering from a severe drought for several years past. Except in the far north-western districts seasonable rains have lately fallen, and hence the prospects for next season are decidedly satisfactory. This means that wool, the staple product of the Colony, will be produced much more largely, and if prices maintain their present level the profits will help to maintain our present satisfactory condition.

In a previous article we referred to a large building erected by the Equitable Life Assurance Company of New York in the Romanesque style, which we thought would have an influence on subsequent works, and this has proved to be the case. The most important instance is the new Victoria Market Building, erected a year or two since by the City Council: a structure 611 ft. in length by 96 ft. in width, and surmounted by one large and twenty small domes. It possesses the inestimable advantage of an excellent site near the Town Hall, and faces good streets on each side; but for all that it is a failure, practically, artistically, and financially. The Architect and the Council do not seem to have grasped the idea of what a market should be. They have in fact relegated it to the basement. As a result, light and ventilation are deficient and access is difficult, notwithstanding lifts both for people and for carts. In the old market on the same site, which the present building superseded, a large trade was carried on in fruit and vegetables, thus showing the suitability of its position. But, notwithstanding the fact that the position remains the same, the drawback of a basement for market purposes has proved an absolute deterrent, and not a single legitimate market tenant is to be found therein. The ground story of the building has been converted into a covered arcade running the whole length with transverse entrances midway. Shops with fronts both to the arcade and to the street fill up the remainder of the space. Many of these are yet empty, although offered at unremunerative rentals, and are likely to remain so for a long time to come. The upper stories of the building are approached by staircases, lifts, and internal galleries, with the idea that they would let for offices and showrooms, but here again anticipations have not been realised to any extent. Architecturally the building is hardly more successful than it is practically, for although imposing by its size, the detail is wiry and mechanical, and the vigour typical of the style quite wanting. One of the chief errors in design is the cutting up of the long façades into vertical divisions by clustered shafts or slightly projecting bays, instead of emphasising the strongly marked horizontal lines of the building. Even the main cornice is broken by projections and the vertical treatment is accentuated by the multiplicity of small domes. These in themselves are of fair size, but in contrast with the large central dome look mere cupolas. All round the lower story, covering the footpath, a verandah has been built consisting of strong and fairly well designed cast iron columns and an iron and glass roof.

Here, again, the tendency to cut up features vertically has manifested itself, as each frieze between the columns is subdivided into three parts instead of being treated, as would have been better, in a horizontal fashion. On the whole, however, the verandah is an advance on most of those seen in the City or permitted by the Council, who compel building owners to adopt a uniform design of very inferior character. The two principal lateral entrances, with their massive polished granite columns, radiating wheel tracery, and large semi-circular arches over them, have a good effect, especially when the perspective of the stone staircases inside is taken into consideration. Some of the carving and modelling of the caps is pleasing in design, although too mechanical in execution. The large dome which surmounts the structure might have been made a very striking feature, but it is marred by a very high vertical stilt, the optical effect of which is to make the dome itself look as if it were crippled. The base of the dome is surrounded by a light corbelled balustrade, evidently studied from that which surrounds the dome of the cathedral at Florence; but, unfortunately, it is meagre and thin in detail. The lantern which crowns the dome rises vertically out of it, without any line to soften off the junction, and is crowned by a small cupola. The predominating feeling of the critical observer is that a great architectural opportunity has been missed.

Three other buildings in the Romanesque style have lately been erected in the city, all forming sets of offices. The building erected by Dalgety & Co. has an excellent site facing a large open space, and stands on a rather steep slope, which permits of two ground floors being obtained. The building is four stories in height; the principal entrance is in the centre of the longer frontage, and the corner at the street angle is rounded off. The lower story is in rock-faced stonework, and the upper stories in brick, relieved with stone bands. Apart from the semicircular arched entrance and the very flat bow-window over, there is but

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little feature in the building, and what little there is might have been omitted with advantage; for instance, the windows on each side of the central entrance are placed in 4½-in. recesses, arched over at the top under the main cornice. As, however, the stonework is mostly rock-faced, the effect of these shallow recesses is decidedly feeble; indeed, it is a question whether the rock-faced stonework itself is not a mistake as a dressing to the smooth and truly-laid brickwork. The general idea of a dressing is that of a superior material to the bulk of walling, whereas in the present case the finish, at any rate, is inferior. The main cornice above the second floor is corbelled, but the corbels are crude, and the level coping-stone which finishes off the building is unduly heavy; in fact, the whole effect of the building is somewhat forbidding, and gives one the idea rather of a warehouse to carry heavy loads than a set of offices for an important and prosperous company.

The second set of offices is in the same neighbourhood, but has only one principal front to the street and a side front to a narrow lane; its dimensions are less, and although only three stories in height, the general effect is vertical rather than horizontal. The whole of the exterior is of stone, and the greater part of it rock-faced, hence the effect is more homogeneous than Dalgety's building. The ground story of the front elevation has coupled windows with transomes and semicircular heads. The first-floor windows have transomes and square heads, absolutely plain, without a moulding of any kind, but the upper-story windows are treated as broad frieze with shafts between. The cornice is of the corbelled variety, but scarcely more satisfactory than in the other case, and the only feature of the design that possesses special merit is the entrance doorway, which is semicircular-headed, the one half being entrance, the other half window.

The last building in the Romanesque style to be noted is a new set of offices in Bridge-street, now being erected for Messrs. Burns, Philp, & Co., conjointly with the Norddeutscher Lloyd and the North Queensland Insurance Company. This is a structure three stories in height with dormers to the roof; the whole of the front is in stone, somewhat coarsely treated, but the general effect is more pleasing than in either of the examples just referred to, and the practical difficulty of obtaining a large amount of lighting surface has been very well overcome without spoiling the composition. The large central semicircular-headed doorway gives access to the firm's offices, while the shipping company and the insurance company have subordinate, but separate entrances on either hand. Above the three entrances are flat elliptical bays, which, on the whole, look very well, except the corbelling carrying them, and on this the rounded ribbing is extremely coarse. Considerable use is made of projecting circular shafts running up the front of the building, together with smaller shafts to the windows, which look well on the whole, but the carving leaves a good deal to be desired. The corbelled cornice, again, is a weak feature in the composition, and the roof, sharply sloping in front with a flat pitch to the rear, is by no means a thing of beauty when seen in perspective in walking up the street.

It is sincerely to be hoped that these are the last examples we shall see of this style in the city of Sydney, for, however well carried out, there is a want of harmony between the rough-and-rugged treatment, which alone seems effective, and the surroundings and requirements of modern life in a great city with a bright and genial climate.

It is a relief to turn from buildings such as we have described to take a glance at the scores of new and artistic dwellings which are being erected in all the suburbs. Fifteen or twenty years ago cement fronts and slate roofs were universal, while to-day they are fortunately the exception. Plain, honest brickwork or rough cast have taken the place of the cement, and tiles from the south of France have superseded the slates. At the same time the whole character of the design is altered, and instead of speculating builders' Italian, we find a fair number of designs of high merit with a still larger number that are quite passable. Of course, the speculating builder has followed the fashion and vulgarised it, but not to so great an extent as might have been expected. It would be an impossible task to enumerate in detail even the best of the dwellings that have been put up in recent years, but honour should be paid to those architects who have distinguished themselves in a field of professional effort that involves a great deal of work for very little pay. Amongst them should be named Mr. Jeaffreson Jackson, Mr. Manson, Messrs. Sulman & Power, Mr. Joseland, and Mr. Durrell.

While referring to architects by name, it would be invidious not to mention the highly capable and esteemed Government Architect, Mr. Vernon, who has through his department added a large volume of architectural work of high quality to the output of the last few years. Perhaps the most important work he now has in hand, from an architectural point of view, is the new Art Gallery, a portion of which has been completed, one wing is still in hand, and a further instalment in prospect. This building bids fair to become the architectural *chef d'œuvre* of the southern hemisphere, and its progress will be watched with the greatest interest. The design consists of a central hall of great size, with galleries and wings on either hand; and as it is only top lit the exterior presents an unbroken surface of walling, unbroken, that is by windows, but relieved by porticoes and colonnades. The style is Ionic, and the general feeling Greek rather than Roman. The special feature will be the series of panels which it is the intention of the trustees to fill with low relief sculptures in bronze. One of these panels, about 12 ft. by 9 ft., has already been modelled by the late Mr. Ball, and the casts are now in England for the preparation of the bronze-reliefs. If, when the panel is fixed, the result is as satisfactory as anticipated, it will no doubt lead to the gradual filling of the remaining panels, so that the building when completed will present a finer series of bronze-reliefs than any example we can think of for the moment.

Mr. Vernon's fine design for a Parliament House has not been dealt with in view of the imminence of Federation, the institution of a new capital city not less than a hundred miles from Sydney, and the inevitable reduction of the present numbers of the Legislature to a more moderate compass, a consummation devoutly to be desired; for one of the chief drawbacks to the progress and well-being of the colony is the number of politicians and hangers-on who live upon the country and impede useful legislation. It is an absolute fact that millions of money would have been invested in reproductive works in New South Wales but for the impossibility of obtaining an authorising Act to carry out works of public utility in a reasonable time and at a reasonable cost. If Federation will relieve the colony of this incubus it will be worth, for that improvement alone, all that it may cost.

Another of the Government architect's works, and a very difficult one, is the addition now being made to the General Post Office, which consists of a single story over the whole area, and a double story at each angle. The most noticeable feature of the original composition is the tall square tower, quite one of the landmarks of Sydney, which used to rise in a very crude and unpleasant fashion from the main cornice. Mr. Vernon has overcome this by adding a slight wing on each side, which very much improves the setting of the tower, and he has treated the angle pavilions with high mansard roofs and small stone dormers. The windows under are large and semi-circular, enriched with sculpture in the spandrels; very satisfactory in themselves, but a little out of keeping with the original design of the structure below. This departure from the original design has been much criticised, but scarcely with reason. It is a point of considerable interest, when an architect has to make additions to a building, whether he should be bound to literally follow its design, however unsatisfactory it may be, and thus make the harmony a mediocrity, or whether he should, as in the present case, somewhat diverge by introducing work of a much higher architectural character. The latter has certainly been the custom in the past, and on the whole it seems best that it should be the custom in the present as well. The most unfortunate feature in the design is the recessed addition to the mansard at each end, which is required to give the necessary internal accommodation. Its roof is higher than that of the mansard itself, and although the additions are a little out of sight by being recessed, yet from many points of view they are not very satisfactory.

The buildings we have described by no means exhaust the list of those worth criticism, but space forbids and they must await another opportunity.

NOTES.

London Main Drainage.

In touching on the subject of the main drainage of London in his address, the Chairman of the London County Council was able to give some gratifying evidence as to the improvement effected in the Thames by the great works of drainage carried out in the past, which may serve to reconcile us, in some degree, to the expenditure threatened in the future. Though the quantity of sewage increases every year, the actual expenditure of the committee on maintenance has been 5,000*l.* less than in the preceding twelve months. The second notable fact is that a given number of gallons of sewage produced a less weight of sludge this year than they did last year, showing

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that the methods of precipitation are improving, and that water which formerly had to be carried out to sea at great cost now runs into the Thames at the outfalls. As a testimony to the improved state of the river, an eel—a historic eel, of large proportions, has been caught in the Thames, and was sent in evidence to Sir Arthur Arnold, who communicated the good news to the chairman, though he seems to have appropriated the eel. We are now called upon to face an estimated expenditure of 2,947,000*l.* on an extension of the main drainage system, which was designed forty years ago to serve the needs of 3,450,000 persons, while the population to be provided for has actually risen to 4,700,000, so unexpectedly rapid has been the growth of London. It is not likely that this rate of growth will be maintained; it is partly the result of crowding into the capital from the country, and a reaction against this is almost bound to come. But an extensive enlargement of the drainage scheme is no doubt called for, and the expenditure ought not to be grudged. It will be repaid in the increased health of London and the improvement of the river.

Day Classes for the Association.

MR. SETH-SMITH'S suggestion, in his presidential address, for the establishment of day classes in connexion with the Architectural Association, may prove to be the precursor of a very important movement in architectural education. As he observes, the apprenticeship system labours under the two disadvantages that the master in most cases has not really time to devote to the pupil, and that the latter is bound for a term of years before he can really find out whether he is naturally suited to the profession ("or art") of architecture. If he commenced his architectural training in classes he would have opportunity of finding out his own capabilities before binding himself to anything for a term of years, and could abandon it without serious loss if he found he had mistaken his vocation. That, of course, is only a collateral advantage; the more important one would be that he would be getting a systematic training during the first two years of his study. Nothing, we believe, will supply the place of office experience in actual work; but this should be the practical training after the theoretic training has been gone through; and the pupil who has first attained a general knowledge of construction and design will thereby be much more fitted to make the best use of his office experience. The suggestion made by the President of the Architectural Association may perhaps prove to be the first commencement of the establishment of a college for architectural training in this country.

Lunacy in Professions and Trades.

ONE of the numerous appendices to the recently issued Report of the Commissioners in Lunacy endeavours to indicate the proportion of insane persons in different professions and occupations. Owing to reasons arising out of changes in the tabulation of the census of 1891, as compared with 1871, the figures are in some cases incomplete. For instance, whilst we are told that the yearly average number of civil engineers admitted as lunatics during the five years 1894-8 was thirty-five, the number of persons engaged in that profession was not ascertained, so that the ratio of lunatics to the total civil engineer population cannot be shown. The same remark applies to the statistics relating to artists in painting and sculptors, who supplied a yearly average of seventeen male and four female lunatics; paperhangers, plumbers, painters, and glaziers, who contributed a yearly average, during the period 1894-98, of 198 lunatics; and bricklayers, masons, paviours, slaters, tilers, plasterers, whitewashers, stonecutters, and stonedressers, from which group came yearly 203 insane persons. Under the following heads more complete information is given:—Architects, surveyors, and builders, number of persons in these occupations on April 6, 1891, 51,280 males and 213 females; yearly average of the number of lunatics admitted during the five years 1894-8, thirty-four; ratio (per 10,000) of the yearly average number of lunatics to the whole population in the group, 6·6; carpenters and joiners, 220,661 males, 348 females; ratio (per 10,000) of the yearly average number of lunatics to the whole population in the group, 8·7.

The Westminster Improvement Scheme.

THE following brief summary of the history and the present position of the Westminster Improvement scheme is given in that portion of the address of the Chairman of the County Council which deals with the work of the Improvements Committee:—"A syndicate of money-making individuals conceived the idea that by pulling down all the poor property between the House of Lords and Lambeth Bridge, and erecting in its place lofty sets of offices and residential flats right up to the water's edge, a considerable profit would be realised. They accordingly sought powers of compulsory purchase in the session of 1898, and obtained so great promise of support in the House of Commons that there was grave danger of this scheme being carried, and the Thames Embankment and the vicinity of the Houses of Parliament being ruined for ever. In this difficulty the Council was driven to declare that if Parliament would withhold its sanction to the bill the Council would in the near future deal with the matter itself, and on the strength of this offer the Syndicate's Bill was rejected. Thereupon the Council in the ensuing session found itself morally bound to promote a scheme for the purpose of rebuilding this particular area, and, as might be expected, when the scheme came to be elaborated upon the only lines upon which the Improvements Committee could see their way to execute the work so as to provide the requisite embankment and open space which alone would command public approbation, they found that, instead of there being a prospect of the handsome profit anticipated by the syndicate, there would be, after allowing for the sale or leasing of the land, a net loss on the transaction of some 530,000*l.* This consideration, however, did not deter the Improvements Committee from recommending the execution of the project, and the Council assented to their demands. The danger of Parliament allowing a syndicate to play havoc with the embankment was felt to be so imminent that the Council was of opinion that an expenditure of half a million would be justified by the public as the price of its freedom from the clutches of private enterprise. It is not for me to say how far I think this opinion was correct. I am only recording facts. First, the fact that a syndicate forced the hand of the Council; secondly, the fact that the House of Commons, in 1898, practically compelled the Council to undertake this improvement; and, thirdly, the fact that her Majesty's Government have made no money contribution whatever towards the cost. And I may now add a fourth fact, namely, that the Bill has become an Act of Parliament, but with a new and more expensive plan forced upon us by the Committee of the Lords, which will involve an additional charge upon the ratepayer of a sum variously estimated at between 50,000*l.* and 100,000*l.* The total net cost will accordingly be something approaching 600,000*l.*, of which the Council bears five-sixths and the new City of Westminster one-sixth."

Architectural Association Discussion Section.

THE Discussion Section of the Architectural Association opens on Friday evening this week with a paper by Mr. Geoffrey Lucas on the suggestive subject "Logical Building and its Influence on Design." Mr. C. H. Strange is the chairman, and Mr. H. H. Statham is the special visitor for the evening. In connexion with the subject we may take the opportunity of making it quite clear that the chairman, Mr. Strange, is *not*, and is no connexion of, the person of the same name and initials, and living, like himself, at Tunbridge Wells, who was defendant in a "breach of promise" case a few days ago. Mr. Strange's friends will sympathise with him in respect of the annoyance he may have experienced from this unfortunate identity of name and residence.

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

III.—THE CRITERIA (*concluded*).

THE fourth in the list of criteria given above, that of openings, must be employed with the same caution as the rest, for even the most characteristic form of opening, the double-splayed window, is, in one part of the country at any rate, an unsafe guide. There are some forms of opening claimed as marks of pre-Conquest origin that are really as much Norman as Saxon. One of these is the plain unrecessed chancel or tower arch on square jambs, without angle-shafts or mouldings, where the round head, sometimes set back on the jambs, springs from imposts square or chamfered, that are sometimes returned along one or both of the faces of the wall. Some of these, as at Corbridge, Northumberland, and perhaps Escomb, Durham, are actually Roman arches re-used, while others are almost certainly Norman. In his "Notes on the Churches of Derbyshire" Dr. Cox is inclined to claim arches of the kind, such as those at Sawley, Marston Montgomery, &c., as pre-Conquest features, but it is only safe to do this when there is pronounced Saxon character in the masonry. If the stones of the jambs and the voussoirs run through the whole thickness of the wall the work is almost certainly Saxon, and this presumption is still further increased if the jambs are lined with large upright slabs alternating with horizontal binding pieces after the fashion of long-and-short work. On the other hand, if jambs and arch are constructed with facing stones and rubble filling, as for example at Stainton-by-Tickhill, Yorks (fig. 5), the presumption is in favour of a Norman origin, though there may be Saxon jambs, as at Stow, Lincolnshire, that are built without through-stones. There are more than forty examples of these plain arches in the list.

Another form of opening of neutral character is the small narrow round-headed window, widely splayed internally, and often with the outer head cut out of a single stone. The external opening may have a sharp arris, or may be chamfered, or may have a rebate all round for a wooden shutter. Such an opening can be Saxon, but is more generally Norman, and the former ascription can only be allowed when some special features are present. The most decisive of these is the sloping jamb,

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This inclination of the jambs, so as to widen an opening in the lower part, is alien to Norman practice, and is a characteristic of Celtic stone building. In England the peculiarity is not confined to the earliest structures which might be assumed to be under direct Irish influence, but occurs in work that must be late in the Saxon period. The masonry of the jambs of a plain round-headed window may betoken a Saxon hand, as is the case in some early examples in county Durham. The opening with a triangular head, formed by two stone slabs meeting at an angle, as in the numerous examples in the east walls of early towers over the tower arch, has a more decidedly Saxon character; there are, however, Norman as well as Roman examples of the feature. The flat lintel forming a square-headed door or window is not confined to Saxon buildings.

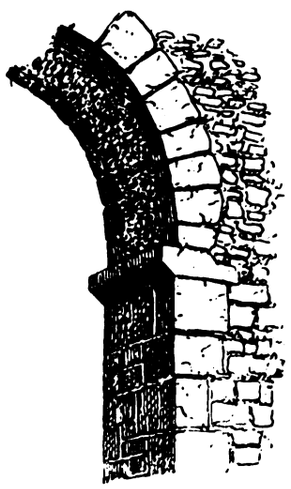

Fig. 5.—Chancel Arch at Stainton-by-Tickhill, Yorkshire. Norman Type.

Passing on to openings that in their general form and character are not neutral but of decidedly Saxon type, there may be mentioned first the round-headed windows cut after Roman and Early Christian fashion, straight through the wall without any splay. Such windows survive in the clearstory at Brixworth and the western face of the porch at Monkwearmouth. To be carefully distinguished from such windows are the openings of similar form in so many pre-Conquest towers, that are really *doorways*, though it is not always easy to see whither they led. Earls Barton tower has one of these high up on its southern face. On the probable use of such means of access Mr. Micklethwaite's already quoted paper is to be consulted. Of distinctly native and non-Norman character are window apertures of a keyhole shape, with vertical or sloping jambs, that are mostly found in the Lincolnshire towers.

Next may be noticed double belfry openings in towers, so abundant in Lincolnshire and other eastern regions, where a mid-wall shaft is employed. Such openings with a division in the middle are always cut straight through the walls. They may occur in towers of post-Conquest date, but they are of distinct Saxon character. They represent one of four methods in which the wall between two arched openings is sustained by bringing the weight down upon a central shaft or shafts. The earliest method in point of date is to double the shafts, placing one behind the other, so that their two capitals support the whole extent of the load. This occurs in Early Christian work in Italy. The device of corbelling out the capital of a single shaft till its abacus corresponds in length to the thickness of the wall is also Italian, while the same thing is common in German Romanesque. The third method is recessing, and this, which occurs in Advanced Romanesque architecture generally, is specially favoured by the Normans. The fourth method, which may be found in use in various parts of the Continent, is represented in our Lincolnshire towers, and in some other openings of certainly pre-Conquest date, and consists in making the shaft, with or without a capital, support a stone slab, or "through-stone," which is long enough to take the whole thickness of the wall. There are exceptional cases in Saxon work of the employment of the first method of doubling the supports in the direction of the thickness of the wall (belfry stage at Earls Barton), and of using a corbel capital (Sompting, Sussex),* but in nearly every case the single mid-wall shaft and through-stone are employed. How alien this was to the practice of the Norman builders is shown by the awkward shifts they were sometimes put to when they tried to deal with double openings that were not recessed. There are corbel caps in the Early Norman tower at Jarrow-on-Tyne and in the Late Saxon tower at Bolam, Northumberland, but in the superb Norman tower at Eaton Bishop, Herefordshire, the shaft with the two small arches it divides is pushed forward to the outer face of the wall, while behind this sort of frontispiece the whole width of the double opening is spanned by a single arch of ordinary construction. It is really a single opening with a pretended subdivision. The same thing is done more clumsily at Burwash, Sussex, and Tugby, Leicestershire. The through-stone arrangement is, accordingly, an important Saxon criterion, though, like almost every other, it must be employed with caution. For the sake of brevity, in what follows this arrangement is referred to by the summary expression, "mid-wall work."

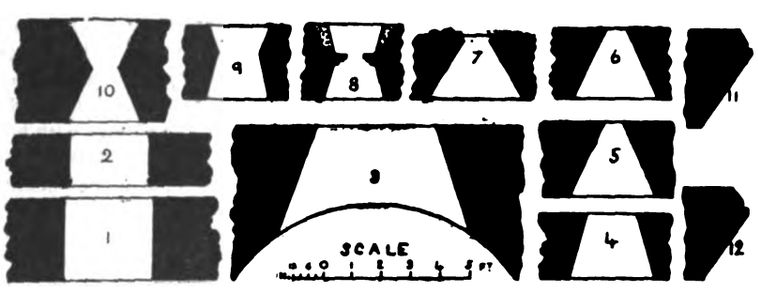

Fig. 6.—Comparative Plans of Window Openings.

1. Clearstory at Brixworth.
2. West Wall of Porch, Monkwearmouth.
3. Splayed Roman at Cilernum, on the North Tyne.
4. West Wall of Church, Monkwearmouth.
5. Killiney Church, Ireland.
6. Chancel at West Hampnett, Sussex.
7. St. Martin, Wareham.
8. Boarhunt, Hants.
9. Barton-on-Humber—western adjunct.
10. Tower Light, Howe, Norfolk.
11 and 12. Ledbury, Herefordshire, and Overbury, Worcestershire (not drawn to scale).

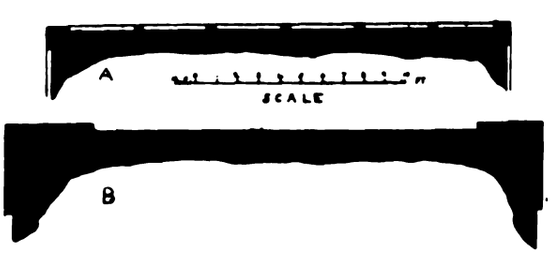

Fig 10.

A. Southern Face of Earls Barton Tower: Plan of Saxon Pilaster-Strips.
B. Western Face of West Malling Church Tower, Kent, with Norman Corner Buttresses.

Double-splayed windows are very often referred to as definite indications of early date. They are both round-headed and circular, the latter occurring most abundantly in East Anglia. It is pressing too far the evidence they afford when they are made to fix a pre-Conquest date for the western wall of the cloisters at Norwich,† which on many grounds should be regarded as early Norman, and this shows that they cannot be made an absolute criterion of Saxon or non-Saxon. We shall be justified, however, in looking on any examples of their use in post-Norman times as a survival, for the Norman builders never seem to have used them in their own country.‡ The central aperture in these double-splayed windows is often cut in a thin stone slab or wooden board. Slabs and boards of the kind are interesting survivals of an early Christian tradition. Specimens in wood remain from Saxon times in the round-headed window south of the tower at Steventon, Beds, and in circular openings at Barton-on-Humber, where the actual apertures for light are a series of round holes, about ¾ in. in diameter, pierced in the board. At Langford, Oxfordshire, the stone mid-wall slabs of double-splayed windows are cut into the curious keyhole form. The mid-wall slab is cut into an aperture forming a cross at Earls Barton, and at East Lexham, Norfolk.

The question of the double-splayed window is complicated by the fact that in some walls, in all probability of Norman date, there occur openings which show a wide and deep inner splay, and a much shallower outer one, which yet is more than the chamfer of the outer arris of the common internally-splayed light. At Overbury, in Worcestershire, and Ledbury, Herefordshire, there are respectively round-headed and circular windows of this type in walls cut through below with Late Norman arcades. Turvey, Beds, exhibits something of the same kind. Genuine Saxon doubled-splayed windows, as at Barton-on-Humber and at Corbridge, Northumberland, may have their outer splay shallower than the inner, but the difference is not nearly so marked as in the instances just noted. The outer splay in the Ledbury windows might conceivably represent either a shrinkage of the genuine Saxon outer splay, or a development of that chamfer of the outer arris which is common in Norman work. Fig. 6 exhibits the plans of specimens of various window openings, and may be found useful for purposes of comparison.

In regard to the position of openings, it may be remarked that Saxon church doors were very commonly in the north and south walls of the nave. This makes a point of distinction between Saxon churches and those of Ireland, where the western door is almost invariable. Lord Dunraven stated that he only knew of three examples of the south door in ancient Irish churches.*

5. Under the general heading, "Features and Details," may be included the following:—

(*a*) Recessing, with the use of angle shafts and soffit-shafts. Recessing is a development of the core-and-facing technique and is alien to the simpler Saxon practice, but pre-Conquest architecture does not exclude it. The tower arch at St. Mary Bishophill junior, York; the tower (formerly chancel) arch at Broughton, Lincolnshire; the chancel arch at Kirk Hammerton, Yorkshire, are recessed, but are of pre-Conquest character. The recessed western door at Kirkdale, Yorks, is of known pre-Conquest date. There are angle shafts at Broughton and Bosham, Sussex, as well as in some external doorways, as at Kirk Hammerton and Wharram-le-Street, in Yorkshire. Soffit shafts occur in the certainly pre-Conquest churches of Sompting and Bosham, Sussex, and are, or were, to be seen at St. Martin, Wareham, Dorset; St. Botolph, Sussex; and Carlton-in-Lindrick, Notts. They are generally built in courses, but monoliths occur, as at Broughton. Their capitals and bases will be noticed presently.

(*b*) String-courses, plinths, and mouldings. It is not possible to draw a distinction in kind between these features in Saxon and in Norman work, though the Saxon handling of them is comparatively crude, tentative, and illogical. Horizontal string-courses occur commonly on the towers, and at times, as at Worth, Sussex, and Bradford-on-Avon, on the lateral walls. They are square in section or chamfered. One of them on Earls

* An exceptional treatment of a double opening in the east wall of the nave at Wing, Bucks, was illustrated in the *Builder* for December 3, 1898, p. 499, fig. 15. It seems due to an alteration.

† "Norfolk Archæology," Vol. viii.

‡ Dehio and Von Bezold, "Kirkliche Baukunst des Abendlandes," i., 695, after describing the single and double splayed windows, make this somewhat sweeping statement:—"The two kinds are sundered by fixed geographical limits, and each allows of hardly any exception within its own boundaries. The double splay obtains in Germany with Upper Italy and Burgundy, the single is found in the rest of Italy and Gaul (Northern France hesitates) as well as in Spain and England."

* "Notes on Irish Architecture." London: 1875. ii., 26.

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Barton tower has a hollow chamfer. A plinth, square in section or chamfered, and sometimes in two stages, is not uncommon at the foot of Saxon walls and towers. In the example at Barholme, Lincolnshire, which there is reason to reckon pre-Conquest, the profile is more elaborate, and includes an undeveloped roll. Around openings the large roll moulding occurs as well as small rolls close together, forming a sort of reeding, as at Bradford-on-Avon, and Bolney, Sussex. Nicks or grooves are also in favour, but we do not find those systematic compositions of rolls and hollows, accentuated by fillets and quirks, which are exhibited round Early Norman door or window openings. Perhaps the most advanced specimens of such a group of mouldings in buildings of pre-Conquest pretensions are to be found at Iver, Bucks, and Stopham, Sussex. These will be illustrated in the sequel. The cornice surmounting the walls of the crypt at Repton, which is earlier than the responds and vaulting, has an enriched profile.

(*c*) Columns, including shafts, capitals, and bases. Of these the following classes may be noticed :—1, Baluster shafts, generally without capitals and bases ; 2, small shafts, with or without capitals, that occur commonly in belfry openings of towers of the Lincolnshire type. These two classes may be passed over here, as they have been recently illustrated in the *Builder** ; but it may be noted that the baluster has undoubtedly Roman affinities, though at the other side it occurs both in the banded and the bulging form in Norman structures, as at Newhaven, Sussex, the west front of Tewkesbury, and at Lindisfarne. Here we will confine our attention to Class 3, columns proper as constructive features of buildings.

The subject of Saxon columns is one of some importance, in view of the theory that the use of large round piers of columnar shape in English-Norman architecture is due to a traditional familiarity with this feature on the part of Saxon builders. As a matter of fact, notices of the employment of such columns in pre-Conquest buildings, as well as actual examples, are singularly hard to find. Wilfrid used columns in the seventh century in his churches at Hexham and Ripon, and in the former case, no doubt, he derived them from the Roman stations on the Wall. The neighbouring mediæval churches of Lanchester and Chollerton possess Roman monolithic shafts in their arcades, and it is conceivable that they are Wilfrid's shafts re-used. The church built by Archbishop Albert at York in the eighth century was also *solidis suffulta columnis*, but we hear nothing of columns in connexion with the later work at Winchester in the tenth century, or at Canterbury.†

Of columns proper actually in use as supports in Saxon structures there are the four in the crypt at Repton, which have twisted monolithic shafts, round discs for bases, like those of Egyptian columns, and square capitals rudely chamfered off to fit the top of the shafts. Besides these there are preserved in the porch of Repton Church two shafts built up of drums with similar capitals, that may have stood originally in the opening between nave and transept. These are obviously, like the crypt, late in the style. The only other examples that can be referred to are the two well-known columns from Reculver Church, which, with their bases and capitals, stand now in the garden to the north of Canterbury Cathedral. These must be either Roman or Early Saxon. Mr. G. E. Fox considers that they are probably Saxon imitations of Roman work ;‡ but considering the limited technical capabilities of the Saxon builders, it is highly improbable that they could have executed such careful work on so large a scale, for the columns are more than 16 ft. high, and the shaft is everywhere within an inch of 7 ft. in circumference. The absence of tapering and entasis is immaterial, for the Roman shafts in the North already mentioned are also devoid of these refinements. It is true that no exact Roman parallel can be quoted to the form of the caps and bases, and that they both look barbarous beside the Attic base of the Roman shaft to be seen at St. Pancras, Canterbury, in a position corresponding to that once occupied by these columns at Reculver. If we assume, however, that the capitals were intended to receive enrichments in gilded bronze there is nothing unclassical about them or the bases, while they certainly have no Saxon affinities. The under-cutting of the lowest member of the neck-moulding should in this connexion not be overlooked, as there is no Saxon parallel. If these columns are to retain their old repute as Roman productions, we are left with the Repton examples as the sole monumental evidence for the supposed predilection of the Saxon builders for this feature. There is no Saxon columned basilica like the Mauritius-Kirche, near Hildesheim in Germany. See fig. 7.

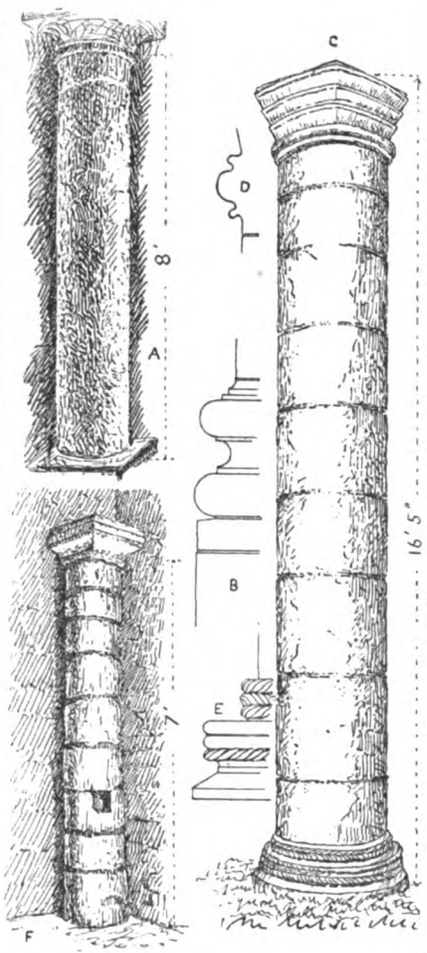

Fig. 7.—Roman and Saxon Columns.

A. Roman Monolithic Shaft in Chollerton Church, Northumberland.
B. Base of Roman Column in Church of St. Pancras Canterbury
C. Column from Reculver Church. D. Necking to Capital. E. Base.
F. Column in Repton Porch, Derbyshire.

A collection of Saxon capitals and bases may be made from the belfry openings in the towers, and with these, already illustrated sufficiently in the *Builder*, may be associated some crudely-shaped cubical caps on the angle shafts in recessed arches. The origin of these must be sought in German rather than in Norman models. The cap of the soffit shaft at Sompting (fig. 8) is unique and interesting. A word may be added about a form of base, not uncommon in Early Norman work, which has sometimes been claimed as Saxon. This is the so-called bulbous base, which can also be used, as in the slype at Worcester, as a capital. It occurs in the belfry opening of the pre-Conquest tower at Dunham Magna, Norfolk, but in almost every other case we find it in a Norman connexion. It is occasionally met with in the Duchy.

(*d*) Imposts, on the piers of chancel and tower arches and in the form of through-stones in belfry openings, are common and at times characteristic features. The plain square, or the more usual chamfer, is equally well represented in Norman and even in Roman work. The hollow and the quirked chamfer introduce varieties. The former does occur as an unimpeachable pre-Conquest feature in the window in the east wall of the nave at Wing, Bucks, and appears in the chancel at Deerhurst and the belfry at St. Peter-at-Gowts, Lincoln. It occurs, too, on one of the string-courses at Earls Barton tower. Of the quirked chamfer the writer knows of no instance in work that is certainly Saxon, and the examples of it in towers of the "Lincolnshire" type may be

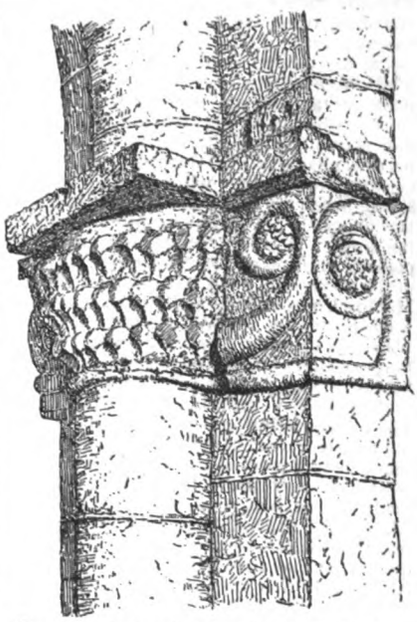

Fig. 8. Impost and Cap of Soffit Shaft, Tower Arch, Sompting.

due to a Norman chisel. On the other hand, imposts in the form of huge trapezoidal blocks, as at Wittering, Northants, and Market Overton, Rutland, are unmistakably Saxon, as likewise those apparently formed of superimposed slabs (Barnack, Northants ; Miserden, Gloucestershire). Moulded imposts must be judged by the character of the work and its surroundings. A few specimens are given in fig. 9. That at

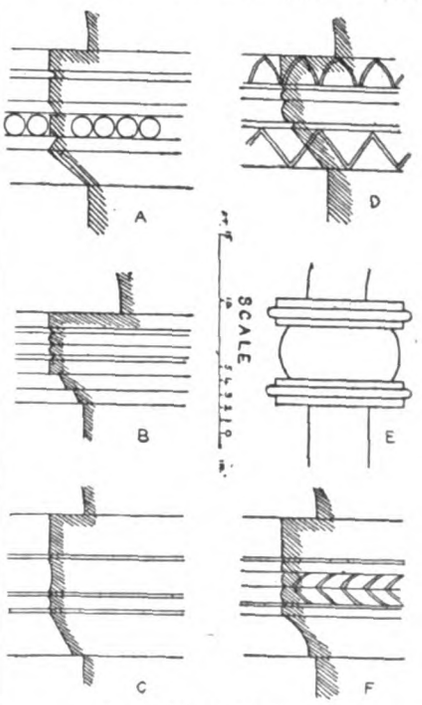

Fig. 9. Moulded Imposts.

A. Coln Rogers, Gloucestershire : Chancel Arch.
B. Howe, Norfolk : Tower Arch.
C. Deerhurst Chapel : Chancel Arch.
D. Pattishall, Northants : Chancel Arch.
E. Corhampton, Hants : North Door of Nave.
F. Daglingworth, Gloucestershire : South Door of Nave.

Corhampton (*e*) from the blocked north door of the nave is, on a small scale, like the grand impost of the tower arch at St. Benet's, Cambridge. Deerhurst Chapel (*c*) exhibits the timid Saxon grooving. The other examples are more advanced, but even that at Coln Rogers, Gloucestershire (*a*), is in Saxon surroundings, and the arch and jambs are constructed with through-stones.

(*e*) Buttresses and pilasters. These supply us with the best of all the criteria under con-

* August 6, 1898, and December 3, 1898.
† See the "Winchester" Volume of the Archæological Institute, 1845, and "Canterbury Cathedral," Lond., 1845, both by Prof. Willis.
‡ *Archæological Journal*, liii., p. 355

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sideration. It is a safe general principle that Saxon walls are unbuttressed while Norman builders favour this feature, but there are numerous exceptions that must not be ignored. Thus the earliest churches at Canterbury, St. Martin (chancel) and St. Pancras, possess buttresses coeval with the fabrics, and such occur, too, at the corners of the apse at Brixworth, while there are plenty of unbuttressed Norman walls, as at Abinger, Surrey; Kippax, Yorkshire; Gillingham, Norfolk, &c. The distinction shows itself in the use by the Saxons of narrow pilaster strips, decorative rather than constructive in intent, while Norman walls are strengthened by broad but shallow buttresses that appear first, if anywhere, at the corners of buildings. It is instructive to compare the plans of the faces of two characteristic examples of the styles—the Early Norman tower of West Malling Church, Kent, and the Saxon tower of Earls Barton (fig. 10) What appear in the latter plan like clasping corner buttresses are really long-and-short work quoins, in which the "short" pieces are not cut back for plaster, so that in elevation there is no pilaster-like effect. The pilaster strips on the face of the wall are quite independent of the quoins, though when the quoining stones are cut back and the plaster brought up to the vertical edge thus made, as at Barton-on-Humber, the quoins present the appearance of pilasters. Regarding the pilaster strips as independent of the quoins, we may note about them the following. At Earls Barton they measure only 4 in. in width, and in general are not more than 6 or 7 in. across. They are usually built with long upright stones and "short" or bonding pieces alternately, but sometimes with small stones. They start either from a plinth, sometimes with a step-like footing, as at Bradford-on-Avon, or else, as at Stanton Lacy, Shropshire, from projecting corbels, and end at times under a horizontal string-course either abruptly or with an enriched heading as at Langford, Oxon. Strips half-round in section occur on the tower at Sompting.

At Earls Barton, Wing, &c., they are joined at the top by round or triangular-headed arches; and at Repton, Corhampton, and elsewhere they run up under the eaves, but curve out a little on each side at the top as if to prepare for the springing of arches. At Stanton Lacy they end abruptly at different levels on the wall in a puzzling manner. One notable peculiarity here and at Corhampton and Barholme, Lincolnshire, is that a strip ascends the wall directly above a lateral doorway. Strips of the kind, usually square, but occasionally semi-circular in section, are also often used to surround doorways (Middleton-by-Pickering, Yorks), or belfry openings (Monkwearmouth and the Tyneside Saxon towers), or chancel and tower arches (Corhampton, Skipwith, Yorks); and this treatment, which may be compendiously termed "strip-work," is a distinct pre-Conquest symptom. It is worth while giving some special attention to this feature, because it is the only one which is a really unfailing test of pre-Conquest work—at least the writer knows of no instance in which a true narrow pilaster-strip is found on work that is non-Saxon. At the same time it must be granted that there are transitional forms in which the pilasters become wider, as at Langford, or clasp the corners, as at Tichborne, Hants. In both these cases these bastard Saxon pilasters are, however, connected with double-splayed windows, which go far to vindicate the pre-Conquest character of the walls in question.

6. It is not practicable to enter into the subjects embraced under the heading of ornament, for they could only be treated fittingly in connexion with the carving on Saxon tombstones and crosses, and the designs on Saxon coins. There are no criteria of style to distinguish Saxon from Early Norman figure and animal carving, but local setting and special details enable us to claim as Saxon, *inter alia*, the figure carving at Monkwearmouth, Hexham, Bradford-on-Avon, and Daglingworth; the mutilated roods at Headbourne Worthy, and Breamore, Hants, and Bibury, Gloucestershire, as well as fragments of animal forms at Monkwearmouth, Deerhurst, St. Benet, Cambridge, &c.

Apart from figure and animal carving, it is now recognised that interlacing work is no sure test of pre-Conquest origin: and the date of foliage and vine scrolls, which occur in Christian art of almost every period, is hard to fix. The scroll-work on the jambs at Britford, Wilts, is certainly Saxon, but that on the south door at Ledsham, Yorkshire, may seem to some more doubtful. It is uncertain whether, in the present state of our knowledge, either figure, animal, foliage, or geometrical ornament, can in itself be used as a test of pre-Conquest date. For rudeness, at any rate, Early Norman carving can be found to match anything ever perpetrated in other styles. The ornament called sometimes the "horn-butter-spoon" is really a variety of the enrichment formed by rows of upright leaves which has been in use from Assyrian days. It is not observable in Norman work on the Continent, and may be regarded as in character Late Saxon, though the archivolt of the tower arch at Stow, where it occurs, looks like an Early Norman erection on the Late Saxon jambs.

LETTER FROM PARIS.

Among the innumerable congresses for which the Exhibition has furnished occasion, that of "Art Public" has been one of the most interesting, and may prove the most productive in practical results. It was organised with the support of the Paris Municipality, and set itself to consider the whole question of what may be called the æsthetic of cities, and to lay the foundations for an International understanding for checking the effects either of official vandalism, or of the ignorance or indifference of private owners, in regard to all relics which are of historic value and importance. A special point worth mention is that a resolution was passed recommending that every Government should safeguard the monuments of the past by an enactment, with penal clauses to be put in force on its violation. The Congress contemplated also that such legislation should extend to the preservation, in special cases, of the general grouping and character of an ancient city, so as to prevent, for instance, such a destructive work in this respect as the Municipality of Avignon are carrying out, and to preserve intact such remains of ancient cities as are represented by the older portions of Carcasonne.

In considering also the subject of ill-advised restorations, by which the value of ancient monuments is too often destroyed under the pretence of preserving them, the Congress recommended that the greatest prudence should be practised in operations of this kind, and that in place of the often valueless restorations (*restitutions*) of such monuments, operations should be confined to simply consolidating them against further decay, with care to select, in doing this, the materials or processes most likely to be durable. Also, whenever there seems to be an unavoidable necessity to remove an ancient building, the Congress recommends that careful photographs should be taken of the building and its surroundings; and the same in the case of any unavoidable repair which might alter its original appearance. Recalling a resolution passed at the Congress at Brussels, they have also called upon public authorities to take measures to check the continually increasing disfigurement of streets and buildings by commercial advertisements. The Congress of Public Art has worked hard, and its recommendations are important, and it has had at all events the effect of leading to the formation, in Paris, of a committee to endeavour to promote the carrying out of the objects aimed at, and which will remain in office until (or unless) the hoped-for international legislation is realised.

M. Bonnat, Conseil des Musées, has presented to the Minister of Fine Arts his annual Report, in which he again draws attention to the necessity of securing our art treasures from danger of fire. The Government seems at last disposed to listen to these repeated demands and to withdraw the Ministry of the Colonies from its quarters in the Pavillon de Flore, which will then be entirely given up to the Louvre Museum.

It seems to be now officially decided that the Exhibition will be definitely closed on November 5, and they are already considering what is to be done with the different establishments comprised in it. Naturally the ephemeral structures of the Esplanade des Invalides will disappear, to give place to a large square connected with the Champs Elysées by the Pont Alexandre III. The palaces of the Rue des Nations and the buildings of the Rue de Paris and the Trocadéro will also be demolished, as well as the galleries on each side of the Champ de Mars. It is not known yet whether the Municipal Council will preserve the Galerie des Machines for future use. Perhaps it will be decided to suppress this immense edifice in order to leave the façade of the Ecole Militaire, the work of the architect Gabriel, to take its place as before at the extremity of the Champ de Mars, which will also become a public square. The palaces on the Champs Elysées will, of course, remain; the Large Palace for exhibitions and State celebrations, while the Small Palace will form the Municipal Luxembourg, and the gardens formed around them for the Exhibition will be preserved and prolonged to the Pont de l'Alma. The Municipality propose also to preserve for horticultural exhibition the great conservatories built on the Cours la Reine. The so-called Porte Monumentale, which is so much out of keeping with the general character of the Place de la Concorde, will be demolished.

The chapel in the Rue Jean Goujon, just completed, will contain fourteen commemorative monuments, among which we may mention especially that designed by M. Pascal in memory of the daughters of the Comte de Chevilly, who both perished in the Bazaar fire. This monument, which is very simple but very expressive, consists of a basement with two pilasters, and adorned with shields bearing the dates, and having in the centre a console, surmounted by the head of an angel. Over this is a kind of altar table, on which is a cover with panels, decorated with bas-reliefs and armorial bearings. The whole is crowned by a cross, at the foot of which are seen two doves.

It appears that the grand banquet recently offered by the Government to 22,000 mayors is to be commemorated both by the painter and the medallist. M. Roll has been commissioned to paint an immense picture of the scene, which is intended for the Museum at Versailles. M. Vernon is to execute a commemorative medal of the fête. Another medal, in commemoration of the opening of the Great Exhibition, has been commissioned from M Naudé.

M. Jules Machard, a painter of considerable merit, has died at the age of sixty-one. He studied at the Ecole des Beaux-Arts under the direction of Signol and Hébert, and, like all the pupils of the Ecole, painted a great many mythological subjects. He gained the Prix de Rome in 1865, and medals at various exhibitions. Among his principal works may be mentioned "Narcisse à la Source," which is in the Museum of Chartres, "Psyche Rendue à la Mort," and "Le Passage de Venus devant le Soleil." For a long time past, however, he had devoted himself to portraits of ladies, in which he showed great delicacy of style and execution, though in his later years this quality had degenerated into a certain weakness and over-refinement, and his earlier works will remain his best title to reputation.

THE ARCHITECTURAL ASSOCIATION:

OPENING MEETING OF SESSION.

The first ordinary fortnightly meeting of Session 1900-1901 of the Architectural Association was held on Friday evening last week in the Meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, W., Mr. W. H. Seth-Smith, President, in the chair.

The minutes of the last meeting having been read and confirmed,

Mr. G. H. Fellowes Prynne, past President, moved the adoption of the committee's report and balance-sheet for Session 1899-1900. The past Session had been a very successful one to the Association. The membership had steadily increased, and the attendance at the ordinary general meetings had been more satisfactory, while some of the discussions had been very valuable. Financially, the Association stands on a sound footing. The nett increase of members at the end of last Session was sixty-one, and the total membership at that time was 1,308. Eighty-nine new members were elected, ten members rejoined, and the losses by death, resignation, &c., amounted to forty-three. The new common room has been well used by members and students, especially during the evenings. The Sub-Committee appointed last Session for the purpose of compiling a list of buildings and monuments of interest in London and the provinces has been considerably augmented, and "Consuls" have been nominated to fifty-five London districts. These gentlemen are now engaged in the compilation of the lists, so

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far as the Metropolis is concerned, the provincial districts being deferred until progress has been made in London. The Register of Assistants has been even more largely used than hitherto, and has again fully proved its usefulness both to architects and assistants. The registration fee to non-members has been increased to half-a-crown.

Professor R. Elsey Smith seconded the motion, which was agreed to.

On the motion of Mr. Hampden W. Pratt, Hon. Treasurer, seconded by Mr. Prynne, a vote of thanks to the hon. auditors, Messrs. W. E. Davis and E. Greenop, was agreed to.

The President then proposed a vote of thanks to the Royal Institute of British Architects for the ninth annual grant of 100*l.* towards the educational scheme of the Association. The grant was of great help to the Association in its work.

The motion having been heartily agreed to,

Mr. G. H. Norman was elected a member.

Mr. G. B. Carvill, Hon. Secretary, having announced some donations to the Library, said he had to propose a vote of thanks to Mr. Samuel Gardner, of Harrow, for a valuable donation of photographs illustrating English architecture. The photographs are now on view at No. 56, Great Marlborough-street, and special cases have been made for them.

Prize List.

The vote of thanks having been ageed to,

The President distributed the prizes, medals, and certificates gained during the past session. The following is the list of successful students:

A. A. Travelling Studentship, value 25*l.*, and silver medal, C. H. F. Comyn; A. A. Medal and Ten Guineas, S. Towse, Hon. Mention, J. E. Forbes; A. A. Essay Prize, J. Maclaren Ross; Architectural Union Company's Prize, value 10*l.*, P. J. Turner; The Banister Fletcher Bursary, value Twenty-five Guineas, and medal, A. Stratton; Andrew Oliver Prize, F. C. R. Palmer; Arthur Cates Scholarship, L. W. Ensor.

Lectures, Division 1.—C. M. Crickmer, Prize value one guinea, and Scholarship value three guineas.

Lectures, Division 2.—T. Bee, Prize value two guineas.

Studio, Division 1.—M. Skinner, Prize value one guinea; S. H. Goodwin, Prize value 7s. 6d., and Certificate.

Studio, Division 2.—A. A. Carder, Prize value two guineas.

Lectures, Division 1 (Book Prizes).—Greek and Roman Orders, S. V. North; Elementary Construction, C. M. Crickmer; English Architecture, C. M. Crickmer; Mediæval and Renaissance, C. M. Crickmer; Elementary Physics, L. W. Ensor; Plane and Solid Geometery, L. W. Ensor.

Lectures, Division 2 (Book Prizes).—Materials, C. H. Gage; Construction, T. Bee.

Elementary Class of Design.—Prize, value three guineas and Bronze Medal, A. Durst; Certificate, A. A. Carder; Hon. Mention, M. J. Dawson.

Advanced Class of Design.—Prize, value five guineas and Bronze Medal, H. M. Cautley; Certificate, J. E. Forbes; Hon. Mention, C. H. F. Comyn.

Extra Subject.—Mensuration and Land Surveying (Book Prize), H. E. Rider.

President's Address.

The President then delivered the following address:—

Fellow Members of the Architectural Association,—In one of Lord Rosebery's happy speeches, when receiving some civic distinction, he begins by saying that he was full of an uneasy feeling due to a sense of unworthiness which accompanied it. I assure you, gentlemen, I entertain that sentiment tonight when I thank you for the honour you have conferred on me by electing me to the chair.

My first word must be one of congratulation upon the prosperous condition of every department of our Association. We now number 1,291 members, and no one taking the trouble to read the annual report can fail to observe how great and varied is our work, how well it has been maintained, and how rapidly developed. There has been uninterrupted progress in the growth of our membership from the first. That prosperity during the past two years has been in no small degree due to the enthusiasm and unwearied exertions of the retiring President, Mr. Geo. H. Fellowes Prynne (ably assisted by the energetic Committee and other officers), who, during his term of office, notwithstanding his large practice, took the chair, not only at every general committee, and at all the ordinary meetings, but also at most of the innumerable sub-committees. His admirable epitome of the history of our educational work in the past as given in his first presidential address, relieves me of that difficult task. Such devotion forms a record surely even in the Architectural Association, to serve which nearly every well-known London architect, and many in the provinces, have cheerfully given so much time, thought, and experience. I hope the Association may before long be in a position to realise his workshop scheme. It is only want of space which has so far hampered what our students much need in this direction.

It is my duty to record our sense of loss in the death of six of our members during the past session.

On the whole, the students have shown commendable zeal by supporting all branches of our work, but it is necessary to warn some that no reading at home will make up for irregular attendance at the Studio and the classes. System is as essential to study as to practice, and must be adhered to if we are to become proficient. Our Registrar reports that when business is brisk in London he has no difficulty in finding a good berth for every well equipped young man when he emerges from the student stage, but the register contains too many who lack a knowledge of construction or the ability to design, and who realise too late their neglect of precious opportunities for making themselves competent assistants, and, in due course of time, capable architects. On the other hand I would advise those working in the classes not to slacken their home work or to relax their exertions as the session advances; some students commence with enthusiasm, but as the session progresses their earnestness appears to decrease.

Our School of Design offers the greatest attraction and the most unique opportunity for cultivating skill and taste. The subjects as you know are set, and the designs are criticised by, a large number of the most artistic and able architects in London; nor can I refrain from urging our students never to miss the spring or summer visits, by which we arrange to see the best old work as well as the most important buildings in progress of erection. Can anything be of greater value to all of us, old or young? The power of giving public expression to our thoughts and so of eliciting the ideasof other men is one to be cultivated by every young man, and members will find a fitting opportunity for this side of their education in our Discussion Section. They will at the same time be surprised at the amount of knowledge they derive from the debates. I scarcely think our "A.A. Sketch Book," in which the best-measured work of the members is published in quarterly parts, and which makes such a valuable book of reference in any architect's library, is sufficiently well known. We shall be glad if some of the members are disposed to encourage the energetic honorary editors, Messrs. W. A. Pite and W. G. B. Lewis, by subscribing to it this year. The library needs better support. Students should not be afraid of borrowing certain books on account of their large size. Perhaps many of our young men are too busy in their evenings to attend more frequently than they do the papers read to us by the best men on the various subjects selected. Let me say they little realise their loss every time one is missed. Such papers generally represent the experience of a lifetime compressed into an hour's discourse and given gratis. The generous way in which these Esaus part with their birthright to their hungry younger brethren often astonishes me. No greater compliment could have been paid us than that Mr. Florence, our senior delegate to the International Congress of Architects in Paris, was on one occasion called upon to occupy the chair of that distinguished assembly. It is also gratifying to note that twelve of the nineteen awards by the International Art Committee to English architects were made to members of the Architectural Association. Eleven of our members have served in the Transvaal War, and I regret to say that one of these volunteers lost his life there.

Gentlemen, we are entering upon the session which will see the commencement of the twentieth century. It is the privilege only of a very small minority of mankind to experience the emotions which such an occasion must inspire. To a much smaller number has it been given to review a century such as that to which we bid farewell. Shall we be safe in defining true progress as the increase of the sum of human comfort and happiness? If so, surely the past century has seen more progress not only than any previous hundred years, but perhaps than all previous centuries put together. The root of this progress has been the practical application of the central truth of Christianity, viz., the universal brotherhood of mankind, and from this root has sprung universal education, and to education may be attributed all the splendid achievements of modern science. But amid this phenominal activity in science, has art been asleep? or has she made any corresponding contribution to human happiness? Has it been a century as fertile in the production of poetry, painting, sculpture, and architecture as in the discoveries and inventions of science? Perhaps not. This is an interesting inquiry, and my own belief is that the intellectual activity of the century has shown its influence in art, as well as in science, though not in the same degree. A century which has produced the great and essentially English water-colour school and such truly poetic schools as are best represented by Corot and Millet in France, and by some perhaps equally great Dutch and English artists, notably Turner, cannot be said to have been indifferent to art. Poetry and architecture, too, have been active enough in all conscience, even if wanting in concentration and consequent power. Music may be said to have triumphed; we are fast becoming a musical people.

The faculties and habits of mind which respectively develop science and create art are essentially different; the one class of mind is objective, the other subjective. The one is inquisitive, familiar, and practical in her friendship with Nature, the other is reverent and imaginative. The two classes of mind, both Nature's offspring and complements of one another, may be living their own lives side by side in an age in which the mind of the vast majority of men is centred upon science and its material benefits, but that age is in the nature of things unlikely equally to encourage, though it may pave the way for, the fine arts. Do not misunderstand me here. Art is not a rival of science, but it is a higher law regulating and a feeling pervading every invention. We are on different ground, however, directly we deal with the applied art of architecture. Here we shall find that science has always been the origin of its greatest departures. The arch and its multiform developments and resultant features are ancient witnesses to this truth. If we consider, moreover, the extent to which education and sanitary science have multiplied and specialised the buildings which we are now called upon to design, we shall recognise at once how enlarged are our functions, and how likely it is that the twentieth century will see still greater developments.

As regards monumental architecture, the imperious command of one great patron has given place to the more imperious directions of a co-operative body themselves merely fiduciaries of the will and purse of the community. But the wants of this co-operative community, if not so colossal, are infinitely more numerous and varied. They call for town halls, municipal offices, colleges, schools, polytechnics, hospitals, asylums, workhouses, electric lighting stations, baths and washhouses, and what-not. Surely, gentlemen, there is no room for disquietude as to the future of architectural practice if our training is equal to the demands of the public and if the policy of our profession is broad and well directed. All these are modern requirements, and show how really changed are the conditions of our work, how varied and how complicated that work has become, and how impossible it is to put the dial of time back, or to depreciate the influence of science. Why should we struggle to cast the mould of future architecture to the form of our own narrow and short-sighted prejudices? Our duty is clear and unmistakable, namely, to accept, and accept joyfully, the altered conditions of our age, and to do what our hand findeth to do in a spirit of devotion to the present and confidence in the future. Taking its origin in the knowledge of building construction, and inseparable from it, the essence of architecture is, nevertheless, beautiful design, design full of thought and feeling. This differentiates it entirely from mere construction, however rude or however scientific. This constitutes our art. Design is to building what religion is to life, what poetry is to language, the indefinable and spiritual, the changeless element, the one thing needful. It leaves the

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prose and business of our calling essentially what they were, every department of our buildings worthy of our close and vigilant care, but makes us conscious of a higher order of desire and affection that guides us through all these and lifts us above commercialism. The latter is the instinctive faculty common to all, the former (art) is the conscience. The man who has this spirit is alone the true architect, and the ideal society of architects would be one from which all others would be excluded. It is the decree of Providence, however, that both shall grow together in spite of our rough tests, which may, it is true, do much, but can never be infallible. We need not regard engineers or builders as serious rivals in our field so long as we are true to this ideal, and insist as far as practicable on its possession and its cultivation by every man who bears the title of architect.

Allow me to utter a note of warning to our students against pinning their faith exclusively to any of those schools of thought which lack the sense of proportion and tend just now to lead us away from the broader fields of systematic study, schools which on the one side insist that we should be content to be craftsmen and builders, and, on the other hand, appear to regard draughtsmanship and design as the be-all and end-all of an architect's training. None can know too much of construction, none can draw too well, but bear in mind Sir Joshua Reynolds' remark: "How difficult it is for the artist who possesses this facility (of accurate and rigid declination) to guard against carelessness and commonplace invention is well known." How frequently we see this truth illustrated in Royal Academy pictures by the cleverest men.

Then there is the non-traditional school, insisting that we should divest our minds of the forms of past work and invent our own. All these schools have originated in the gross neglect of training in draughtsmanship in some, the equally egregious want of practical knowledge, or a slavish copying of ancient architecture, in others. They are each emphasising all important truths, and wherever great truths are enunciated, be they only a fraction of *the verities*, we should receive them gladly. As a matter of experience it will be found that the full truth lies somewhere between these extremes, and that the best architect will be both a wise and experienced builder and a good draughtsman and designer. If he be great enough to add archæology and other subjects he may be a happier man, but not necessarily a better architect.

It is not to be expected that many men should be equally strong on the scientific and artistic sides of our calling; nevertheless there is no excuse for the existence of two classes of architects which specially bring the profession into disrepute. On the one hand those who are grossly ignorant of structural work and confine themselves to the study of design from the artistic standpoint, and on the other hand the men who have technical knowledge, but who ignore architecture as an art. It is difficult to say which of these classes does the most harm.

The key-note of the best work of our younger men is enthusiastic love of beauty in form and colour (irrespective of the amount of remuneration its pursuit may bring), thought as to the capacities of the material in hand, and individuality in feeling. It is fearful of the pedantic and the commonplace, faults so often associated with too academic a training. Can we wish for a better spirit? Personally I have no fear of the future of English architecture on the score of pedantry. Our lithic language savours perhaps too broadly of our national characteristic, individual freedom. We are apt to forget how much our literature, and even our fine arts, owe to exotic sources. We can surely afford to be as tolerant professionally as we are nationally and imperially.

The antidote of academic uniformity lies in the study of nature. The man who keeps his mind in harmony with nature will have recorded, however unconsciously, the great principles underlying stability and composition everywhere observable in nature. These principles, violated as they so often are in our buildings, will be instinctively detected and condemned by a true artist, to whatever branch of art he may belong. An architect imbued with these principles will not advise his clients to erect a severely classic style of house in a very rural spot. He will select a more picturesque type as more harmonious with its surroundings. It is the withdrawal of all Nature's conditions and restrictions which makes a more formal and dignified style more suitable to city architecture. Of course, if your building approaches the scale of a palace, and the interval between it and unfettered nature can be disciplined by formal and architectural gardens, it is another thing. So far our sense of fitness has been so true that English country houses are renowned for their appropriateness to their environment. It is this contact with nature which, with her infinite variety appealling to the equally diverse character of the human mind, will preserve our individuality of taste. I submit that it is the neglect of this study in France which has done so much harm to its rural architecture. The French architectural school is one of exclusively civic and monumental artists. It is at home among man's creations, it appears to have no sympathy with the works of Nature. On the other hand, Mr. Warren in his paper read before the last annual convention of the American Institute of Architects, on the influence of the French school of design upon architecture in America, most justly commends this school for its insistence on composition, its excellence of proportion and mass, and its mastery of monumental planning. These points are admirably exemplified in the two new palaces in the Champs Elysées, and we shall do well to study them carefully. A notable feature of our people has always been to preserve a national character in all our institutions and in all our schools of art, while freely adopting such features of other systems as commended themselves to us. It has always been so with our architecture; it is so to-day; and this consideration warrants confidence that our architectural profession will not blindly follow any school, but evolve one of its own.

It is upon a wide basis that the Architectural Association curriculum has been founded and has worked so well. The better education of the profession is our mission. It is a mission which finds support and sympathy from every school of thought among us, and it may be safely said the Architectural Association has not an enemy, scarcely a critic. Our watchword has been—and will, I hope, ever be—*continuity of policy and progress with the times.* How are we fulfilling this mission? Our educational work is, as you know, conducted wholly in the evening; there are 200 students attending our courses, and about 200 more of our members may be said to be still in the student stage of their career. The characteristic of our Architectural Association seems to be, to use the pithy expression of a popular past-President, *the power to enthuse.* But enthusiasm, like others among the best of things, is a dangerous endowment unless well directed; it has led many a man to be impatient of that strenuous effort for the mastery of the prose of building which is so essential; but this patient and sometimes irksome work will alone give him a solid satisfaction, without which enthusiasm for art must wither and die in the failure of his practice. As to the need for the study of the history of design—a point much debated just now—I venture to reiterate the words of the reader of an able paper two sessions ago. Mr. Reginald Blomfield then said what I believe to be profoundly true, and I quote him because we all regard him as a good architect and because I cannot put the thought into better language:—

"In architecture, the oldest of the arts, we can only consider ourselves on safe ground so long as we keep in touch with what has actually been. The days of the craftsman working independently, yet in unconscious unison, ceased when the choice of styles arose. He tasted of the tree of knowledge, and henceforth to his knowledge of the craft had to be added the responsibility of conscious judgment if he was to undertake, I will not say architecture as it might be thought to beg the question, but building of any sort. Because, in any building nowadays, a man has to use one method of expression in preference to another, and implicitly in this there is raised the whole question of selection. Now this responsibility proved too much for the simple craftsman, as you may see from the blunders in design which abound in more ambitious Jacobean works; and it was only a question of time how soon there should arise the man who had sufficient training and intellectual capacity to enable him to discriminate between good and bad, to enable him to grasp the logical coherence in expression which is an essential element of architecture. As soon as such a man arose the matter was settled for good or bad. The architect ceased to be a craftsman in the technical sense, and what might be lost in craftsmanship was assuredly gained in architecture. I think, therefore, that this critical function of an architect, this detachment from the actual details of craftsmanship which chafes the enthusiasm of some of by no means the least gifted of our younger men, is of the very essence of his work. His craftsmanship must be of a wider range, it must embrace full knowledge of the past; it must rest on a constant habit of analysis of the best methods of expression in building."

One thing on which all who are experienced in the training of the human mind are agreed is that a good *general* education must precede special knowledge. This is an axiom which guides your committee in their educational work. It finds expression in the large number of subjects we provide, all of which we consider it of importance that every architect should be acquainted with. It is essential that our curriculum should aim to be comprehensive, to lay a good foundation of general architectural education which will fit men to adapt themselves as readily as possible to the special line they may wish, or be compelled to adopt. If your foundation is not sufficiently deep and wide, you will sooner or later show signs of settlement.

So much for our successful past, and hopeful present. I will now with your kind indulgence deal with what I am persuaded we ought at once to take in hand. I refer to the establishment of *day courses* of instruction, and I will give you reasons, which I think will commend themselves to you as indisputable. Not that I claim originality for this idea. It has, like almost every other subject which affects the profession, been discussed many times by your committee, but dismissed for the time being mainly on financial grounds.

In the first place, our system of pupilage—necessary and excellent as it is in principle—is still admittedly and radically faulty, from the standpoint both of the master and of the apprentice. The former is too busy to undertake the pupil's education; it is as much as he can do to give him the run of his office, to allow him to spoil material and waste his paid assistants' time in gleaning what knowledge he can. The latter finds himself irrevocably bound to serve at least three years, even if he discovers within the first few months that he has mistaken his vocation. A two years' full course of study in a *purely architectural college, controlled entirely by experienced architects*, would obviate both these objections to the present system without in the least endangering it, and I am sure that most architects in practice, and probably every Fellow of the Royal Institute of British Architects would, as an encouragement to a movement which would secure useful servants from the first, not only agree to accept a rather smaller premium, but probably also to a less lengthy apprenticeship. The pupil, on the other hand, would as a rule discover during his first two or three terms in such a school whether he was fitted for the work, and would be free to drop its further pursuit without loss of time or premium. It would be a truly advantageous arrangement to both parties.

Another cogent reason is that we already have the premises needed for a start, most of the apparatus and some of the staff, and that consequently we can run the school economically, and in about three years' time it ought to become a substantial source of revenue, enabling us to do what we have of late proved we cannot do on our present income, viz., build or rent premises to suit our ever-growing needs, and in a neighbourhood worthy of our position. If we fail to seize this opportunity others will certainly do the work which I believe to be the great mission of the Association. With the exception of the Victoria University at Liverpool, I believe King's College is the only institution in this country which has an architectural day school, but King's College architectural course appears to be a department of what is really an engineering school. May I here say how warmly we congratulate our late instructor in classic architecture, and present Vice-President, Mr. R. Elsey Smith, on his appointment as Professor of Architecture to that College. We should have no difficulty, I am sure, in obtaining guarantees of financial support for two or four years during which we must expect to make a loss. This was the method pursued so successfully in 1891 in launching the present curriculum.

Our standard of training is far behind that of other countries. The paragraph in Messrs. Florence and Balfour's report of the drawings exhibited at the Paris Exhibition is not flattering to our English pride. It reads thus:—

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"Your delegates could not help comparing the skilled design, the able execution, the artistic feeling, and patient care displayed in these drawings with the careless and slap-dash effects which seem to be sufficient for the student of the present day in England."

No man has done more for architectural education in this country than Mr. Arthur Cates, and his recent generous offer of 250*l.* towards a scheme, which unhappily fell through, for the rebuilding of our premises, is only one of many evidences that he is a true friend to this Association. Let me read you an extract from his very interesting and valuable article in the June number of the Royal Institute of British Architects' *Journal*, on "Architectural Education in the United States of America":—

"Attention has from time to time been invited to the great advance made in recent years throughout the United States in the organisation and development of a complete systematic course of architectural education. . . . In the late 'forties' and early 'fifties' many smart young architects went from London to the States, and there speedily attained to good and influential positions, prospering greatly; but as London did not afford any opportunity for sound systematic artistic education, the young American student did not come here for the instruction which he sought, but a steady stream of earnest aspirants flowed to Paris, where, in the ateliers of distinguished architects, and in the Ecole des Beaux-Arts, they found the instruction and guidance they desired. This special training of those who now occupy leading positions in the profession, and the developments which have followed the persistent teaching and exertions of Professor Ware, have so influenced the progress of education in the States that the student, if he has not already done so, may soon hope to find at home sources of instruction which will render the course in Paris less necessary, and even a comparatively superfluous luxury. It has even been suggested that at no distant period, the ambitious English student who may desire to prepare himself for the effective practice of architecture, and go through a complete course of technical and artistic training, may find it expedient to resort to one of the American Universities, and there obtain that thorough education which sluggish indifference of educational advancement, and blind adherence to the antiquated and effete system of pupilage, does not afford him here.

The Massachusetts Institute was opened in 1865. . . . For the department of architecture there is a special staff: of a professor of architecture, a professor of architectural design, two assistant professors, an instructor, a lady assistant, and a teacher and lecturer of design, the necessary instruction in other subjects, such as mechanical and freehand drawing, mathematics pure and applied, geometry, perspective, stereotomy, languages (French and German), business law and relations, and the other items of the curriculum, being given by other members of the professional staff. This architectural course aims to prepare the students not only for those years of work as subordinates, when accuracy, rapidity, and taste in drawing and design, with accurate knowledge of detail, will be most useful qualifications, but also for their subsequent independent career, when sound technical knowledge will be most important.

The full course extends over four years, the first being devoted to those preliminary studies which are essential to form a sound basis for the strictly professional course of the three succeeding years, in which the instruction comprises the study of construction and materials, of building processes and professional practice, of composition and design, and the history of architecture. The course is arranged to meet the needs of those who are commencing their professional studies, as well as of experienced draughtsmen who desire to make up deficiences in their training, or to qualify themselves for undertaking the responsibilities of practice. During the entire course there is regular instruction in freehand drawing, that of the last year being from life. For three years the students are continually engaged upon architectural design, each student's work being examined and criticised before the classes by a jury from the Boston Society of Architects. The studies are not limited to the University course: travelling students and measured drawings as 'envois' from Rome, Florence, Bologna, &c., and a large number of graduates continue their studies abroad; a year of study and travel in Europe forming an excellent continuation of the regular course, especially when the studies are properly directed under scholarly supervision. Study in the vacation is not overlooked; there is a Summer School of Architecture, which last year made a very profitable tour in Europe. These particulars of the development of systematic education apply in all general features, not only to the Massachusetts Institute, but to many other institutions throughout the States, of which it may suffice here to mention, the Harvard University, also in Massachusetts; the Columbia University, the Cornell University, the Syracuse University in New York City and State; also in Philadelphia, the University of Pennsylvania, and in Chicago the University of Illinois, all with similar and not less efficient courses of instruction in architecture. At Harvard University, less time is given to general studies, and more to design and history; but the broad principles are similar. As is the universal custom in relation to these Institutions in the United States, liberal donations for buildings and endowment much facilitate the work. A recent gift of 40,000*l.* by a benefactor whose name is not disclosed will much advance the development of this new school. Professor Ware warmly urges the cultivation of individuality in the students, so that while strictly conforming to certain requirements, they shall at every stage of their work have a degree of latitude and freedom, always finding some necessary element to supply from their own taste and intelligence, thus tending to develope in every student whatever independence of character and spark of originality he may chance to possess. Besides the regular course in these colleges, a special two years' course in architecture is arranged to meet the requirements of those draughtsmen of two or more years' experience who are desirous of pursuing a course in architecture, but whose early education would not enable them to pass the entrance examinations in mathematics and other subjects, and who cannot take the time to pursue a four years' course. This systematic training and completion of education in academic studies in these University courses cannot, however, be allowed to supersede the necessary final stage of experience in an architect's office; but it effectively prepares for it, enables the student to rapidly appreciate and assimilate such experience, and to supplement it in a most important manner.

With all the advantages now accessible to the student in this country, there is not any systematic and thorough course available for him in any way approaching in completeness to those afforded by the American Universities; in too many cases the pupil desirous of advancing his knowledge can only do so by taking up courses of evening instruction after his daily work of office routine has exhausted him physically and mentally, and rendered him unfit to reap the full benefit of his studies. The Institute, by its position and influence, can do much towards attaining this end: it has already, with the help of the Architectural Association, effected great improvements in the education of the architect, and, with the success of the American schools as encouragements, may well endeavour to secure for the coming race of students a systematic course of professional University education not inferior to those herein described. The task, if undertaken, is one of great difficulty, and in any case can only be advanced slowly."

Let the Architectural Association hope for some liberal benefaction to put it on a satisfactory and permanent footing. There are many very wealthy men in this country who sufficiently realise the immense importance of the art of architecture as the most important and permanent expression of civilisation and of national greatness, to contribute in a substantial manner to the establishment of a college for the education of the profession if once they became aware of the urgency of the need. It is not generally realised how poorly paid the architectural profession is, and how consequently impossible it is adequately to endow its own teaching. A school such as I suggest this Association should open would be a fair start for the higher training we so much need. It has probably occurred to many that the Association as the principal architectural teaching body, should be officially recognised by the new London University. The Committee will not lose sight of this important question, but in view of the character and standard of technical training the University requires, I do not think we can just now expect to do more than obtain its official recognition for our teaching staff.

As regards examinations the good old English proverb is true to human nature, "You cannot put an old head on young shoulders," and no man of common sense expects more than a very small fraction of youths to be sufficiently enthusiastic (in the abstract) to put forth their best efforts to acquire skill and knowledge (for their own sake) before they know their joys and their value as a means of livelihood. It is therefore necessary to provide some incentive to work. Our system of studentship and of prizes is founded, of course, on this obvious truth. Experience proves that the best course of systematic training falls to the ground without some such stimulus. There is no prize so precious as the testimony of the leaders of one's profession that one has sought by long and well-directed study to make oneself proficient in one's calling. I find that out of the total number of London candidates in the Royal Institute of British Architects qualifying examination last year, 48 per cent. in the Intermediate and 63 per cent. in the Final were students of this Association.

The possession of ability to design and to draw are comparatively rare gifts (in combination especially with business and constructive capacity), but they are absolutely necessary to an architect. Both can be sufficiently tested to exclude from the Institute men who are grossly deficient in these qualities. Can anything therefore contribute so greatly to the improvement of architecture, as an art, as an examination in these? Let it be borne in mind that the temptations to take up architecture as a business are as numerous as the opportunities are great as compared with those presented by painting or sculpture. Consequently we are bound to choose between retaining our present examinations in art (as well as science) as a qualification for membership of the Institute or of admitting builders equally with architects to a test of knowledge of construction *only* with the certainty that this qualification would in the public estimation be equivalent to a complete architectural equipment! This *art* test is our only hope of purging the profession, as far as may be, from the commercial spirit, the worship of mammon. To those who are just joining our courses of study I will give no further advice—they must already be wearied with my platitudes—but I will offer them some refreshment in the words of one of the greatest of modern artists. Louis Stevenson penned these words at Fontainebleau with the spirit of Millet beside him, and although they were addressed to a youth who was thinking of making painting his profession, they may with almost equal force be applied to every aspirant to our calling, and you may substitute the word architect for artist all through the quotation:—

"The vast mass of mankind are incapable of doing anything reasonably well, art among the rest. The direct returns—the wages of the trade (art) are small, but the indirect—the wages of the life—are incalculably great. No other business offers a man his daily bread on such joyful terms. In the life of the artist there need be no hour without its pleasure. Suppose it all paid: the wonder is it should be paid at all. Other men pay, and pay dearly, for pleasures less desirable. The public knows little or nothing of those merits in the quest of which you are condemned to spend the bulk of your endeavours. Merits of design, the merit of first-hand energy, the merit of a certain cheap accomplishment which a man of the artistic temper easily acquires—these they can recognise, and these they value. But to those more exquisite refinements of proficiency and finish, which the artist so ardently desires and so keenly feels, for which day after day he recasts and revises and rejects—the gross mass of the public must be ever blind . . . Under the shadow of this cold thought, alone in his studio, the artist must preserve from day to day his constancy to the ideal. It is this which makes his life noble; it is by this that the practice of his craft strengthens and matures his character. . . . Many artists forget the end of all art—to please. It is doubtless tempting to exclaim against the ignorant bourgeois; yet it should not be forgotten it is he who is to pay us, and that (surely on the face of it) for services that he shall desire to have performed. Here, also, if properly considered, there is a question of transcendental honesty. To give the public what they do not want, and yet expect to be supported; we have there a strange pretension, and yet not uncommon, above all with painters. The first duty in this world is for a man to pay his way; when that is quite accomplished he may plunge into what eccentricity he likes, but emphatically not till then. Till then he must pay assiduous court to the bourgeois who carries the purse. And if in the course of these capitulations he shall falsify his talent, it can never have been a strong one, and he will have preserved a better thing than talent—character. . . . . The artist is of the Sons of Joy, chose his trade to please himself, gains his livelihood by pleasing others, and has parted with something of the sterner dignity of man. . . . . If you adopt an art to be your trade, weed your mind at the outset of all desire of money. What you may decently expect, if you have some talent and much industry, is such an income as a clerk will earn with a tenth or perhaps a twentieth of your nervous output. Nor have you the right to look for more; in the wages of the life, not in the wages of the trade, lies your reward; the work is here the wages."

On the still larger question of the legal protection of the title of architect I would call attention to the growing feeling abroad as represented by the resolution by M. Couran carried, I understand, with unanimity at the recent International Congress of Architects at Paris. It runs as follows:—

"That Governments take measures to protect and ensure respect for the title of 'Architect' by reserving it for the future, and without retro-active effect, to architects provided with a proper certificate, by forbidding others to use it, and by putting it within the reach of all by means of the diffusion of Architectural Education."

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In the monstrosities which deface every new street and so large a proportion of our recently cleared sites in London, there is no lack of desire for architectural effect, and all this, let us bear in mind, represents a demand on the part of the public who are now wealthy enough to afford the luxury of art. The fault is in the ignorant expression of this ambition by men who presume to call themselves architects. It is knowledge and taste we want, and none but men who have spent their lives in patiently acquiring and practising this knowledge can design a good street front. There is, to my mind, little doubt that "taste" (the subtle and most precious attribute of every true architect) is largely a matter of experience or, if you like, of knowledge. It is possible not to associate with persons who use the language of Billingsgate, but the educated community cannot avoid continual contact with the architectural Billingsgate which first offends, then prostitutes, our æsthetic sense. We may, however, congratulate the London County Council for showing that it is alive to its responsibility in protecting the educated public from such shocks to their feelings in relation to the frontages of the new street from the Strand to Holborn. Let us hope this effort will be a success. Another hopeful sign of the times is that some of the great London freeholders, in rebuilding their estates, insist that an architect of established reputation in design shall be employed by the lessees. Here again we have the evidence that influential parties interested in supplying the demands of the middle classes realise that the public are beginning to want, and are prepared to pay for, good work.

The prospects before us were never so bright as to-day. Besides the ever-growing demands at home for all kinds of special public buildings, there lie beyond our shores immense and rapidly ripening fields for architectural skill. Few of our young men can have considered the growth of innumerable towns in Africa, India, and the more Eastern of our colonies without its arousing the spirit of adventure and a certainty of occupation. And bear in mind that it is London-trained men who are mostly in demand for such situations. When cities are being conceived and largely erected in two or three years (Khartoum for instance), all designed by Royal Engineers, one asks oneself, what training in architecture do Woolwich and Cooper's Hill and other colleges afford? I believe *nil*. If art is not for ever to be ignored by English Governments, why should it not be made a rule that each young engineer who is appointed to government architectural work in the great cities of our dependencies should have a year in our leading architectural schools or offices?

A movement among us full of promise for the future of architecture, and one which was the key-note of this year's congress of architects convened by the Institute, is the alliance of the architect, sculptor, and painter, as well as the artist-craftsmen in the production of a building of any importance. Such brotherly counsel, combined with a clear conception in the mind of the architect of the effect required, ought to result in buildings of greatly increased beauty and interest. It would tend to this happy co-operation in the constructive and decorative arts if our studio could in some way be made preparatory to the Royal Academy School of Architecture, which naturally will take only advanced students. If this were found impracticable, possibly on the social side of the Architectural Association (a side we hope will ever be encouraged by all concerned) a rendezvous may be devised which will bring the students of all these arts into closer touch in their early days.

What age other than our own can claim to have supplied subjects for sculptors and artists so magnificent in their conception or fraught with greater hope for the immediate benefit of mankind in general? They may record in stone and colour in our buildings the vast truths of evolution, or celebrate the welding together of an empire whose arms exist alone for the defence of liberty. Can we as architects have a higher ideal before us than to dignify and beautify the Metropolis of such an empire, and this should be the ambition of every member of our Association. And then, when this is done—

> We shall rest, and, faith, we shall need it—lie down for an æon or two,
> Till the Master of All Good Workmen shall put us to work anew!
>
> And only the Master shall praise us, and only the Master shall blame;
> And no one shall work for money, and no one shall work for fame,
> But each for the joy of the working, and each, in his separate star,
> Shall draw the Thing as he sees It for the God of Things as They are."

Mr. G. H. Fellowes Prynne, in proposing a hearty vote of thanks to the President, said that the address had been an admirable one on account of its suggestiveness and because it went deeply into questions which interested all of them. In their new President the Association had an artist and a man whose convictions were sincere—who was practical, methodical, and persevering; and with such a President they might safely prophesy a prosperous session. The President had made some kind allusions to his (the speaker's) term of office, but perhaps the least said on the personal side of the question the better. Much that he had accomplished was the result of the earnest and hardworking efforts of the officers of the Association, who had worked with him with perfect unanimity. If any reward were necessary for his efforts as President, he had found it in the good-fellowship which existed in the Association and which he hoped would always exist. In reference to the falling-off in class attendances at the end of each session, it had been referred to in previous presidential addresses, and it was difficult to say what the cause was. It might be that the younger members tried too quickly to rush into advanced work—into the Advanced Class of Design, for instance, before they had been in the elementary class—and in doing so discovered their weakness; they found cleverer men than themselves, and in the prize hunts they found themselves out of it, with the result that apathy set in. The steadier men, however, began properly, built up their education on a solid foundation, and generally gained the prizes. He thought it was a pity that the system of the Association did not force men to go through the elementary stages before admitting them to the advanced, for only in that way, he thought, could they avoid the great differences noticeable in students' work—the clever designs of some and the meagre designs of others. As regards the *Sketch Book*, he agreed that it was a pity that the younger members did not seem to value that invaluable publication, for he was sure, with Messrs. Lewis and Pite as editors, that whatever was published in it was worth looking at. He was glad that the President had referred to the eleven members who, in a patriotic spirit, had gone to the Transvaal war, and in that connexion he might say that he believed there would be a fine opening in the new colonies for young architects. As an instance of the value of being on the spot at the right time, he mentioned the case of a young fellow who, after being in his office for six and a-half years, and serving in a builder's office two years, went to the Cape, and, after the Matabele war, went into a township where he got 150,000*l*. of work. During the Boer war he had returned to this country to perfect himself in architecture. In mentioning the art of the century, the President had omitted to mention Burne Jones, who, as an idealist in painting, would rank for ever as one of the great leading artists in England; and the President, unintentionally, had omitted Stevens, the sculptor. As to architecture, it did not seem able or ready to take advantage of the great scientific movements at the commencement of the century, probably because it was hampered by precedent and tradition. Take the use of iron: architects had ignored or barred its artistic use, as they do now to a large extent, with the result that engineers, who at once grasped the wonderful use of the material, were able to advance by strides, and in their works erect scientific monuments—monuments which, though scientific, were monstrosities in art. Could architects be surprised that bridges and similar works, which should have architectural features about them, should not be given to them to carry out? He could not agree with one remark made by the President, viz., that an engineer should pass a year in an architect's office, for that was quite insufficient. What was needed was combination, such as was seen in France. Could a year's training in architecture do more than make an engineer think he knew sufficient about architecture to enable him to ignore any combination with the architect? He desired specially to endorse the President's advice to accept the altered conditions of our age; that should be the key-note for the twentieth century at least. He desired, too, to support warmly the President's warning against pinning their faith to temporary schools of thought—or art. There was as much narrow bigotry and thought in art as in religion or politics, and he specially deprecated that too ready condemnation of design—that putting aside with a sneer a work that had cost days and days of thought and labour. His advice to students was to try and seek for the good in every design; not to hunt only for the bad points—to try and get at the back of what an artist meant in his design. In that way they could get a value out of every man's work. They must all know people who had been brought up in one school of design thinking meanly of and abusing the work of another school: Gothic as against Georgian, and *vice versa*. There were those who called all modern Gothic work a bastard imitation, and the same men would go into raptures over a bastard and a mongrel Classic. "There is much that is good in what is called bastard Gothic as there is in so-called bastard Classic." Let them keep aloof from such narrowmindedness. As to the educational system in France, one must sympathise with the President's remarks that that academic system had not improved the domestic work of France. In thinking of the domestic work of Norman Shaw, Aston Webb, and others one could compare our domestic architecture favourably with the French; but with national works the case was different. Our national works were, no doubt, improving, and much was expected in the future, but the Belgians and French were far ahead of us in both dignity and power; their works spoke of the object for which they were intended, whereas ours were too often mean and insignificant. The academic system had given foreign countries greater national monuments, comparatively, than we possess in this country. The most important point raised in the whole address was as to day classes. He did not suppose that any one would doubt that it would be an excellent thing if such classes were possible. There was not an architect worthy of the name who would not far more gladly accept a pupil who had been in the classes of the Association two years than a novice, for it would be a far greater economy to the architect and infinitely more economical to the pupil. As regards pupils, there ought never to be an agreement made which did not permit a pupil to give up the calling if he chose at the end of six months, and he, the speaker, always made it a rule that a pupil could leave at the end of six months, should he find himself unsuited for the work. He agreed as to the necessity of the day classes, but he doubted whether it would be possible to start them at present. The American system was far and away superior to our own, and Mr. Cates's valuable article, quoted from by the President, had supplied them with many ideas for consideration as to the possibility of forming such classes in our own country. Amongst other points in the American system was the one admitting ladies to the study of architecture. If the day classes proposed by Mr. Smith would be dependent on financial aid from architects themselves, he was afraid they would be a failure. Architects were not, as a class, able to afford great sums, but the President said (and with this he, the speaker, agreed) that there were many people rich enough to support such a scheme. In America rich men came forward and helped in a most liberal way various institutions; but in England no one seemed enough interested in the great art of architecture to help in that way. There were big landowners round them who were raising enormous sums from buildings on their estates, and it seemed as though they were the people to come forward if they had any interest in national architecture. Unfortunately, the majority were not interested, and few rich people cared anything and knew little about architecture as an art. There seemed to be not the same seeking for good architecture amongst the moneyed class as there was for good painting and sculpture. The Association had started well and had established the voluntary system, and he believed the work which was done voluntarily was the best work men could do. How long that system would go on, how long it would be possible, was quite another question. They must face the fact that sooner or later the work would get so great, and the requirements so much more numerous

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than they had been, and the sacrifice of time, energy, and money so much greater, that it would become too great, and the Association would no longer be able to get really efficient work out of the best men. The great law of self-sacrifice for the good of others which seemed so necessary in all human undertakings had to a great extent been practised by those who had guided the destinies of the Association, and he believed that that spirit would continue. But they must take care that the labours of the past were not thrown away by not recognising and keeping in touch with the needs of the present day, and by not recognising that the need of the students called for some more thorough system of education. Whether the time for day classes had come he could not say, but he sincerely hoped that the classes would one day be commenced, and he believed that when that system was started the next idea would be to aim at some regular collegiate system.

Mr. E. W. Mountford, in seconding the vote of thanks, said that the office in which he had received his architectural education had provided the present President of the Association, the President of the Royal Institute of British Architects and the Colonel of the Artists' corps, and he thought that was sufficient to make that office a notable one. He was able to give the correct explanation of why the attendance at the classes fell off towards the end of the session, as he had had the privilege of passing through the classes, and his attendance used to fall off at the end of the session. If a young architect worked all day in an office and every evening in classes during the winter months, towards the spring he felt the need of recreation, and accordingly his attendance at the classes fell off. When students got all their education in the Association, and when there would be no need to work in the office, they would probably work right through. He thought it was a very good idea that young architects should go to the Colonies. They had heard how the Association was prospering—that there were 1,291 members—and, in his opinion, a good many of them might with advantage go abroad. One of his former assistants went to the Cape and to the office of one of the leading architects of the Colony, and he wrote home that the chief trouble was that they not only supplied the architecture, but most of the building material, and in preparing a design they were much influenced by a desire to work off old stock. That man was doing exceedingly well now.

Mr. C. H. Strange said, in reference to the President's remarks about the Discussion Section, which was sometimes in danger of being overlooked by the general body of the members of the Association, he desired to take the opportunity to correct a rumour which he understood prevailed in the Association—viz., that the Discussion Section was a rival of the general meetings. Nothing was farther from the fact or the intentions of the Committee of the Discussion Section.

Mr. Carvill said a telegram had been received from the President of the Institute, Mr. Emerson, expressing his regret at being unable to attend the meeting owing to an engagement at Chester.

The vote of thanks was then put to the meeting and heartily agreed to.

The President, in reply, said he heartily agreed with Mr. Prynne as to the influence of Burne-Jones, for he considered him, next to Turner, the greatest of modern painters; while there was no doubt in the minds of those who had seen Stevens's work that he was one of the greatest of the sculptors of the century. He also desired to endorse Mr. Prynne's criticism that one year's education in architecture for engineers would not be sufficient, though he still felt it would give an engineer some interest in the principles of art, and might to some extent correct the troubles which now exist. Still, he agreed that engineers and architects should work in collaboration. Mr. Prynne was dubious as to the possibility of carrying out the scheme of day classes, but he did not at all share those doubts. He had made a careful calculation, and he believed the scheme could be carried out for about 1,000*l.*—that was to say, they would lose in three years, until they got enough students to make it pay, about that amount. He had got promises of 500*l.*, and he did not see why they should not get the remainder. As to the public not having the same interest in architecture as in music and painting, he thought it was largely due to the want of patronage on the part of leaders of public thought, and especially of those in a position to influence the public Press to bring the subject before the attention of the public. He did not think architects themselves had done enough to induce royalty or other leading personages to support architecture, for in his opinion that was how music and painting had got to be talked much about, though whether they were understood was another matter.

The meeting then terminated.

The conversazione will take place on Friday, the 19th inst. Visitors' tickets are available on payment of 2s. 6d. The next ordinary meeting will be held on October 26, and the paper arranged for is by Mr. Francis Bond, the subject of which is "French and English Cathedrals," illustrated by lantern views. Mr Bond, however, is seriously unwell, and may be unable to read his paper, in which case a paper arranged for a later date will be read.

AN ARCHITECTURAL CRITIC IN THE YEAR 2000 A.D.*

THERE is no pleasure without alloy: no honour without its drawback. The prologue and epilogue of the session form the drawback to the honour you have done me in electing me as your President, and destroy the pleasure I should otherwise feel at the distinction you have conferred upon me.

For not only is the honour a great one to be President of the oldest provincial architectural society in the kingdom, a society which is only second in age to the Royal Institute of London, but it is rendered still greater by the eminence of the previous occupants of the Chair. My knowledge of the Society is of recent date, and of Presidents prior to the date of my appointment at University College I cannot speak; but I had the good fortune to come to Liverpool when this Chair was occupied by one who has worked long and zealously for the welfare of the Society, Mr. Henry Hartley. For the first time for many years his name is not on the list of the Council of the Society; a fact we all deplore, and nobody more so than myself. Since then Mr. Bradbury and Mr. Culshaw, and my immediate predecessors, Mr. Willink and Mr. Ould, by their energy and devotion, have raised the value of these meetings and have greatly helped to extend the influence of the Society and make its power felt in all matters affecting our profession and the welfare and beauty of this city.

In occupying this Chair, therefore, I am conscious of the difficulties of my position, and of the comparisons which may be instituted, to my disadvantage, between my predecessors and myself. I only ask for your kind indulgence in the mistakes which I am certain to make and for your friendly support in any difficulties which may be encountered during my year of office. Upon this I feel certain I may rely.

Although it is not in your power to help me in some of my difficulties, of which this opening address is not the least, I am glad to be able to say that, as regards this address, I have received assistance elsewhere, and from a quarter least to be expected. There has lately come into my possession a lecture delivered by a Professor of Architecture in the year 2000 A.D., in which he reviews the architectural work of the century previous to his own, or in other words, the work of the present time. How I obtained this paper would take too long to explain, but I can assure you that it would be an interesting story to tell if only time permitted. As this is not possible I will only say that you can imagine the relief I experienced at not being called upon to produce anything of my own after the two able addresses of last year, which all of us, I feel certain, have recently been reading with so much pleasure.

The address by this unknown author which I have the honour to present to you to-night is entitled "Architectural Conditions in the Nineteenth Century." The paper it is printed on is much like what we use now, and the type is very similar. It would indeed take a clever expert to detect any differences. It is addressed to the Students of——, and here, unfortunately, the name has been torn off. I may mention that here and there words are illegible, which is particularly unfortunate, as they are generally the names of architects or of buildings, which the author selects for praise or blame. In some cases, therefore, I have been obliged to slightly vary the wording of some of the sentences, for which I ask your forgiveness.

The address commences: "Ladies and Gentlemen," and this is particularly interesting as showing that at that period architects were not exclusively of the male sex. In fact, I gather from fragments of other papers in my possession that in some branches of architectural work, and especially in the decoration of buildings, female practitioners were in a majority. But that is by the way.

Here is the paper:—

"The state of architecture in the nineteenth century is difficult to define. The revivals at the end of the previous century had destroyed the last vestiges of traditional art remaining in England, and the architectural world for many years afterwards was divided into two camps, one containing the exponents of the Gothic style, the other of the Greek. This latter revival need not occupy our attention. It was merely an interlude, and had no subsequent effect on architecture. But the revival of Gothic had different results. This is not to be wondered at when we remember that Gothic was an indigenous style, and that the influence of the old mediæval traditions of building had lingered in England almost until the commencement of the century. In the early days of the revival, the most English of all the phases of Gothic, that which was practised in the fifteenth century, was the one universally followed. Foreign idioms, so to speak, crept in later, and copies of earlier work were not attempted until the century was half over. It is not my intention to give you a history of the revival, or to describe or refer to the many churches and buildings, beautiful though many of them were, erected in that style during the fifty years when it reigned supreme. That would mean a paper in itself. But one result of this revived interest in Gothic art requires special mention. The middle of the century was the great age of 'restorations.' For five and twenty years, that is to say from about 1850 onwards, the restoring architect carried everything before him. It is difficult for us to realise now the intense fervour with which the work proceeded. The ancient Cathedrals were scraped, rechiselled, recarved, practically rebuilt. A clean sweep was made of everything that was not Gothic. Even Gothic work itself was not sacred. Portions of buildings, of later date than the original erections, were in many cases destroyed in order to give place to nineteenth century versions of what might have been. The parish churches were treated in the same way as the cathedrals. For a clergyman to have an unrestored church was considered as great a disgrace as to have a son who was a convicted felon, or a daughter who bicycled in rational costume. By the end of the century no such thing was to be found in the length and breadth of the land. The enthusiasm for restoration which undoubtedly existed and which seems almost inexplicable to us now, was not due so much to a love for architecture as to a mixed feeling partly sentimental, partly religious. The cathedrals appeal to us now merely as fine works of architecture, but 150 years ago they possessed an additional interest. They were then not only architectural creations; they were also historical monuments. Injured as many of them were, through various causes, they were still full of memories of the multitudes which had worshipped within their walls and of the craftsmen who had laboured to add beauty to them.

Every stone could tell a story. In every bit of carving you could still see marks of the chisel of the original artificer. The carving was mutilated perhaps, but enough of its beauty remained to recall its original splendour, and in spite of, perhaps partly because of this mutilation, it aroused more enthusiasm and admiration than if it had been unbroken. In those days the churches were full of the work of all ages. Windows which had been altered in order to give more light, or else increased in size to frame the splendour of the painted glass, still stood sandwiched between others of earlier date. Oak benches and screens with crude but interesting carvings by Elizabethan or Jacobean men showed that the churches had not been so neglected after the Reformation as the restorers wished people to believe and strove to make apparent. Pews of the time of Queen Anne or the first George

* Opening address delivered to the Liverpool Architectural Society, by the President, Professor Simpson, on Monday, October 8.

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still remained where the squire had sat and slept through the sermon, his gouty leg propped on a fat and comfortable hassock. The old 'three-decker' pulpit was still to be seen proclaiming the Protestant trinity of rector, curate, and clerk. The history of England was written in and about these old buildings. It was this history which the 'restorers' of the nineteenth century ruthlessly destroyed. Not only this, they also destroyed the glamour which hung around them, making it impossible for future generations ever to experience the same sensations. We owe the restorers a debt of gratitude for preserving these *structures* for us as monuments of architecture, but we can never forgive them for destroying what was to a great extent the principal charm of this old work. If the architects of the time had been less skilful or more self-assertive, we should probably have been more thankful to them. But their knowledge of the art they loved was in most cases too great; their self-renunciation too complete. The latter was worthy of the old monks in whose architectural footsteps they strove to follow. But their very correctness was the cause of the decay of interest in Gothic art which set in even before the end of the century. The more correct their work, the more exact their carvings, traceries, and mouldings, the more surely was the revival doomed. It was a case of killing through kindness. The problem confronting these restorers was no doubt a very difficult one. To have allowed these old buildings to fall would have been an act of vandalism, and the wave of Gothic enthusiasm was too strong for half measures. In the case of the cathedrals and large churches it is difficult to see how they could have acted otherwise than they did. But some of the parish churches might surely have been left undisturbed to act as sweet resting-places to sit and dream in, away from the rush of the matter-of-fact prosaic age in which we live. This could easily have been done. These buildings could undoubtedly have been preserved without the elaborate scheme of restoration and refitting to which they were subjected. The money which was spent on them, the thousands of pounds, if not millions, would have been better expended in building new churches alongside them and allowing the old ones to remain as historical monuments, a little judicious attention preventing their further decay. But the clergy and laity alike would have regarded this as an attack on the established religion, and subscriptions would not have been forthcoming. One consolation we have, and that is that certain buildings were already in ruins before the restoration mania set in. Fountains, Tintern, Glastonbury still remain to us, as perfect and as beautiful as they were then. In those ruins we can picture the abbeys as they were once, and admire such carving and detail as remain without an unpleasant feeling at the back of our minds that we may be gazing at clever copies and not at the originals. Thank God, they did not attempt to restore these.

In one other respect we have cause to be grateful to the restorers. Their love of archæological correctness destroyed archæology. Our delight in those old buildings is now purely an architectural one. Disputes as to the date of the structure, as to whether a bit of carving is thirteenth or fifteenth century, are no longer possible. The nineteenth century is responsible for all. The old test as to the age of any part, the state of the stone, no longer holds good; unless it be urged that the more decayed the stone, the more recent the work. The old materials had become seasoned through centuries of more or less pure atmosphere, before coal was worked and when the population was less numerous, and were consequently able to stand the vitiated air of the later periods to which the newly-worked stone soon succumbed. But this test is by no means infallible, and even if it were, few have the curiosity or leisure to investigate the matter.

To the age of revivals and restorations succeeded an era of experiments. The period between 1875 and 1900 was marked by most interesting work, ecclesiastical and domestic, but a recognised architectural style seemed more than ever an impossibility. Not only did different architects work on totally different lines, but individual architects often jumped from one style to another with surprising alacrity. It was no unusual thing to find men designing in Gothic one day, in Classic the next, or indulging in their odd moments in a delectable compound called 'Queen Anne.' They were like children, who, with several sweetmeats before them, nibble a bit first from one and then from the other. This architectural jumble was due as much as anything to the changed conditions of the times. The introduction of steam had revolutionised all things, amongst others the methods of architectural study. The old days of the 'grand tour' and severe examination of ancient buildings were things of the past. With quickened means of transit came feverish haste in study. Men discovered that they could go to Paris from Saturday to Monday, and to Rome and back in a week. They no longer sat down before a building and laid siege to it with calipers, measuring-rod, and tape, mastering every detail and studying every stone, but, sketch-book in hand, were content to jot down 'bits' as they hurried along which might be useful to them afterwards. Sketch-book architecture became for a short time the rage. Flemish gables, German doorways, French windows, and Spanish ironwork crossed the Channel, and united to form original architectural designs. It was resurrection-pie *à la Continental*. It tickled the palate, but did not fill the stomach. The phase was short-lived; like all fashions, it ran its course, met with its meed of approbation, and then died out. Men, sated with Continental fragments, like truants returned home; some, to their credit, had remained staunch to their own country. The Queen Anne movement, which had effected so vast a change in domestic work, reasserted itself, but in a more subdued and chastened spirit. The high priest of the movement, Mr. Norman Shaw, had at the end of the century retired from active service, crowned with well-earned laurels; but there were many others to carry on the work, who with one accord united to try and revive the old traditions of English building which had been so completely destroyed by revivals of a hundred years before. This was the most important movement of the century, and the one that had the most lasting results. It was not universal. There were still those who clung to archæological Gothic and picturesque Elizabethan, and there were others who went to the other extreme and said: 'We will have nothing to do with traditional work; we will absolutely ignore precedent; we will return to materials and materials alone, and create our designs out of these and nothing else'—all of which sounded very pretty in a paper, and was received with much applause when enunciated at meetings, but which landed the authors in serious difficulties as soon as they attempted architectural design. The successful architects were those who neither ignored old work nor slavishly copied it; who understood and respected their materials, but who were not above learning from the masterpieces of bygone times.

The many new and different problems the architects had to solve formed one of the great difficulties of the age. In the first half of the century only churches and public buildings were considered worthy of architectural effort. Utilitarian buildings were left to the builder. But with the growth of the æsthetic movement in other branches of art grew the desire for architectural expression in all buildings, irrespective of the uses to which they were to be put. This meant a severe tax on the architects' powers of designing. Without a recognised style, with no traditions to assist them, with an absolutely uneducated set of workmen to carry out their ideas, hampered by work foreign to architecture, such as surveying, valuing, questions of dilapidations, ancient lights, and other semi-legal business which has long since passed into the hands of a separate class, it is no wonder that they did not always succeed. We flatter ourselves that we can do better now, but then we have their successes and failures to guide us. What the old Gothic and the Renaissance of the 'teens' was to them their work is to us, and in one respect we have the advantage, as the problems we have to solve are not very different from those which exercised them. Some things they did are difficult to understand. To give one single instance only. In the International Exhibition held at Paris in the year 1900 a large building represented England officially. When one considers that science was represented by its latest inventions, and that the workers in all other branches of art contributed their best and most original work, one would have thought that this building would have been a typical example of English architecture of the end of the century. One would have expected an original design to show what English architects could do. Nothing of the sort was attempted. An old house erected some 300 years previously was carefully copied, detail for detail, an exact replica as far as the outside was concerned, and this was the English official architectural contribution. No doubt it was well done; it was the kind of thing they could do then uncommonly well; but I wonder what would be said now if it were proposed to reproduce a building of the nineteenth century as our representative contribution to an exhibition whose object was to advance the arts, sciences, and industries. I do not envy the man bold enough to make such a suggestion. We might not be able to produce anything better, but at all events we could present something of greater interest because it would be an example of the art movement of the day.

The greatest crime of the nineteenth century—but for this the architects were hardly responsible—was the erection of acres of small houses which surrounded all the great cities. Crime is perhaps too strong a word to use when one considers the difficulties which existed. The working man and the city clerk had to be housed, and tenement blocks were few and far between. The English artisan still insisted on regarding his house as his castle, even though the walls would hardly stand an assault from a popgun. Two stories high, and the rooms so low that a popular writer of the day said that the people looking out of the first-floor windows appeared to have their feet on the ground floor, these cottages sprawled over the immediate outskirts of a town, house after house, street after street, a dead level of degrading ugliness. There were thousands of front doors all alike and all equally atrocious, and millions of chimney pots, vents for the polluting smoke from the coal fires then in general use for both cooking and warming purposes. London was entirely spoilt before the century was half over, and the once pleasant old villages, which had stood sentinel round it for ages, were reached and then engulfed by the stream of 'homes for human beings.' Other big towns fared no better. Aigburth and Wavertree, round Liverpool, fell into the clutches of the speculative builder. It is sometimes asked why the people were so mad as to allow such things; why did not the municipalities step in and, by buying up the land round the city, prevent this spreading of their boundaries? If they had done so our difficulties would not have been so great. The task of forming a zone a quarter or half mile broad round each city, according to its size, such as is now universal—a zone laid out as a park for the recreation of the people—could have been done at a tithe of the present expense if it had been undertaken when the land was still country or but sparsely built over. But there were difficulties in the way. The money of the corporations was needed for other things. The sanitary conditions of houses in the towns and of the towns themselves were in some cases disgraceful. The absence of adequate laws in former years had allowed overbuilding and overcrowding to a degree hardly credible. To clear out the rookeries was the first object of every corporation, and that engaged much of its attention and most of its money. Another reason was the dislike of the people for tenement houses. Until this was overcome, and it took some time to do it, the law which prohibited buildings being erected within the town itself and for a certain distance beyond the zone, less than four stories high, or covering less than a certain superficial area, could never have been passed. A third and most important reason which rendered the 'zone' impracticable was the difficulty of communication between town and suburb. In those days there was only the crawling omnibus, drawn by horses, and the cumbersome train, with its heavy steam engine and tender for coals, and guard's van and other accessories. Electricity was in its infancy. But as soon as the application of that power became understood and in general use this objection to the zone disappeared. One minute or two minutes longer in a car night and morning was a small price to pay for fresh air and sunlight, for a healthy city and a healthy people. This they might have realised sooner than they did.

The extent of a city now is once again defined within lines as clear as those which surrounded the towns of the Middle Ages; but instead of a wall and fortification there is a park. And beyond the park the suburbs, where, in some parts, the houses are all detached, the private residences of the merchants and well-to-do middle classes; and in

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others the tenement buildings of the poorer classes, lining wide avenues, housing double the number on half the space possible in the nineteenth century.

With greater height of buildings came, of course, wider streets. Many more buildings would have come down to us if it had not been for this. It is amusing to read the instructions of 100 years ago. Streets had to be at least 40 ft. wide, important streets 60 ft. wide; and everybody thought that a great triumph had been effected when a new thoroughfare in London, from Holborn to the Strand, was, after many years' discussion, projected with a total width of actually 100 ft. It makes a good street even now, I admit; but we should no longer regard it as an 'important thoroughfare.'

The difficulties of architects have been already mentioned; but the difficulties of the workmen were still greater. The complaint of the day that the average artisan took no interest in his work, and that it was quite impossible to leave any little detail to him to carry out without a full-size drawing, was a very true one; but it was not the fault of the workman. An architect had opportunities for study denied to him. In the eighteenth century his path had been an easy one. All men designed then much on the same lines—the lines on which their fathers and forefathers had worked—and it was easy for the workman to keep in touch with the minor modifications which were introduced from time to time. Even for the first half of the century confusion was not so rampant. It is true the styles favoured then were not traditional, but in the Gothic movement, at least, architects were only too anxious to train workmen in what they believed to be the only possible style. That they succeeded in many cases is proved by the excellence of much of the carving and mouldings still to be seen on such buildings as the Houses of Parliament and the Law Courts, London. But as soon as a number of workmen were beginning to understand and appreciate the feeling of this work, round went the architectural weathercock, and from due Gothic veered to due Classic. Then came the mixture at the end of the century, and it is no wonder that the workman, finding it impossible to understand all the styles, lost touch with his work and ceased to take interest in any. The intelligent foreman who thought for himself, and who would sit, note-book in hand, after working hours, puzzling out the solution of a difficulty—the class of man so admirably portrayed by George Eliot in the charming story of 'Adam Bede'—gradually became a thing of the past. The old traditions which had been passed on from father to son had disappeared. The apprenticeship system was dead, and nothing existed which could take its place. The technical schools were in their infancy, and, although increasing daily and beginning to make their influence felt, had to struggle against difficulties which no longer exist. Fathers had not learnt the value of a preliminary training for their boys. Employers had not realised how much more valuable boys were to them who had received such a training. The trades-unions, which might have been a good influence, were in some cases apathetic, in others unfriendly. Many of the boys, it is true, attended classes, but these were only in the evenings, when the boys were tired after a day's work. Besides, the time spent in these classes was so small, that it gave neither teachers nor students a chance.

The situation was well summed up by a leading architect of the day who, in describing some work carried out in France from his design, said: 'The interest displayed by the local workmen in the decorative details was such as may be looked for in vain from the British workmen.' It was not that the French workman was more intelligent than the English. It was because the vernacular traditions had not been destroyed there so much as here, and because their technical education was far in advance of that existing in England.

The education of the architects was as defective as that of the workmen. Some few years before the end of the century it was publicly stated that there was no architectural education in England, and that in order to meet this deficiency the Institute had started a scheme of examinations. This is probably the most glaring instance on record of putting the cart before the horse. It could only be equalled if a nation were to declare war in order to teach its generals tactics and its soldiers how to shoot. There were architectural classes, it is true, sometimes attached to Universities, sometimes to art schools, and sometimes under the control of architectural societies. But a preliminary systematic training for students was by no means universal. Schools in which all art students—students of architecture, students in the arts of painting, and sculpture, and design, and in the crafts allied to architecture, and students whose future would lie in the more humble paths of building—could work side by side and get in touch with one another were few and far between. The pupilage system was still the most common means of entering the architectural profession, although its drawbacks were almost universally recognised. Advertisements were still common in the building papers:—'An architect in practice has a vacancy for a pupil; must be fond of drawing, and willing; premium required.' Heaven help the boy who stumbled into such an office. He probably learnt nothing, and his duties were those of an office-boy and tracing-clerk without the salary of either. Such advertisements ought only to have been printed with the warning signal 'danger' before them.

Many other points might be referred to if only time permitted. We are better off than our forefathers in some respects, worse perhaps in others. A good deal of work was done then with which we are now out of sympathy; but, on the other hand, we must admit that, whether we consider the enthusiasm of the Gothic revival, or follow the history of the Queen Anne movement, or take the last phase of all, the return to purer English Classic, much work was accomplished that commands our respect and admiration. There was plenty of enthusiasm, plenty of originality, and the two combined to make the work of the century, especially towards its close, an extremely interesting link, although rather a twisted one, in the history of architectural progression."

Here endeth the lecture, and I can only add my thanks to its unknown author for the trouble he has saved me, and express the satisfaction I feel that I have been able to place his views before you to-night instead of my own. It is a paper which I hope will lead to a good discussion, although I believe it has not been customary to discuss Presidential addresses; still, none of you need hesitate about saying what you think, because your remarks, I am afraid, are never likely to reach the author; and even if they did, you need have no fear of retaliation, as by the time he is able to reply, few, if any, of you will be in existence.

MAGAZINES AND REVIEWS.

THE *Art Journal* contains an article on "The Museum of Tapestries at Florence," little known even in the town itself, but which appears to contain some goodly treasures of art. In a paper under the title of "L'Art Nouveau" Mr. Lewis F. Day remarks on some of the too patent weaknesses of the new school of decorative designers, who are all, as he expresses it "writhing up to date—for the lines of their design are with one accord contorted, in a manner which begins to be as trite as the severest of classic forms; the trick is already a convention, only an ugly one instead of a beautiful. It is used to express no matter what—flames of fire, wreaths of smoke, waves of water, and is an invaluable means of veiling forms, such as the nude figure, which it is inconvenient to draw definitely." This and a good deal more that is said in the article is what much needs to be said at present.

In the *Magazine of Art* Mr. Baring-Gould writes a pleasant article on Ightham Mote House, the real value of which however lies in Mr. Railton's beautiful and perfect sketches. Mr. Baring-Gould's exordium, in which he pours a certain contempt on Italian *palazzi* and French chateaux in comparison with English mansions, is rather narrow and insular. Of course an Italian palace has not the homeliness of an English mansion, but it has other and possibly greater qualities proper to itself; nor is the Pitti Palace, to all eyes, "sublimated ugliness." Each land has its own *cachet* in its domestic architecture: and if the whole world were covered with mansions of the English type, we should lose our perception of its special qualities. Other articles are on the works of Edward Stott, as "the painter of the field and of twilight"—a title which he merits, and an interesting one on the process of painting panoramas.

In the *Architectural Review* (Boston) it is curious to find an article devoted to a description and numerous illustrations of a church like that of All Saints, Dorchester, Massachusetts, which, with the exception of a few slightly independent details, is simply an English Late Gothic church, and this is described as "a step forward in the right path towards a true and consistent church architecture." One would be inclined to ask if it is not rather a step backward. Messrs. Cram, Wentworth, & Goodhue are the architects. Messrs. Wheelwright & Haven's design for a building for the Massachusetts Horticultural Society, at Boston, seems to be founded on Wren, in the use of the brick order rising through two stories, with some touches of French feeling added in the cornice and balustrade ornaments. This is another type of imitated architecture. Mr. Blackall's interior details of the office of the United States Trust Company, Boston, show a great deal of grace and refinement.

The *Artist* contains what we think a very exaggerated estimate of Claude Monet, in an illustrated article on his work, but the illustrations given serve to show that in some respects Monet gains by being reduced to black and white. An illustrated article is devoted to pencil sketches by Mr. G. W. Collins, the author of the excellent set of sketches in Clare Market published in our issue of September 29.

The *Studio* (September 15) includes "A Few Notes on Bench-ends," by Mr. J. Henwood Blamey. The writer, we observe, refers to the old oak bench-ends as "of extraordinary and apparently unnecessary strength;" but was that massiveness "unnecessary"? It is to it that a great part of the effect is due. Mr. Grubhofer's sketches at the Paris Exhibition are very good. We quite concur in the tone of the article on the work of Mr. Arnesby Brown, a painter whose pictures always display original thought.

The *Antiquary* contains "Notes on Some Stone Finds at Killucan, co. Westmeath," by the Rev. W. Falkiner. "The Noblest Guild of Freemasons" is the title of a review of Leader Scott's considerably over-rated work on the Comacine masters, who are themselves—or their importance—over-rated.

The *Engineering Magazine* for September (not noticed before) includes articles on "Recording Steam-engine performances," the object of which is partly to record the power of the several cylinders, in order to keep an eye to an equal distribution of work between them—a point as important with an engine as with a team of horses; on "Locomotives at the Paris Exhibition," and "Electricity in the Collieries of Great Britain." One of the objects aimed at is to work portable electric lamps in a convenient manner, to replace the old safety-lamps.

"The portable electric lamp consists of a case, in which is stored sufficient electrochemical energy to furnish current for a one candle-power lamp for ten to twelve hours or more, with a small incandescent lamp attached, the lamp being either on the top, the side, or the bottom of the case, the lamp itself being protected by a stout outer glass, similar to that used with the ordinary oil safety lamp, and usually, also, if above the case, with a metal plate and with wire guard rods. A hook or ring for carrying the lamp completes the equipment, but in some forms of lamp there is also a switch to turn the current on when not required. The case containing the cells which form the supply of energy is also protected with an outer case, either of steel, aluminium, or wood. The supply of energy is contained in galvanic cells."

There are not wanting objectors, however who say that the old lamps gave indication of the presence of gas, while the electric lamp does not. But its advantages, we should surmise, counterbalance this objection. The number for October includes articles on "Air-Compression by Water-Power," on "Centralised Steam-Condensing Plant," and on "Electric Power in Great Britain," the latter a short but comprehensive article on what may be called the administrative treatment of electric power.

The most important article in *Feilden's Magazine* is that on "Electrical Methods of Heating as applied to the Working of Metals," by Mr. de Tunzelmann. It describes and illustrates the Benardos and the Voltex systems of electric fusion as applied to the welding of metal. Mr. Twelvetrees is writing an account of the making of the Central London Railway, the second instalment of which appears in this month's number. "Quick-firing Guns" is a subject not within our professional sphere, but

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it is one which may at present interest English readers of all professions.

Scribner, under the heading "The Field of Art," has some remarks on architectural style. The writer thinks the great trouble is the lack of agreement among the men who might save the situation. He suggests however (as does Mr. Blomfield in a passage quoted in the address of the President of the Architectural Association, on another page) that we must after all adopt an ancient style and work in it until we can work out of it.

"Let the reader consider the new house in Milan, discussed in the *Field of Art* for July, 1899, together with the Paris house described in the number for July, 1900, and he will see the contrast between something even too closely copied from the past and something wholly fresh in design. Discussion of that existing movement in decorative art, in the spirit of which the Paris house is conceived, must be deferred to another time; but it is easy to see that the designer of such a building has immense difficulties to struggle with. No one of his forms—his windows, his balconies, his columns—is a well-worked-out, well-understood element of design. His new fashion of design may possibly grow into a system, a permanent style; but until it has done so he has a reluctant set of units to combine into architecture. Then look at the corresponding parts of the Italian building; how obvious they are, how acceptable, and how easy to fit together!"

The final suggestion is that the best thing we could do is to carefully study the French Renaissance of the seventy years following 1500 A.D., and work it out in detail. There might be many worse suggestions.

The *Nineteenth Century* contains a learned article on "The Majolica of Siena" by Mr. Langton Douglas, who, being engaged in research in Siena, and having reason to think that her majolica pottery deserved a higher place than has been allotted to it, made a search for further documentary evidence as to its history. The results are given in this article, which gives evidence of a great deal of labour, and contains a good many of what are probably new facts. "The Burden of Coal" is considered by Mr. Benjamin Taylor with the seriousness befitting what is at present such a grave subject. The only hopeful note in his article consists in the suggestion that we have not sufficiently considered the results of the great development of electric power and lighting, still in its infancy, in reducing the consumption of coal for steam-raising purposes and gas-making, and how we shall learn to dispense, to a large extent, with coal for our dynamos "by making use of the vast reserves of water-power stored up in the hills of Cumberland, Wales, Scotland, and elsewhere." The latter suggestion is logical, the former surely hardly so, since the diminution of steam-raising and gas-making can only be obtained at the cost of a proportionate increase in the use of electricity for power and light. Force cannot be created out of nothing, whether in the form of steam or electricity; the only improvement in that respect lies in the supposition that electric power is developed with less waste of energy than steam power. The article is worth serious attention, however. Under the title "The Oldest Picture-Book of All" Mr. Walter Maunder considers, in a very interesting article, the question of the origin and age of the constellation figures and nomenclature, and their connexion with early myths. The subject is a most fascinating one, at all events, even if the article, like *Paradise Lost*, "proves nothing."

The *Century* contains an article by Miss Pauline King on American miniature painting, accompanied by a good many very charming illustrations. There seems to have been a revival of this art in America, as in England, the pioneers of it having been Miss Laura C. Hills and Mr. W. J. Baer, whose "Aurora," two female busts with floating hair, and a morning sky over a level landscape behind them, is a lovely work, as shown in the engraving. We cannot however agree with the writer in thinking that miniatures are to be considered from the same point of view as larger portraits in the more serious media of art. Make the best you can of it, miniature painting on ivory will always remain a pretty and conventional type of art, more or less of a plaything or ornament. In all probability the portraits engraved here as illustrations give more the impression of serious art than the originals would convey. The engraving from a full-length portrait by Mr. Chase, "The Lady with the White Shawl," shows an interesting and characteristic "Example of American Portraiture."

Harper contains one of those personal articles on living artists which are becoming so popular in periodical literature, and are to our thinking in very questionable taste. This one is an appreciation, or what we should rather call an adulation, of Mr. Mortimer Menpes—"the man and his methods."

The *Contemporary Review* contains an article under the title "Ruskin, the Servant of Art," by Mr. R. Warwick Bond, which we strongly recommend to the attention of those who are specially interested in Ruskin. Written not without sympathy and a certain enthusiasm, it is a most thoughtful and temperately worded estimate of the nature of Ruskin's criticism and elucidation of art, and of the strong and the weak elements in his utterances.

The *Pall Mall Magazine* contains a popular article on Wollaton Hall, by Mr. E. M. Middleton, written with enthusiasm, but rather over-rating it as an example of architecture. Wollaton Hall is sumptuous but lacks refinement in detail. The shadowy form of "John of Padua" is again evoked as the architect.

Temple Bar contains a rather interesting article on "Pope as a Painter." Probably it is not generally known that the poet, in his earlier days, prided himself on being something of an artist, and executed a good many drawings, concerning which some detailed information is given. It is not probable that they were worth very much in an artistic sense; the interest lies in the fact that Pope made them.

The *English Illustrated Magazine* contains an account, with some illustrations, of what is called "The Most Remarkable Railway in the World," which perhaps at present deserves that title; it is the Wupper Valley railway in Germany, running from Barmen and Elberfeld, an eight-mile single-rail line in which the carriages are hung underneath the rail, which is carried by ∧ or ∩ supports according to situation, the ∩ form being used in passing through a town. The article is only a popular one, of course, but it may help to direct public attention to a method which is likely to be further developed.

The *Revue Générale* contains the first part of an article on "L'Assistance par le Travail en France," in other words, the system of finding work for those who have none, and making the work the condition of assistance.

The *Nouvelle Revue* contains an article on the subject "De Watteau à Rodin," sketching the course of feeling and principle in art between these two very opposite artists. The author shows insight in his observation on the vein of melancholy which pervades Watteau, in spite of the generally gay character of his subjects.

The *Genealogical Magazine* gives illustrations and descriptions of the arms of Calcutta and Madras. Both seem to have been evolved with a view to local colour. The supporters of the Calcutta arms are adjutant birds with snakes in their mouths; the shield of Madras shows "a tiger passant proper on a chief sable, a pale or between two elephants' heads couped of the field, a lotus-flower," &c.

In the *Gentleman's Magazine* Mr. W. H. Thompson endeavours to extract from Chaucer's poems a distinct idea of "The Chaucer Garden."

The *Home Counties Magazine* continues the article, "Notes on Church Plate": that on the old Igatehouse at Lincoln's Inn is concluded. A short article on "Chaucer at Aldgate" is among the other contents of the number.

Knowledge gives a drawing of the solar corona of 1900, with a paper by Mr. W. H. Wesley on the dark markings observed in that corona. "Astronomy without a Telescope" is continued by Mr. Walter Maunder.

The *Quarry* gives a description of the electric "Titan" crane at the Paris Exhibition. The serial article on the mineral industry of the United Kingdom deals with the geology and resources of Antrim.

We have received the *Architects' and Builders' Magazine*, a small magazine published in New York, and dealing chiefly with the practical side of building.

Water Supply, Manchester.—The first pipe of the second series of pipes to convey water from Thirlmere to Manchester was laid on the 4th inst. The Thirlmere scheme consists of tunnels and "cut-and-cover" work of about fifty miles in length, and pipes for a further distance of forty-five miles, covering the distance of ninety-five miles between Thirlmere and Manchester. Mr. G. H. Hill is the chief engineer.

Illustrations.

THE ALEXANDER III. BRIDGE, PARIS.

We give in this issue an engraving, from a photograph taken specially for the *Builder*, of the pylons and sculpture decoration of the northern end of the new bridge over the Seine, which, though carried out as part of the Great Exhibition programme, will remain as a permanent feature, at once of utility and of beauty, after the Exhibition has ceased to exist. The view is taken from a point just to the north of the bridge, on the Champs Elysées side of the river. The principal object has been to show the effect of the beautiful architectural and sculptured pylons which flank the entry to the bridge, and which exhibit all the refinement and finish of the best days of French Renaissance art.

The engineers of the bridge, as previously stated in our columns, are MM. Résal and Alby, and the architectural treatment has been carried out by MM. Cassien Bernard and Cousin, architects. The figures at the base of the pylons represent "Mediæval France," by M. Lenoir, and "Modern France," by M. Michel; the corresponding places on the two southern pylons, at the other end of the bridge, are occupied by similar seated figures representing "Renaissance France" (M. Coutan) and "Louis Quatorze France" (M. Marqueste). The lions led by Cupids, on each side of the entrance to the bridge, are by M. Gardet, the first living animal sculptor in France. The lamp-posts on the bridge are model by M. Gauquie, a young sculptor with a special aptitude for decorative work. Thus six of the first French sculptors of the day have been called on to assist in the decoration of this bridge: something rather different from the way the London County Council go about such a piece of work, where the engineer is (nominally at least) to do all the designing, because his feelings would be hurt if artists were called in to assist him!

The figures of winged horses and genii, which surmount the pylons, are entirely gilt; the photograph unfortunately turns them dark, so that their real effect is not seen in the illustration. It may be thought a little "gewgaw" to gild these figures, but they must be judged where they stand, and in the atmosphere of Paris. In the bright days of summer, under a blue sky, they looked perfectly beautiful, and the gilt wings actually had an effect as if the sun shone *through* them, though no doubt this was really the result of reflected light from the surfaces below the wings. These gilt steeds would perhaps not do in the London air and surroundings, but somehow they look quite right in Paris.

The buildings to the left of the view, at the further side of the river, are a portion of the Exhibition buildings on the west side of the Esplanade des Invalides. The distant building with the central and angle cupolas, seen in the middle of the view, is the pavilion of Italy, which terminates the row of structures in the "Rue des Nations."

WALSALL MUNICIPAL BUILDINGS: ACCEPTED DESIGN.

We give this week the plans and elevations and exterior perspective view of the design by Mr. J. G. Gibson for municipal buildings at Walsall, which has been selected for execution. The interior perspective view of the Town Hall was published in our issue of last week. The interior view actually sent in was a tracing in line of that drawing, the first drawing not tallying, in regard to method of execution, with the conditions of the competition, from which washed drawings were excluded.

The following are some remarks by the architect in explanation of his design:—

"The main lines of the plan were laid out to give perfectly straight corridors, leading direct to the different departments, and having windows along one side.

The main block of municipal offices was planned to have the principal entrance in Lichfield-street, in the centre of the whole of the offices when completed, and for this reason the 'future extension of offices' required is placed alongside the county court, and balances the offices now to be erected on the New-street frontage. The Town Hall has its main

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entrance to Leicester-street, this being nearest the town, and ample accommodation for carriages can be found in this street. The grouping of the departments was governed by the light or aspect required, the Borough Engineer having north-east light, and the Town Clerk being placed adjacent to the principal entrance.

The suggested art galleries have been worked out in sufficient detail to show that they will form an integral part of the complete scheme.

It is intended to build the whole of the frontages with local sandstone from Penkridge Quarries. This is of a fine warm colour, and will prove very suitable for the atmosphere of the town.

The roofs will be covered with silver-grey slates. The interior decorative parts are suggested on the section, and will be carried out in hardwood panellings, while painted decorations will be largely relied upon for the ultimate effects.

It is proposed to use 'low-pressure' steam heating for the buildings; very plain and simple fittings in the way of radiators will be used. The vitiated air will be extracted by means of electrically driven fans, and the whole buildings will be lighted by elec ricity.

The estimated cost amounts to 55,000*l.*, exclusive of the tower and stone external facing to the new street; but the Town Council are determined to erect the tower at the same time as the first part of the buildings, and tenders for the work will be asked as soon as the working drawings can be got ready."

Mr. Gibson's plan appears to us quite admirable, especially in the arrangement of the corridors and the approaches to the large hall. In this respect we recommend it to the attention of architectural students, many of whom we fear, at present, have a tendency to neglect plan in their enthusiasm for picturesque sketching.

COMPETITIONS.*

In no other profession that I know of is there a path open by which any member of the profession, however little known, may with perfect propriety attempt to secure the prizes of the profession with no other assistance than his own ability and skill; this privilege belongs, however, to architecture. A very considerable proportion of the public work which is carried out in this country is offered to the best man, without restriction, by public advertisement. The method of doing this is known as Competition, a word which has a special meaning among architects a little different from that which it has when used by merchants, manufacturers, or tradesmen. It is surely worth while to give our attention to some of the aspects of so unusual a mode of procedure as architectural competition.

Having begun by setting forth the greatest of the advantages which competitions have to offer to our profession, I am almost bound to add that the profession as a whole pays a very heavy price for them; so heavy, indeed, that were there no other benefit we might be disposed to reckon that the privilege is dearly bought. There is, however, another benefit which must be taken into account, and which serves to turn the scale. I allude to the value as professional training of an opportunity of trying one's hand at a bit of actual work. Such an opportunity is—or at least may be—of the greatest value to those who avail themselves of it, and justifies me, if a justification is sought, in bringing the subject forward at the outset of an academic course.

The individuals who desire to promote the erection of a public building, and have the control of the arrangements, very often take it as a matter of course that they should obtain the design, and even appoint the architect, by the method of competition; that is to say, they invite architects to submit designs, they in some way arrive at a selection, and they very often entrust the erection of the building to the architect whose design they have chosen. Whether in pursuing this method the promoters are following the path of wisdom does not concern you and me. What I am telling you is that which is actually customary. It very seldom occurs in the case of buildings for private owners, and it does not invariably occur in the case of public buildings, that the promoters have recourse to competition, but it occurs sufficiently often to justify me in saying that it is customary.

Sometimes recourse is had to an invitation by an advertisement in the public newspapers to which any one may respond. At other times only a certain number of architects are invited by direct invitation. This last method is called a limited competition, and, of course, it is seldom open to men who have not yet begun to make a name for themselves. We will consider the case of public competitions first.

In this case the designs are invited by advertisement in some of the daily papers or professional journals, or both, and it is usually set forth that the competitor whose design is considered the best shall receive a money premium, and usually a second premium and even a third are promised, smaller in amount; and beyond this the promoters do not, as a rule, pledge themselves; though, of course, there is behind the expectation that the successful man will be the architect of the building.

The promoters always find that it is necessary to prepare and issue some kind of description of what they want their building to be, and this document is often a very imperfect one. Occasionally the promoters (as I shall call the persons who issue the invitation) are wise enough to call in an experienced architect; and he, with more or less trouble, makes out for them a statement of what is required. Mostly, however, they do not think that at this stage they need any help, and very often there are imperfections in their work which might be avoided, and which lead to trouble. But even when there is much that is defective, the fact that it relates to a real building, a real set of wants and requirements, and a real desire to build, makes the preparation of a competition design a better—a far better—lesson to a young architect than a competition for prizes offered by such bodies as the Royal Academy, the Royal Institute of British Architects, or the Architectural Association, good and useful as the latter are in their own way.

It is now usual to promise that the advice of an architect of standing shall be taken in the adjudication. He is usually known as a professional assessor. It is, unfortunately, often customary to stipulate that if the architect who obtains the first place be employed to erect the building, his premium shall merge in his commission—an unfair custom. The instructions vary very much in quality, the most common defect being that they describe in far too much detail the accommodation required. For example, in a recent case the dimensions of all the rooms were given instead of the area, with a result that as there were several floors it was impossible to place rooms over each other. To tell a competitor that a room 20 ft. by 22 ft. is wanted implies that it must be very nearly square, whereas if it were directed that about 440 ft. superficial should be provided in a room of convenient shape, the designer would be much more free.

The most troublesome part of such a set of instructions to competitors is, however, that, as a rule, they not only prescribe with too much exactitude the accommodation to be provided, but they also fix the limit of cost without sufficient ground for believing that the promoters can get what they want for what they propose to spend. A plan of the site usually accompanies these instructions, and sometimes it is the custom to make a charge for each copy of instructions and plan; with the promise that the money paid shall be refunded to each competitor who actually sends in a design. This is not an unreasonable custom.

A date is usually fixed for the reception of designs, but it is very usual for that limit to be extended. Some system for securing that the authorship of the designs shall not be known is in most cases adopted, the general method being to sign the drawings with a motto, and lodge with the drawings a closed envelope with the same motto outside and the name inside. In a few cases architects are allowed to sign their plans with their own names. It is perhaps right that I should say that in my opinion these precautions generally answer the end proposed effectually. In a very important competition indeed, like that for the Law Courts for example, the authorship of many of the designs is known unavoidably to so many people that the mottoes are only a conventional screen; but, generally speaking, I believe that unless competitors themselves tell their friends (which is unfair), the authorship of designs submitted under motto remains unknown in most cases; though handwriting or some peculiarity in draughtsmanship, which is equivalent to handwriting, may sometimes betray an individual set of drawings. All this is to a certain extent anticipating matters, and we must now consider what should be the course of an intending competitor after he has obtained his instructions.

It appears to me that his first duty is to see the site. This, of course, may involve a journey, but if the competitor really sets himself to make a design which will fit the circumstances, he *must* take the nature of the site into account. Very few buildings indeed are designed successfully unless the site is considered by their designer and they are fitted to occupy it.

In many cases when a young architect goes to see the site of a building for which he intends to make a competitive design, it will be the first time that he will find himself face to face with the question of site at all seriously; and he may be glad of some suggestions as to what to look for. He will do well to ask himself the following questions and see how far the site supplies the answers:—1. Where will the building be approached from? *i.e.*, from which direction will the larger part of the people come who will make use of the building? 2. From which direction will it be best seen? 3. In which direction is it to front? 4. Is there an inequality of levels? Can such inequality be anyhow turned to advantage? 5. At what level should the ground floor be? 6. Is there any existing object or building with which the new building should either contrast or combine? 7. Is there an object which ought to be visible from the windows of the new building? 8. Is any part of the site specially open to storms and bad weather, or, on the other hand, specially open to sunshine and light? An architect who will put each of these questions to himself successively, and will extract an answer to each one from the plot of ground which he has before his eyes, will not have visited the site in vain.

Another benefit which a visit to the site may bring with it will be a chance of personally seeing the building materials in common use in the locality, if it be an unfamiliar one; and possibly some suggestions as to the kind of treatment which the exterior is to receive or is *not* to receive may be gained by noticing what has become too hackneyed in the district or what is appropriate to the district. England is not a large country, but it is infinitely diversified; and an architect with his eyes open, and who tries to form an idea of how he might most successfully fit in a new building into an existing locality, is very likely to benefit by seeing the locality with his own eyes.

Another preliminary which it is usually wise not to neglect is to visit some good and recent specimen of the sort of building, and, if possible, to converse with the people who have the use of such building. You will gather what has been done before. You may gather what are the most recent improvements or innovations in the class of building to which yours belongs; and you may perhaps gather useful indications of the modifications which the people who occupy it consider would, in their judgment, remove difficulties in working or introduce new facilities.

We have now reached the stage when the designer must set to work with preliminary sketches of *plan*. The first thing needful is to work the requirements into his head, and this is usually best done by making out plans, often by revising and amending the sketches again and again. The most important feature of the whole design is unquestionably *the general disposition of the plan of the principal floor*, and you must be prepared to reconsider and revise and improve this down to a very late stage in the preparation of the design. It may very well happen to you, as it has to others, that after working for days or even weeks on one plan, a new one unquestionably better suggests itself. If that occur, do not hesitate to adopt it at whatever sacrifice of previous work. Your great object is to succeed, and if a stroke of luck or genius reveal to you a means of doing something obviously better than you were doing, you will deserve to fail if you do not adopt that means. I do not propose here to give you a description of proper planning, but I will just say that in a good plan the required accommodation is provided, and no more. The relation of the different rooms to one another is the most convenient possible. Every room is of a good shape and of the prescribed size, and well lit. The fewer corridors, the better the plan, but what there are *must* be roomy,

* Address delivered to architectural students at University College, October 8, by Professor Roger Smith.

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airy, direct, and light. If there are internal courts for light, it is to be regretted; but in a large building they cannot always be avoided. Let them be large, and where practicable open on one side for better ventilation. Avoid top lighting and top ventilation where windows are possible. Of course, billiard-rooms, museums, and picture-galleries are exceptions to this rule. Staircases must be well placed, convenient, light, airy.

The building must be planned from the first with an eye to the possibilities of architectural treatment inside and out. Trial sketches of elevation and section must be made as the plan goes on; and if your plan obstinately refuses to give you good architectural opportunities you must alter it, just as you would if you found you could not light some of your rooms. Finally, the design takes shape as a complete design. You have done your best in planning, in elevation, and, above all, in section. Now do your level best in draughtsmanship. It conduces to success that the drawings should be effective and their general aspect pleasing. If the conditions permit a perspective, do not omit as good an one as you can possibly make or get made. Do not attempt to infringe any of the directions to competitors; but within the letter and spirit of those conditions do not spare any pains to make a good set of drawings. A report usually accompanies the plans. Make it brief. It is your drawings, and not your report, that will win or lose the competition. Lastly, an estimate is asked for. It is usual and sufficient for competitive purposes to make a cubed estimate. Make it honestly, supply the figures, and the price at which you rate them, and be quite sure that the amount of the estimate will influence the result. Of course, you will, if you are prudent, cube up your design more than once as it begins to take shape, and if you find that your building contains so many cubic feet that your price must be an impossible rate per square foot, (fourpence per foot, for example), see if you cannot condense your building; and be fully sure that, supposing it can be done, if you do not do so, another competitor will. In some little experience as an assessor, nothing has surprised me more than the difference in this respect between the work of competitors, each giving the accommodation required, but one diffuse and the other compact.

At last the design is completed and sent in, and the competitor is probably by this time too eager after success to care a straw for the gains which failure cannot take away from him. The chances, suppose there are only half a dozen competitors, are apparently five to one against you, but they may be very different. If you have taken very great pains you may very possibly have reduced the odds. If you have a spark of architectural genius or have had a lucky inspiration, in this case your chance may be a very good one indeed; but settle it in your mind that you are very likely to fail, and ask yourself, Supposing I fail, has it been worth while? Very few beginners, at any rate, will hesitate to say, if they are candid, that it has been well worth while. The time may come when they will have learned the lessons which competitions can teach, and will not look on competitions as exercises; but the student and the young architect starting in his profession have a great deal to learn; and grappling with one of the problems of real life and work, possibly an important problem, will have taught him a great deal which he must acquire if he is to practise his profession successfully, and which will help to equip him for the future, whether he finds it of advantage to engage in many more competitions or not.

Lest I should be misunderstood, let me say that I do not advise engaging often in competitions merely as exercises. When you go in, go in to win; give your best attention and your best powers to the preparation of the design. I have already urged you to keep your mind open to improvements that occur to you down to a late stage in the design. I think it also useful to suggest that you give careful attention to the part that naturally interests you least. You are not likely to succeed unless your work is good in planning and also good in architectural treatment, and if it happens that you have a decided bias towards either of these two, be very attentive to the other.

Pains should be taken in the get-up of competition drawings, and though there is no great good in preparing a large and unnecessary number, sufficient drawings should be made fully to show the design; and if circumstances admit, some details should be furnished, well drawn and striking if possible. When perspectives are admitted and not restricted in number, one or more perspective sketches of portions—especially of interiors, if there are good points to illustrate—are serviceable.

Of course, a competition is seldom if ever decided on these additional drawings, but they contribute to draw attention to its possibilities; and suppose that two designs are practically equal as to the merits of their planning and their general treatment, the details, if good, may very well serve to turn the scale, and very properly so.

Let me, however, urge that genuine professional employment, coming to a young man through his connexion, should never be interfered with by a competition. Perhaps a limited competition is an exception to this rule, because the invitation to engage in it really comes from a man's connexion; but if the choice lies between neglecting a modest commission from a real client and giving up a public competition, the path of prudence leads in the direction of doing your client's work thoroughly and letting the competition go.

Lastly, let me urge that it is the duty of an unsuccessful competitor to accept his defeat like a gentleman, and not to fill the air with lamentations, or to try to attack his successful rival behind his back.

(To be continued.)

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A Home Counties meeting of the members of the Association of Municipal and County Engineers was held at East Molesey and Hampton on Saturday, October 6. The members met at the Castle Hotel, East Molesey, where they were received by Mr. H. J. Robertson, Chairman of the District Council. Mr. E. G. Mawbey (Leicester) presided, and there were present Messrs. W. Weaver (Kensington), W. N. Blair (St. Pancras), J. P. Barber (Islington), A. H. Campbell (East Ham), W. H. Savage (East Ham), A. M. Fowler (Westminster), J. A. Angell (Beckenham), R. J. Thomas (Aylesbury), A. D. Greatorex (West Bromwich), J. S. Pickering (Nuneaton), Jenkins (Walton), Smith (Kettering), Chambers Smith (Sutton), T. Cole (Westminster—Secretary), J. Walker (Croydon), Shone (Westminster), J. Kemp (Hampton), J. Stevenson (Molesey), and others.

Mr. J. Stevenson, Engineer to the Urban District Council, read a paper on some of the public works in East Molesey. He stated that the district was sewered in 1893-5, Mr. J. C. Melliss being engineer. The high-level portion, comprising quite three-fourths of the district, gravitated to the disposal works, where the sewage was pumped from a deep pump-well into the precipitating tanks. There were also two Shone ejector stations for raising the sewage from the low-level areas of the district into the high-level system. The scheme was one of the best and most water-tight schemes that had been carried out in the Thames valley, and up to the present time the sewers had worked in an excellent manner. The sewage, on being received at the disposal works, was precipitated in tanks, sulphate of ammonia and lime being used in the treatment, and occasionally sulphate of iron when the sewage was of a strong character, and atmospheric conditions very high. The supernatant water was then passed on to the land and dealt with by intermittent downward filtration. Under the surface was a stiff clay, varying from 1 ft. 9 in. to 2 ft. 6 in. in thickness, and it had been imperative that this should be broken through, additional drainage provided, and the land levelled in order that stagnation on the surface should be avoided and a proper effluent obtained. The house refuse collected in the district during the past four years had been used in lightening and levelling the ground and improving the filtration area. This was all properly selected and screened upon its arrival at the works, the decaying vegetable and other matter burned; this was then screened and the clinker broken and placed around the land drainpipes. The sludge from the precipitating tanks was pressed into cake and disposed of to local farmers. The average dry weather flow was 22½ gallons per head, and the cost of the main sewerage scheme and sewage disposal works 37,250*l*.

The Chairman proposed a vote of thanks to Mr. Stevenson for his paper, which he said was excellent in quality and brevity.

Mr. A. M. Fowler, London, said that precipitation and downward intermittent filtration were the principles of sewage disposal upon which the Local Government Board pinned their faith, and until the Royal Commission issued their report they must take it that that was the best system before the country.

Mr. W. Weaver, Kensington, said that sludge-pressing was an expensive process. The question was whether some of the refuse could not be mixed with the sludge and sold to farmers in the district as manure. He had had a good many requests from farmers in that district, and the question was whether they could not sell it to the farmers without the cost of pressing.

Mr. Stevenson, in replying, said the water test was applied to all the main sewers, and the pipes used were Doulton's self-adjusted, Hassall's single lined, and Hassall's double lined.

Mr. J. Kemp, Surveyor to the Urban District Council, read a paper on the sewerage and sewage disposal works at Hampton-on-Thames. He said that, owing to the condition of the district with the level of the ground water so near the surface, it became evident to him that any scheme of sewerage should be accompanied by a scheme for the permanent lowering of the subsoil water also if the full benefits of drainage were to be reaped by the inhabitants. He also recommended the construction of surface-water sewers concurrently with the construction of the soil sewers in those roads not already so provided. It became apparent that the sewage must be pumped, and the site of the disposal works must be away from the Thames and the water companies' intakes, and thus in the highest part of the district. After considering the geographical configuration of the district, he came to the conclusion that it was an ideal one for the application of the Shone system in its entirety. The advantages of this system were the construction of comparatively shallow sewers, the saving in cost, the facility of laying the sewers so as to be watertight, and of constructing beneath the same subsoil drains with free outlets, so as to lower permanently the subsoil water, and so reduce the possibility of infiltration into the sewers. The scheme as designed divided the district into eight areas, in each of which at the lowest point an ejector station was constructed, containing automatic ejectors in duplicate, each ejector being estimated of sufficient capacity to discharge the whole of the sewage from the district when fully built upon. The sewers gravitating to the several stations were mainly 7 in. in diameter, with 5-in. branches for house connexions. With the exception of about two miles they were constructed with Hassall's patent pipes, the remaining length made up of Wakefield's patent. The sewers were all laid on a concrete bed which practically formed an arch over the subsoil drain. The sewers had gradients varying from 1 in 150 to 1 in 250, and at the head of each was placed one of Adams' automatic flushing apparatus; some of these discharged once in twenty-four and others once in forty-eight hours according to the length and gradient of the sewer. The scheme of disposal sanctioned by the Local Government Board was that known as the Intercepting, but before the works were commenced he heard of the Sutton experiments with bacteria beds, and after inspection of the Sutton works, the Council passed a resolution authorising a departure from the original scheme. The sanction of the Local Government Board for this departure was not obtained or sought, nor was it until the beds were nearly completed that they discovered the alteration. This occurred on the Council's application for further money to complete the works, which had exceeded the estimated cost. The Council received a severe lecture, and the Board's refusal to grant any further sanction unless they would agree to lift the effluent from the third contact bed and pass it overland. The Council had no alternative but to agree to what they considered useless expenditure, and subsequent experience had proved that they were right, as the final effluent from the beds was and always had been of a very good and uniform quality, and satisfactory to the Thames Conservancy. The effluent was used for condensing, feed, and cooling purposes with no ill effects on the boilers in the shape of incrustation; in fact, it was the only water on the works. The sewage was delivered by the ejectors into a screening chamber, where it passed through a ½-in. mesh

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screen, and from thence to the bacteria beds without sedimentation. The beds were fifteen in number, 4 ft. 4 in. deep; the coarse beds filled to within 4 in. of the top with coarse clinkers rejected by a ¾-in. sieve; the medium beds filled with clinkers passed through a ¾-in. sieve and rejected by a ¼-in. sieve; the third or fine beds filled with the residue of the material from the second beds, and consisting largely of fine powdered clinkers and ashes. The liquid capacity of each of the coarse beds when newly constructed was 20,000 gallons, or 46 per cent. of the total, and this capacity had not diminished, although the beds had been working since December 8, 1898, when the first connexion was made with the sewers. A coarse bed was filled within 4 in. or 6 in. of the surface, allowed to stand full about two hours, and then emptied slowly, taking about one hour, and this process was repeated with the medium and fine beds. In each case when a bed was emptied the valves were left open until the bed was required to be filled again to assist æration. Each bed was allowed one week's rest in five, so that one set of three beds was always resting. According to a report prepared by Mr. C. E. Cassal in October, 1899, the Hampton sewage was strong domestic sewage, absorbing in four hours 129·4 parts per million of oxygen from permanganate, and containing 79·32 parts of saline ammonia and 15·2 parts of organic ammonia per million. The percentage of purification obtained was of oxygen absorbed 96·9, ammonia reduced 97·5. In his opinion no better material than furnace refuse could be obtained for bacteria beds. By its use the largest possible liquid capacity was obtained in the beds, which was a great consideration in the cost of construction, nor did the material deteriorate by disintegration. There was no doubt that by the adoption of the bacterial method of treatment, the District Council had saved a large annual expenditure which would otherwise have been incurred in the cost of chemicals, labour, and sludge pressing. Although only one analysis had been taken by the Council, the effluent from the bacteria beds had always satisfied the Thames Conservancy, and, so far as his experience went, there was no necessity whatever to pass the effluent from the beds overland. He was pleased to say that the sewers, although in many places under water, were practically tight, and therefore a minimum quantity of sewage had to be lifted and dealt with by the beds. The cost of the whole scheme was 61,915*l.*

Mr. W. Weaver, Kensington, proposed a vote of thanks to Mr. Kemp for his paper. He complimented the district upon the excellent manner in which the roads were maintained.

Mr. A. D. Greatorex, West Bromwich, congratulated Mr. Kemp upon having thrown over the original scheme and adopted the bacteria treatment of the sewage. It was well known to the members of the Association that he had for a time been dealing with a large quantity of sewage on this system, and as his experiments had been running twelve months, he could give analytical results which bore out Mr. Kemp's statement that sewage could be dealt with sufficiently without the aid of land. One portion of the sewage was dealt with on the high level through a coarse bed, and then the effluent was passed on to the land. That bed had dealt with in twelve months some twelve million gallons of sewage, and the average of eighteen analyses was—oxygen absorbed in four hours, ·369; nitrogen, nitrites, and nitrates, 1·260; albuminoid ammonia, ·0416. He thought they would all agree that was an extremely good result. The low level had also a coarse and a fine grain bed. The Local Government Board, in sanctioning the loan, insisted that the effluent should be put on the land, and to do that they had to pump it. Those beds had dealt with forty million gallons in twelve months, and the result of a similar number of analyses was—oxygen absorbed in four hours, ·457; nitrogen, nitrites, and nitrates, ·52; albuminoid ammonia, ·0083. These results were very satisfactory and largely in excess of any standard laid down at the present time. He was absolutely convinced that there was no necessity to place the effluent from fine beds on to the land. He was sorry only one analysis had been made at Hampton, and he thought they would be well advised to have samples analysed once a quarter, if not once a month.

Mr. J. S. Pickering, Nuneaton, said he would hesitate to accept the statement that the liquid capacity of the beds had not diminished. The flow from the beds ought to be gauged by meter, as the statement in the paper seemed incredible.

Mr. Shone, London, expressed pleasure at the suggestion of Mr. Greatorex in favour of taking frequent analyses of the effluent. He knew there was much difficulty in persuading members of local authorities to go to the expense, as they did not realise the necessity in the same way as the professional man. He had never seen an effluent to be compared with that obtained there. Mr. A. M. Fowler and Mr. Santo Crimp had said the same thing. There was also no sludge, which he attributed to the adoption of the separate system, and to the fact that the large main acted as septic tanks. Thus, when the sewage was driven out by the ejectors, it absorbed some of the compressed air, and doubtless arrived at the outfall charged with this compressed air.

Mr. A. M. Fowler, Westminster, said he had the courage of his convictions, and had yet to be satisfied that there was any better system than that recommended by the Local Government Board universally, that of precipitation and downward intermittent filtration.

The members then proceeded in brakes to the East Molesey Sewage Disposal Works, over which they were conducted by Mr. W. G. Garland, Chairman of the Drainage Committee, to the Lambeth Water Company's extension works, new storage reservoirs, and intake works at West Molesey (where luncheon was served), the sewage disposal works at Hampton, and the Southwark and Vauxhall pumping station at Hampton.

THE ARCHITECTURAL ASSOCIATION:

SCHOOL OF DESIGN.

THE preliminary meeting of the School of Design of the Architectural Association was held on Tuesday evening at No. 56, Great Marlborough-street, W. (Mr. W. H. Seth-Smith, President of the Association, in the chair), when short addresses were delivered by Messrs. Aston Webb, A.R.A., and Beresford Pite. The classroom in which the meeting was held was altogether too small for the occasion, and the Chairman, in the course of a few appropriate preliminary remarks to the students, said that such a large meeting afforded a good illustration of the Association's need of larger premises.

The Study of Materials.

Mr. Beresford Pite said he had chosen a particular subject with a view of trying to indicate some new and, perhaps, original lines of study. The subject was the study of materials. An acquaintance with the nature and uses of the materials for which the architect had to prepare designs, or, more properly, from which he had to design, was of fundamental importance. The acquaintance should not be slight or of a merely general character, but should extend to a certain knowledge of those qualities of each material that were serviceable to building work. Such definite comprehension of each material would, in the designer's mind, ally itself to the intention and purpose he had in view, and procure that harmony between the means used and the end to be obtained, which was a proper element of beauty in anything that a man did. A satisfactory architecture could not be produced with unsatisfactory materials, and ignorance resulting from the neglect of their study was not compensated for by a knowledge of æsthetic form or details of ancient architecture, or any facility in their rearrangement for purposes of modern buildings. Sound and ingenious construction was an element in the art of beautiful building which was as essential as the right and sympathetic use of material, and with which it could not but be closely allied. The effect of this relation between construction and materials upon design and the resulting work of architecture could be readily illustrated by recalling many instances of constructive skill displayed in unsuitable and unlovely material, and of beautiful materials which had been badly constructed and designed. There should be no confusion of thought as to that art which selected and placed materials usefully and beautifully in a building and the science which might attain a constructive end regardless of the means it employed. Without constructive science building was impossible, but unless exercised in suitable materials and with a proper knowledge of their nature and use, good architecture was equally unattainable. As æsthetic design could not exist by itself in architecture, apart from building, both of these qualities (though the æsthetic relation of each might at first sight seem remote and secondary) must be in harmony. Materials, construction, use, æsthetics, were the progressive order of study, but each in relation to the other, and beauty of architecture was the result of the harmonious relations of those elements. The effect on the mind in the achieved building was realised in the reverse order. First, the pleasure of the æsthetic quality of form; then satisfaction with a serviceable and dignified composition; then its security, fitness, and economy of construction; and lastly material imparting substance to the whole. Material was constructive unless it was purely decorative, but it was also æsthetic. The quality of texture was little understood by English architects, though in France they were capable of giving texture in architecture. This æsthetic element in the workmanship of each building material was of great value to fine architecture and the neglect of it would be fatal to real beauty. The excellence of material, such as marble, &c., did not enter into this view of the subject at all. Until form, plan, construction, and texture were mastered by the student in their combined expression, the decorative use of materials had better be dismissed from the mind. It was a subject which was very likely to mislead and to prevent any realisation of the subtle quality of texture, at once constructive and artistic, which could become an element of beauty in our architecture. Closely allied with the consideration of a building material was the workmanship of it, for a design must not only be capable of being expressed fitly in the intended material, but should be such that the kind of workmanship employed should be emphasised and used so as to exhibit its own type of craftsmanship to the greatest advantage. As an illustration he would refer to the joinery in the Law Courts. They would find that the joinery was executed with masons' joints; that was to say, the mitres of the mouldings were returned on the solid in the woodwork. A mason did that in masonry, but a carpenter did not do it in carpentry. That was a fair example of the wrong expression in material of the workmanship allied to that material. The workmanship of the material must most fitly express the quality of the material, and *vice versâ*. He excluded the design of carved or decorative details in order fully to consider the terms of relation between what were considered architectural qualities and so as to understand the artistic quality of material applied to surfaces. Architecture had, unfortunately, for a whole century long been under the spell of an archæological pedantry as unnatural as onerous, and with which it had struggled for a lasting and satisfactory type of expression. It had used architectural forms because they had been used in the past, and not because they were specially applicable to the material with which one had to design. Architecture had almost ceased to have a power of imparting expression and character through the material to the building. The ceaseless change of form in decorations, of features and details, had deprived our civil architecture, at all events, of all seriousness of purpose. Cleverness in design, or what was known as such, was the common ideal, whether the gift of cleverness was possessed or not. It was superficial cleverness, and was dangerous to the student and inimical to the progress of national art. The field of study had to be shifted, and the outlook of the student turned from the service of abstract designs and drawings to which he had hitherto gone for his artistic training. The student had hitherto studied the forms of the past, and had fairly exhausted the available field of research. Let him begin with a new tradition, and devote practical investigation to the qualities of the matter of buildings and to the craftsmanship of their application to the whole and parts, and he will find the whole world of constructed buildings, ancient and modern, lay before him for consideration and study. He would then examine, and discern with growing enthusiasm and delight that ancient buildings contained beautiful examples of treatment of material and delightful craftsmanship. That field of study would offer a great variety of interest in the different nature of each material. All the materials in use would yield their different and distinct characteristics to the thoughtful designer. All offered to the student who would sympathetically study and employ them

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suggestions for design which might issue in living character and vitally rational buildings.

Design.

Mr. Aston Webb said that what he had to say would be very informal, and was only intended for young students, and not for publication; in fact, he felt that a T-square and drawing-board were more important than a tongue in matters of architecture. William Burges was once called upon by the Chairman at an Association meeting to speak on the subject of colour, and after some hesitation Burges rose and said: "Colour is a gift from God, and it is no good talking about it." He then resumed his seat and would say nothing more. With that remark they would all agree, except that some of the colour now to be seen about might be ascribed to another source, so hot and fiery it often was. Two years ago he made a few remarks on planning; this time he proposed to take a much more thorny subject, viz., design. Planning did not seem to rouse the ire of people, but on design he hardly supposed that two of his hearers were agreed. But they would all agree to try and see good wherever good was, whatever the style. It was recorded of William Morris that he wrote the very beautiful prologue to *The Earthly Paradise* in a little wayside railway waiting-room, while waiting for a train. That alertness of mind and preoccupation of subject which enabled Morris to do that, were the qualities which architects had to encourage; they should carry their powers of observation and thought wherever they went, and not keep them merely in office hours. The thing that was once first thought about in design was drawing, and there was a well-known axiom that the first thing was to draw, the second to draw, and the third also to draw. That idea had been exploded of late, he thought, and if the word design were substituted for drawing, it would probably be better. Ruskin once drew on a blackboard, in the course of one of his lectures, a charming and delicate wreath of leaves, and, turning to his audience, said, "No man has a right to be an architect unless he can draw leaves like that." Now we should perhaps think that a man who could draw leaves like that would make a better painter than architect. In the Council-room of the Institute of Architects was a little sketch by Christopher Wren, a rough little section with some figured dimensions, and with no beauty of draughtsmanship about it. If he (the speaker) were addressing any students who were not very great draughtsmen, he thought it would give them courage when they saw that drawing. He thought that sketching, beyond a certain point, was almost a dangerous art, and he did not mind saying so because he had been a bit of a sketcher himself. Sketching was apt to deceive, and in sketching one might think one had done a rather good thing in the way of design, while it might be they had done nothing of the kind. When the President of the Royal Academy addressed the students last Gold Medal day, he pointed out to them that a man's reputation depended finally upon his completed work, not on his sketches. That might be a rather disappointing thing to say to young men who naturally could not get to completed works at first, but it was a very salutary and proper lesson for all to learn. If true of painters, to whom the President especially referred, how much more true was it of architects! An architect could get a sketch published, and in that way get a certain amount of reputation, but it was by the building that he was finally known and estimated. One of the first things he said to a young man who came into his office was this: "You have to show on paper something which cannot be properly shown on paper." They had to show a cube on the flat, and as soon as they began to realise the three dimensions together, the better. He knew buildings (some of his own, he feared) which had been studied too much from the point of view of the elevations, and the returns and the general effect suffered. They would find it a great help if they began from the beginning to think in three dimensions. Scientific men had an idea that there was a fourth dimension—a sort of metrical movement of the three other dimensions put together—and in architectural design there was the correct relation of the three dimensions that produced proportion and perfect design. Certain buildings had that sense of proportion in which the height, length, and breadth were exactly attuned to one another. In music there were chords which were perfectly complete, the "great Amen." The dome of St. Paul's seemed to him to be a sort of "Amen" in architecture, and he believed that no one wanted to improve upon it; it was a perfect thing in itself. The interior of Westminster Abbey, struck on quite different lines, produced a similar feeling. People troubled themselves as to whether the plan should precede the elevation, or *vice versâ*. That was all twaddle; the only way was to think of plan, elevation, and sections together—to think of the building as it would be in reality. Fancy St. Paul's dome being designed without thinking about the plan! Each part of a design should be worked together gradually up towards completion. In addition to that, to make a satisfactory building that much-neglected specification must also be brought in. In the specification were the materials, and in the earliest stages of a design one had to consider what materials were to be used. More than that, there was the question of foundation, for with a bad foundation the architect would not introduce tall towers, but keep his building flat and low, and so his whole design is affected. An interesting paper on the subject of the three dimensions was read before the Association two or three years ago by Mr. F. T. Baggallay, in which he pointed out how often all the features of a building were on the same plane in front; there was no variety and no suggestion of a third dimension. The features of a building when placed on different planes moved differently as one walked towards them, and in that way different effects were got—often very fine, and affording a living look to a building. Another matter of importance was the position of a building and the way it was seen and approached. Often a good deal of work was put into a portion of a building which could never be seen, while another portion, quite in view, was neglected and unconsidered. An architect could hardly go too often to the site while making his designs for a building. A sketch was too often put up from a particular point of view, and it was forgotten that the building would be seen from all sides. A sculptor was most alive to that, and he modelled his work in the middle of his studio, walking round it and making his figure right from all points. Architects ought to do exactly the same, and if they must make perspective drawings (and they could not help it if they were anything of draughtsmen), they should make them from various points. They should note where the walks and roads, &c., were. The position of the building was a matter that the architect ought to have a voice in; but unfortunately in the laying-out of towns the sites for buildings were not settled at all by an architect. Architectural advice ought to be sought from the first in laying-out any public improvement in any town. If that were to be done (and he thought there was a growing tendency in Local Authorities to do so), architects must be prepared to advise them properly. As to simplicity in design, it was important to understand words. No doubt all of them meant much the same thing, but he was not sure whether simplicity was the word intended. Simplicity, as sometimes understood, was apt to lead students astray, and he knew men who prided themselves on what they called the baldness of their designs. That was not what was meant by simplicity. He thought that what was meant was restfulness and repose, for that was the quality they wanted to get into buildings, and that was got by a quiet outline more than by the omission of detail. Think of the Houses of Parliament. What could be more dignified and, to a great extent, simple than the river front of those buildings? What more reposeful? And yet the whole face was covered—possibly with too much ornament, though that did not take off the magnificent effect of the river front. A very important thing in designing a building was to think of the silhouette against the sky. Chimneys, &c., in London were often fatal to the reposefulness of a design, but difficulties were architects' opportunities. As to the rectification of optical defects, they should be careful they did not exaggerate these. In the case of a column, the entasis was sometimes too much emphasised; and the stilting of a dome was often overdone. In the case of the dome of St. Paul's there was very little stilting, and yet the dome looked as well from Cheapside when one was near it as when one saw it from a distance. A distinguished sculptor once said to him: "No figure in architecture should be distorted, even a seated one placed high up;" and in trying to correct optical defects architects must guard against exaggeration and the falling into worse evils. In the case of the well-known difficulty of upright pinnacles against a spire appearing to fall outwards, the mediæval builders sometimes inclined the pinnacle a little inwards and sometimes mystified the connexion between them and the spire. How far utility was to interfere with the elevation was another point. He was inclined to think they should be combined, and the same remark applied to the plan and elevation. All architecture was a matter of compromise, unfortunately. A question that was very much in the air was as to the alliance of other arts with architecture. Every one agreed with that to a great extent, but it must not be forgotten that architecture had a distinct expression, quite apart from painting and sculpture; and that one of the greatest living architects, whose works they all admired, had not introduced much sculpture or painting to aid the expression of his buildings. He was not speaking against collaboration in the arts, but he felt he must put in a word for architecture, that it had an expression independent of the other arts, although it was far more complete if they were all represented. In regard to expression in a building, the late Mr. Pearson was once speaking to Archbishop Benson about churches, &c., and he said to the Archbishop: "When you go into a church you should ask yourself not 'is it grand; is it magnificent; is it splendidly built'? but you should say; 'does it send you on your knees?'" Well, that was what a church should do; that was its object, and if it did it also expressed in the highest sense its purpose. Some of Mr. Pearson's churches had that particular power—St. John's, Red Lion-square, and St. Augustine's, Highgate, for instance. There were living architects who could put into their churches that devotional spirit, which was certainly the highest aim an architect could have. In the same way, in designing such a building as Law Courts, they must try and give it a feeling of awe, and in the case of Parliament Houses (though he did not suppose any of them would be called upon for such work) they would have to give the building an expression of power. When he went over the new Parliament Houses in Berlin he felt humbled by that magnificent interior of Paul Wallot. It was a most impressive and magnificent building. If they did not have a Parliament House to design they would no doubt have a private house, and if so they should impress upon it a homelike beauty. In the case of almshouses they would impress on such a building a little public character, and at the same time the dignity and rest and quiet which was proper for the last years of life. But, as he said at the beginning, it was not much good talking about these things. After that night they must set to work and design for themselves.

On the motion of the Chairman a hearty vote of thanks was accorded to Messrs. Aston Webb and Beresford Pite, and the meeting terminated.

THE BUILDING TRADES' GIFT TO THE NATION:

HOMES FOR DISABLED SOLDIERS.

Mr. T. F. Rider, Past-President National Association of Master Builders, as Honorary Secretary to the Gift, announces the following further subscriptions which have again come to hand:—

	£	s.	d.
The *Builder's Journal* Shilling Fund (Subscriptions, first instalment)	57	12	0
Messrs. F. & H. F. Higgs and Workmen	10	0	0
Messrs. H. Stevens & Co. and Workmen, Southampton	6	17	3
Messrs. Harris & Wardrop and Workmen	5	15	3
Workmen of Messrs. Jas. Carmichael, Wandsworth	3	15	3
Messrs. George Nutter & Sons and Workmen	1	10	0
Workmen of Messrs. Perkins & Co.	1	1	0
Mr. Walter Dennison and Workmen	1	1	0
Workmen of Messrs. E. Chadwick & Sons, Dewsbury	0	18	9
Workmen of Mr. J. F. Godham, Greenwich	0	14	6
Workmen of Messrs. Sparrow & Sons, Nottingham	0	9	6

Established Church, Dundee.—It is proposed to build an Established church on a site at the junction of Lochee and Tullideph roads, Dundee. The architects are Messrs. Johnston & Baxter.

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THE LONDON COUNTY COUNCIL.

The first meeting of the London County Council after the summer recess was held on Tuesday in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Chairman's Annual Address.—The Chairman occupied an hour and a half in reading his address, which dealt with the work of the Council during the past year. In reference to main drainage, he said the total amount of sewage treated in the year had been 70,382,570,830 gallons, and the weight of sludge sent to sea had been 2,288,000 tons. In connexion with this, three interesting facts appeared. The first was that, although the quantity of sewage increased every year the actual expenditure of the Committee upon maintenance had been 5,000*l.* less than in the preceding twelve months. The second notable fact was that a given number of gallons of sewage produced a less weight of sludge this year than they did last year. This showed that the methods of precipitation were improving, and that water which formerly had to be carried out to sea at great cost now ran into the Thames at the outfalls. And the third fact was that the effluent flowing into the river was now highly satisfactory, and the condition of the Thames was becoming better every year.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Battersea Vestry 20,000*l.* and 5,145*l.* for electric lighting works; Camberwell Vestry 2,000*l.* and 9,035*l.* for street improvements, and 28,195*l.*, 500*l.*, and 6,500*l.* for depôt buildings, &c.; Greenwich District Board 10,475*l.* for dwelling-house improvement scheme; Hammersmith Vestry 16,360*l.* for paving works; St. George-in-the-East Vestry 5,295*l.* for paving works; Islington Vestry 3,187*l.* for electric light meters; Fulham Vestry 27,000*l.* for baths and wash-houses; Newington Vestry 24,500*l.* and 2,500*l.* for baths and wash-houses, and 2,150*l.* for underground conveniences; St. James', Westminster, Vestry, 8,995*l.* for paving works; Camberwell Guardians 7,260*l.* for purchase of premises; Guardians of Holborn Union 1,750*l.* for alterations, &c., to hot-water supply system at workhouse, and 1,250*l.* for purchase of land and premises; Guardians of Poplar Union 11,820*l.* for purchase of land; Guardians of St. George's Union 20,000*l.* for extension of infirmary; St. Marylebone Guardians 2,190*l.* for works at Southall Schools; Shoreditch Guardians 3,450*l.* for alterations to premises, and 2,040*l.* for alterations at infirmary, &c.; Guardians of Wandsworth and Clapham Union 1,250*l.* for furnishing of nurses' home, and 15,600*l.* for erection and furnishing of temporary buildings at Tooting Home; and St. Giles-in-the-Fields and St. George, Bloomsbury, Baths, &c., Commissioners, 13,500*l.* for baths and wash-houses.

Widening of Piccadilly.—The Improvements Committee reported as follows in regard to the proposed widening of Piccadilly between Hyde Park Corner and Walsingham House:—

"We have had under consideration an important proposal made by the First Commissioner of H.M. Office of Works, &c., for the widening of Piccadilly between Hyde Park Corner and Walsingham House. The First Commissioner states that in consequence of representations which have been made to him as to the congested state of traffic at Hyde Park Corner, especially at the angle of Piccadilly and Hamilton-place, he has had under consideration the question of endeavouring to obtain the assent of her Majesty the Queen to granting her Royal Warrant to enable a sufficient strip of the Green Park to be added to the street in order to widen the thoroughfare and facilitate the course of the traffic passing eastwards and westwards, without interfering with the traffic passing northwards by Hamilton-place. The First Commissioner is prepared to advise her Majesty to approve of this proposal on the understanding that the Council will undertake the expense of setting back the railings of the park and of paving the widened carriageway and the new footway. . . . . The present width of Piccadilly between Hyde Park Corner and Walsingham House varies from about 68 ft. to about 100 ft., and by the plan submitted by the First Commissioner it is proposed to increase this to a width varying from about 70 ft. to about 170 ft. The width of the new footway on the south side of Piccadilly will be about 24 ft. The width of the new carriageway near Walsingham House will be about 48 ft. This width will gradually increase to 58 ft. near Clarges-street, to 70 ft. between Half Moon-street and Down-street, and from Down-street westwards it will be increased to 90 ft. at Park-lane, and to about 120 ft. at Hamilton-place, whilst at Hyde Park Corner the width of the carriageway will be 170 ft. It has already been pointed out that the chief spot where the traffic is so frequently congested is at the junction of Hamilton-place with Piccadilly; hence the suggestion that the new width of the carriageway of Piccadilly at the spot in question should be as much as 120 ft. It is proposed that at this point there should be a large refuge in the centre of the road, and that at Hyde Park Corner the traffic should be diverted with a view to arranging that the traffic wishing to go to Hamilton-place shall use the carriageway to the north of the refuge, where the width will be 60 ft. The traffic passing eastwards and westwards along Piccadilly, and not desirous of using Hamilton-place, will pass to the south of the refuge, where the width will be 60 ft. The cost of re-erecting the railings and executing the necessary paving works is estimated by the Council's engineer at 30,000*l.* . . . and the length of the widened portion of the thoroughfare will be no less than 2,400 ft., or approaching half a mile. . . . We may state that for some time past we have been in communication with H.M. Office of Woods and Forests, who are the freeholders of most of the property on the north side of Piccadilly between Piccadilly-circus and Sackville-street, our object being to arrange for the widening of that portion of the thoroughfare. We have not yet succeeded, however, in coming to an arrangement with the Commissioners, but we do not despair of being able to make some arrangement with them when the existing leases expire. . . ." The Committee moved that "the estimate of 30,000*l.* submitted by the Finance Committee for the purpose be approved."

The recommendation was agreed to after a brief discussion.

Sanitary Inspectors' Examination Board.—It was agreed that the Council do address a letter to the Local Government Board asking that it may be authorised, under Clause (*c*) of the Memorandum of Association of the Sanitary Inspectors' Examination Board to appoint five representatives to serve on that Board, and stating that the Council will be glad if the President of the Board will receive a deputation from the Council in support of its request.

Tenders.—The following tenders for work at various fire stations have been accepted:—

Poplar and Bow Stations: Horsed Escape Sheds.—F. & F. J. Wood, 335*l.*

Hackney Station: Repairs, Painting, &c.—Vigor & Co., 87*l.* 10s.

Poplar Station: Repairs.—J. Jarvis & Sons, 98*l.*

Stoke Newington Station: Repairs, Painting, &c.—Vigor & Co., 75*l.* 10s.

After transacting other business the Council adjourned.

METROPOLITAN ASYLUMS BOARD.

This Board resumed its meetings after the summer recess on Saturday, the 6th inst. Sir E. Galsworthy presided.

The Asylums Committee submitted a plan for converting the convalescent home at Leavesden Asylum into officers' residences, and recommended that it be approved and forwarded to the Local Government Board, and, further, that advertisements be issued inviting tenders. It was stipulated that the work should be carried out under the supervision of the Surveyor to the Board. The estimated cost was 171*l.*

The report was adopted.

The Works Committee reported that Mr. Hatch, their engineer, was engaged at the present time on the preparation of seven sets of plans and specifications in connexion with the laundries of the North-Eastern Hospital, Tooting Bec Asylum, Joyce Green Hospital, Caterham Asylum, St. Anne's Home, Darenth Asylum, and the Eastern Hospital. Mr. Hatch pointed out that with his present staff, a period of at least six months must elapse before he could get the several works out of hand. The Committee, being of opinion that three at least of these laundries should be put in hand with the utmost possible dispatch, considered it imperative that additional temporary assistance should be afforded the engineer in order to enable him to hasten forward the work. They therefore recommended that the General Purposes Committee be instructed to appoint an additional assistant draughtsman in the engineer's department for a period of six months.

This was adopted.

Presbyterian Church, Birkenhead.—The new St. Paul's Presbyterian Church of England in North-road, Devonshire Park, Birkenhead, has cost 5,000*l.*, and provides seats for 600 worshippers. The new building is in the Gothic style, and has been built with Ruabon brick. Mr. James Merritt, of Birkenhead, was the builder, and Mr. R. G. Sykes, of Liverpool, the architect.

COMPETITIONS.

Board Schools, Salford.—An extraordinary meeting of the Salford School Board was held on the 8th inst., at the offices of the board, to consider a report upon the competition plans for the Tootal-road School. The Chairman moved, and Mr. Smith seconded, that the design submitted by Mr. H. E. Stelfox for the erection of the Tootal-road School be accepted, subject to such modifications as may be made by the General Purposes Committee; that Mr. Stelfox be appointed architect for the school upon the terms and conditions in the instructions to architects; and that the plans be forwarded to the Board of Education. The motion was adopted.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

At the meeting of the London County Council on Tuesday the following applications under the 1894 Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

Lines of Frontage.

Hackney, North.†—Houses on the eastern side of Upper Clapton-road, Hackney, to adjoin No. 152 (Mr. G. R. Woodruff).—Consent.

Hackney, Central.†—Two blocks of residential buildings on the west side of Clarence-road, Hackney (Mr. A. Bedborough for Mr. J. W. Woodall).—Consent.

Wandsworth (Detached).—The erection in advance of the general line of buildings in the street of portions of six blocks of dwellings for persons of the working class on the south side of Rosendale-road, Herne Hill (Messrs. Cubitt & Co. for the Peabody Trust).—Consent.

Lewisham.†—A greenhouse in the grounds of a house known as Cumnor, Laurie Park-avenue, Sydenham (Messrs. Rose & Sons for Mr. E. M. Stone).—Consent.

St. Pancras, West.—A one-story shop upon part of the forecourt of No. 88, Hampstead-road, St. Pancras (Mr. W. Eley).—Consent.

Hackney, South.†—A block of buildings, to be inhabited by persons of the working class, on the east side of London Fields, Hackney (Mr. J. Briggs for the Improvements Committee of the Council).—Consent.

Lewisham.†—Two dwelling-houses on the south side of South-vale, Blackheath, to abut upon Collins-street (Mr. W. Hallam for the Owners of the Collins Estate).—Consent.

Clapham.—Five dwelling-houses, with bay windows, on the east side of Queen's-road, Battersea, next No. 174 (Mr. J. S. Cooper for Mr. A. E. Balls).—Refused.

Hampstead.†—An iron and glass covered way in front of No. 12, St. John's Wood Park, Hampstead (Mr. A. Hackworth for Mr. H. Hart).—Refused.

Hackney, South.—One-story stable and cart-shed at the rear of No. 138, Chatsworth-road, Lower Clapton, to abut upon Elderfield-road (Mr. P. Gerber).—Refused.

Lewisham.—A one-story addition to No. 11, George-lane, Rushey Green, Lewisham, to abut upon Chestnut-road (Mr. C. Marks).—Refused.

Lewisham.—One-story shops on the forecourts of Nos. 162, 162A, and 164, High-street, Lewisham (Mr. F. A. Smith for Mr. A. Smith).—Refused.

St. Pancras, South.—A one-story shop on part of the forecourts of Nos. 77 and 79, Euston-road, St. Pancras (Messrs. E. J. Pain & Son for Mr. A. Hicks).—Refused.

Projections.

St. George, Hanover-square.—A conservatory on the balcony at the first-floor level in front of the Grosvenor Hotel, Buckingham Palace-road, St. George, Hanover-square (Messrs. A. Waterhouse & Son).—Consent.

Wandsworth.†—Wood and tile pents to fourteen houses on the south side and twelve houses on the north side of Clarendon-road, and to seven houses on the east side and seven houses on the west side of Rossdale-road, Putney (Mr. H. Bignold for Mr. Brooker).—Consent.

Fulham.—That permission be given to Mr. C. F. Barnard to retain an iron and glass sign over the saloon-bar entrance to the White Hart public-house, No. 563, Fulham-road, Fulham, extending beyond the general line of buildings in that street.—Agreed.

Hampstead.—Wood balusters on top of the projecting porches in front of a pair of semi-detached dwelling-houses on the north-east side of Finchley-road, Hampstead, near Platts-lane (Mr. E. Sibson for Mr. A. Davis).—Consent.

Lewisham.—Wood and tile pents at the entrances to Nos. 5A, 6A, 7A, 8A, 9A, and 10A, George-lane, High-street, Lewisham (Mr. E. Petters for Messrs. G. & C. C. Story).—Consent.

Poplar.—Iron and concrete balconies at the ground and first floor levels in front of the new

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wards in course of erection at the Poplar Hospital, on the north side of East India Dock-road, Poplar (Mr. R. Plumbe for the Chairman and Governors of the Poplar Hospital).—Consent.

St. George, Hanover-square. — A bay window, portico, and balcony in front of No. 38, Hill-street, St. George, Hanover-square (Mr. W. Flockhart for Mr. E. G. Raphael).—Consent.

St. Pancras, South.—A projecting iron landing and ladder at the escape door from the flies of the stage at the Euston Theatre, Euston-road, St. Pancras, to abut upon Tonbridge-street (Messrs. Wylson & Long for The Euston, Limited).—Consent.

Strand.—That the consent of the Building Act Committee (acting on behalf of the Council) of August 30, 1900, to the erection of a turret at the 1st, 2nd, 3rd, 4th, and attic floor levels at the western angle of a building to be erected on the site of Nos. 111A and 112, Jermyn-street, St. James's, at the corner of Wells-street (Mr. R. Morphew for Mr. E. S. Morphew), be modified by the omission of the words "dedicated to and" from such consent.—Agreed.

Strand.—Two illuminated iron and glass signs at the Star and Garter public-house, No. 62, Poland-street, St. James's (Mr. H. M. Wakley).—Consent.

Walworth.—That permission be given to Messrs. G. Carter & Son to retain two signboards on the flat roof of a one-story shop in front of No. 9, Camberwell-road, Camberwell (Mr. G. A. Lansdown for Messrs. G. Carter & Son).—Agreed.

Wandsworth.—A wooden portico with balcony over at the entrance to a house in course of erection on the south side of Oakdale-road, Streatham (Mr. J. Mason for Mr. B. Masters).—Consent.

Westminster.—A wood, iron, and glass conservatory on the portico at the entrance to No. 43, Carlisle-mansions, Carlisle-place, Westminster (Messrs. J. Weeks & Co., Limited, for Mr. H. S. Saunders Clark).—Consent.

Islington, North.—Bay windows in front of ten houses on the south side of Heathville-road, Crouch Hill, Islington (Messrs. Wootton & Green).—Refused.

Strand.—An iron and glass shelter and illuminated sign at the entrance to the Tivoli Restaurant, No. 65, Strand; also the erection of gilt wooden letters at the second-floor level of the Tivoli Music Hall, Nos. 66 to 70, Strand (Messrs. Law & Allen for Mr. F. Kissell).—Refused.

Westminster.—Two oriel windows at the first and second floor levels of a proposed block of residential flats on the east side of Great Smith-street, Westminster, at the corner of Wood-street (Messrs. F. & E. Cooper).—Refused.

Width of Way.

Poplar.—That the request of the Guelph Patent Cask Company, Limited, for permission to retain a boundary-fence wall in front of a one-story office building on the south side of West Ferry-road, Millwall, such fence wall being within the prescribed distance from the centre of the street, be acceded to.—Agreed.

Woolwich.—Retention of a one-story addition at No. 1A, Elizabeth-terrace, High-street, Eltham, at less than the prescribed distance from the centre of the street (Mr. W. A. Narbeth).—Consent.

Chelsea.—That the application of Messrs. Beeston & Burmester for an extension of the periods within which the erection of a building on the site of No. 76, Queen's-road, Chelsea, to abut upon Paradise-walk, was required to be commenced and completed, be granted—Agreed.

Fulham.—A one-story shop upon the forecourt of No. 194, North End-road, Fulham (Mr. M. Laport).—Consent.

Lambeth, North.—A school building on the south side of Exton-street, Waterloo-road, Lambeth (Messrs. Beazley & Burrows for the Vicar and Churchwardens of the Joint Parishes of All Saints and St. John, Lambeth).—Consent.

Lewisham.—Retention of a boundary fence at the rear of Nos. 13 and 15, Houston-road, Lewisham, at less than the prescribed distance from the centre of a public footway leading from Woolstone-road to Perry Hill (Mr. H. L. Upham for Messrs. Graves & Shorter).—Consent.

Limehouse.—A building to be used as a bank' offices, &c., on the site of Nos. 660, 662, and 664' Commercial-road East, Limehouse, with a portion of the building and of the forecourt fence at less than the prescribed distance from the centre or Gill-street (Mr. R. C. Harrison for the London Joint Stock Bank, Limited).—Consent.

Westminster. — Rebuilding of No. 17, Chapter-street, Westminster, at less than the prescribed distance from the centre of that street (Mr. A. L. Guy for Mr. B. Mitchell).—Consent.

Lambeth, North.—Retention of a temporary wood and iron tool-house in St. John's Churchyard and recreation-ground, Waterloo-road, Lambeth, at less than the prescribed distance from the centre of Secker-street (Mr. H. C. J. Edwards for the Vestry of Lambeth).—Consent.

Haggerston.†—The erection of an addition to Nos. 50 to 62, Kingsland-road, Shoreditch, at less than the prescribed distance from the centre of Union-walk (Messrs. Ford, Son, & Burrows for Messrs. J. Carter & Sons, Limited).—Refused.

St. George, Hanover-square.—A one-story building on the north side of Hay-hill, St. George, Hanover-square, at less than the prescribed distance from the centre of South Bruton-mews (Mr. B. Slade for Mr. W. M. Pegge).—Refused.

Space at Rear.

Holborn.—A modification of the provisions of Section 41 of the Act with regard to open spaces about buildings, so far as relates to a domestic building with shop on the ground floor on the south side of Tavistock-place, St. Pancras, at the corner of Herbrand-street (formerly Little Coram-street), with an irregular space in the rear (Mr. G. D. Martin for Mr. E. G. Marshall).—Consent.

Battersea.—A modification of the provisions of Section 41 (i.) (vi.) of the Act with regard to open spaces about buildings, so far as relates to the proposed erection of two two-story cottages on the north side of Nine Elms-lane, Battersea, next the Heathwall pumping-station, with irregular spaces at the rear (Sir A. R. Binnie for the Council).—Consent.

Chelsea.—The retention of a conservatory on part of the open space at the rear of No. 28, Hans-crescent, Chelsea, at the corner of Basil-street (Messrs. Read & Macdonald for Mr. J. D. Denham).—Consent.

Lewisham.—Brewery buildings on the south side of Loampit-vale, Lewisham, at the corner of Algernon-road (Messrs. D. Young & Co. for Messrs. Thorne Brothers).—Consent.

St. George, Hanover-square.—An additional story at the rear of No. 48, Brook-street, St. George, Hanover-square, with a portion of such additional story upon the open space required by Section 41 of the said Act to be provided at the rear of the building (Mr. P. M. Horden for Dr. P. H. Pye-Smith).—Refused.

Deviation from Certified Plans.

St. Pancras, South.—Deviations from the plans certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed rebuilding of Nos. 83 and 85, Marchmont-street, St. Pancras (Mr. W. C. Poole for Mr. T. Willis).—Consent.

Strand.—Certain deviations from the plans certified by the District Surveyor so far as relates to the proposed rebuilding of Nos. 19 and 20, Bateman-street, Soho (Mr. H. A. Woodington for Mr. B. H. Lynch).—Refused.

Lines of Frontage and Width of Way.

Hampstead.—A studio at Manor Lodge, Vale of Health, Hampstead (Mr. C. H. Saunders for Miss M. Carter).—Consent.

Chelsea.—The rebuilding of the Roebuck public-house, King's-road, Chelsea (Mr. R. Willock for Messrs. Courage & Co., Limited).—Consent.

St. George, Hanover-square.—The retention of a porch at the entrance to the Empress Club, No. 35, Dover-street, Piccadilly (Messrs. J. T. Wimperis & Arber for the Hotel and Club Investment Company, Limited).—Consent.

Brixton.—A one-story addition at the rear of the Swan public-house, No. 215, Clapham-road, in advance of the general line of buildings in Stockwell-road, and at less than the prescribed distance from the centre of Swan-mews (Mr. J. C. Jackson for Mr. R. Weller).—Refused.

Hackney, South.—A water-closet at the rear of No. 51, Mare-street, Hackney, to abut on Ash-grove (Mr. R. H. Hill for Dr. T. J. Barnardo).—Refused.

Width of Way and Construction of Building.

Poplar.—An iron shed in a yard on the south side of West Ferry-road, Isle of Dogs, and the retention of the existing boundary-wall at less than the prescribed distance from the centre of Deptford Ferry-road (the Guelph Patent Cask Company, Limited).—Consent.

Poplar.—Two wood and iron shelters in the recreation ground, East India Dock-road, Poplar, to abut upon Woodstock-road (Mr. O. E. Winter for the Board of Works for the Poplar District).—Consent.

Width of Way and Projections.

Marylebone, East.—An oriel turret at the north-west corner of a building on the south side of Bentinck-street, St. Marylebone, at the corner of Marylebone-lane (Mr. W. Woodward for Mr. T. H. Griffiths).—Consent.

St. George, Hanover-square. — Wood and glass inclosures to the sides of an iron and glass porch at the entrance to No. 6, Berkeley-street, Piccadilly (Mr. R. G. Hammond for Mr. Thomson).—Refused.

Line of Frontage and Space at Rear.

St. Pancras, West.—Six buildings on the north-east side of a proposed diversion of Mornington-road, and two buildings on the south side of Mornington-place (Mr. E. Mackie for the London and North-Western Railway Company).—Consent.

Formation of Streets.

Clapham.—A variation from the plan approved on April 17, 1894, for the formation of a new street to lead from Larkhall Rise to Wandsworth-road, Clapham, next the London, Chatham, and Dover Railway Company's station, so far as relates to an alteration in the levels of such street (Messrs. D. Young & Co.).—Consent.

Hackney, South.—The formation or laying out of four new streets for carriage traffic on the Glyn estate on the east side of Daubeney-road, Homerton, for Messrs. A. H. and A. E. Simpson. That the names Ashenden-road (in continuation), Meeson-street, Adley-street, and Trehurst-street be approved for the new streets.—Agreed.

Means of Escape from Top of High Buildings.

Holborn.—Means of escape in case of fire proposed to be provided, in pursuance of Section 63 of the London Building Act, 1894, on the fifth and sixth stories of Kingsley Hotel, Hart-street, Bloomsbury (Mr. C. F. Doll for Mr. J. Truelove).—Refused.

Conversion of Building.

Dulwich.—The conversion of a building, No. 14, Wren-road, Camberwell-green, used as a stable and coach-house, with living rooms over, into a caretaker's house (Mr. E. C. Beaumont for the London and South-Western Bank).—Consent.

Alteration to Building.

Dulwich.—The retention of a lumber room constructed in the roof of No. 23, Stradella-road, Herne Hill, without the walls of the building being thickened so as to make such walls comply with the first schedule of the said Act (Messrs. W. D. Church & Son for Mr. R. Lumsden).—Consent.

Artisans' Dwellings and Open Space about Buildings.

Holborn.—That the Council do make an order as follows:—Whereas Mr. J. Briggs, of Nos. 17 and 18, Pall Mall East, on August 15, 1900, under the provisions of Sections 41 and 42 of the London Building Act, 1894, delivered on behalf of the Housing of the Working Classes Committee of the Council, at the County Hall, plans of six blocks of intended dwelling-houses, to be inhabited by persons of the working class, and proposed to be erected, not abutting upon a street, on the site of Reid's Brewery, Clerkenwell-road, Holborn, such plans also showing one block of intended dwelling-houses, to be inhabited by persons of the working class, proposed to be erected on the north side of Portpool-lane, Holborn, with an irregular open space at the rear. . . . Now the Council does by this order sanction the said plans so far as Sections 41 and 42 of the said Act are concerned. . . . .—Agreed.

Construction of a Cabmen's Shelter on Victoria Embankment.

City of London.—A cabmen's shelter on Victoria Embankment, near Blackfriars Bridge, City (the Rev. J. Waite for the Cabmen's Christian Association).—Consent.

The recommendations marked † are contrary to the views of the Local Authorities.

Correspondence.

To the Editor of THE BUILDER.

ILFORD FREE METHODIST CHURCH COMPETITION.

SIR,—In November, 1899, the Free Methodists of Ilford advertised in the professional papers for designs in competition for a new church, and on receiving particulars I found the conditions apparently fair—that only members of the R.I.B.A. or R.S.B.A. (*sic*) need compete, and that the contemplated outlay of 4,000*l.* was to include "umbrella stands." A professional assessor was promised, and three premiums for the best designs, the first premiated architect to carry out the work.

On December 15, 1899, I submitted drawings, and after waiting over a month wrote to the Secretary (Mr. J. Lamb) inquiring if anything had been settled. To this letter I received a reply that the plans were in the assessor's hands, and his report was expected in a week. Hearing nothing after a further interval of two months, I again wrote, and received no reply. Another five weeks having elapsed, once more I wrote and was informed that the matter would be definitely settled in a "few days." These "few days" having developed into another two months I again asked for information as to the award, and received the reply:—"Some time ago I returned your plans, and said the award had been made. I do not know that I can add anything to this." Not having received the plans or award, I threatened to put the matter into my solicitor's hands if the plans were not returned to me. This had the desired effect of obtaining the drawings, but still no mention of any award. On again writing to ask the names of the successful competitors I received the following courteous reply:—"I am thoroughly at a loss to know what you are driving at, as I have already informed you that, after very careful consideration of your plans, the architects who made the awards for us rejected yours." This was naturally interesting, as also the following:—"Several eminent architects competed and have accepted the decision of the Committee."

I have informed Mr. Lamb that I am "driving at" the decision of the Committee, as it appears to me a little difficult to accept a decision without

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having the slightest idea what that decision may be. To this no reply has been vouchsafed.

I shall be glad to communicate with any architects who submitted designs in this unique competition. R. Stephen Ayling.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

13 (*Continued*). Measuring Leakage—The Evershed Ohm-meter—"Earth Lamps" Method—The Localisation of Faults.

Reverting to the diagram fig. 1 in our last issue in order to determine a, x, and y, the only instruments we need are an Evershed ohm-meter and generator (see fig. 2). The method of procedure is as follows:—1. Measure the resistance of A to E when B is put to earth, and suppose that this comes out X. In practice we work at the main fuse-block. We take out the fuses and connect one terminal of the ohm-meter to the end of A at the fuse-block, and connect B to a gas or water-pipe by means of a wire. On turning the handle of the generator the ohm-meter reads X directly in megohms. 2. Measure the resistance of the main B to E when A is put to earth (Y suppose). 3. Finally measure the resistance of A and B in parallel to earth (F suppose). Then we have—

$$\frac{1}{x} + \frac{1}{a} = \frac{1}{X} \quad \text{.....(1)}$$

$$\frac{1}{y} + \frac{1}{a} = \frac{1}{Y} \quad \text{.....(2)}$$

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{F} \quad \text{.....(3)}$$

And by addition $\frac{1}{x} + \frac{1}{y} + \frac{1}{a}$

$$= \frac{1}{2}\left(\frac{1}{X} + \frac{1}{Y} + \frac{1}{F}\right) \quad \text{.....(4)}$$

Substituting for $\frac{1}{y} + \frac{1}{a}$ from (2) in (4) we find $\frac{1}{x}$ and similarly we easily find y and a.

Supposing we find that X is 2, Y is 2·4, and Z is 4 megohms, then

$$\frac{1}{x} + \frac{1}{a} = \frac{1}{2}$$

$$\frac{1}{y} + \frac{1}{a} = \frac{1}{2{\cdot}4}$$

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{4}$$

Hence x is 6, y is 12, and a is 3 megohms, and the leakage currents and watts can be written down at once. The whole test is a very simple one and need only take five minutes; it ought, therefore, always to be made.

In practice what is usually done is to measure the resistance to earth (4 megohms in the above case) and the resistance between the mains (2·6 megohms). From these results we can, of course, tell very little. These tests are quite unscientific and ought to be given up. When worked out in the way we have done we see that the insulation resistance of the main B is twice as high as that of the main A, and hence, if we make B the high-pressure house main instead of A, we shall almost halve the waste of power that is taking place through leakage paths to earth, and hence both the consumer and the supply company will be benefited.

In the above test we have supposed that all the lamp switches have been turned off, and that all the lamps are in position. Hence, this does not help us to find the leakage that is taking place when all the lamps are in their sockets and the switches are turned on. In this case we have leakage across the flexible cords leading to the lamps, as these cords have now a difference of pressure of 200 volts between them. It is desirable, then, for the consumer's benefit that tests should be made of the probable leakage between the mains when all the lamps are on. To do this take all the lamps out of their sockets and turn on the switches; then take the same three measurements as before—as a rule we get different values of x, y, and a. If this test be also made, then the electrician can form a very fair idea of how the electrical part of the work has been done.

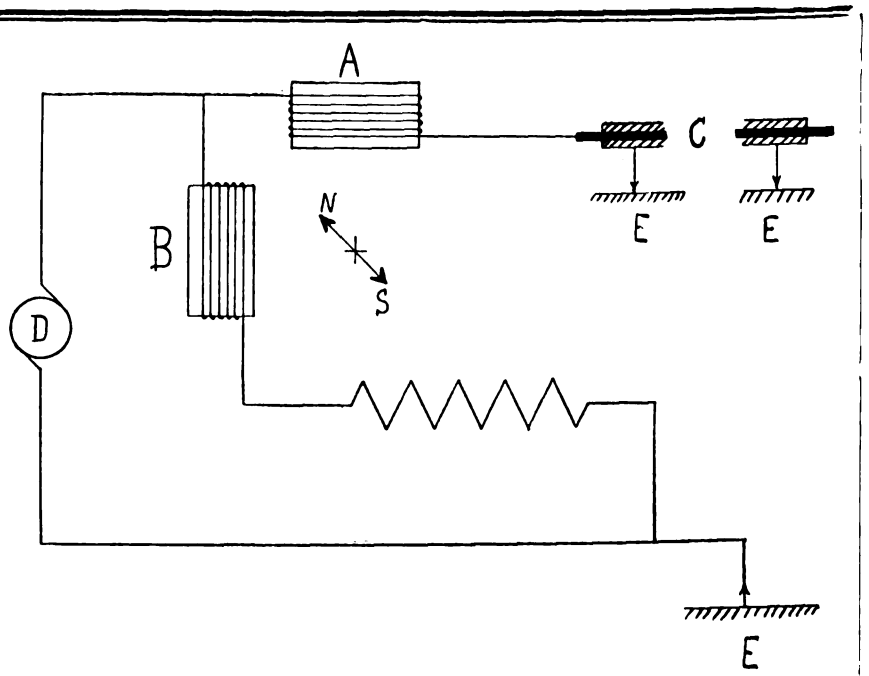

Fig. 2.

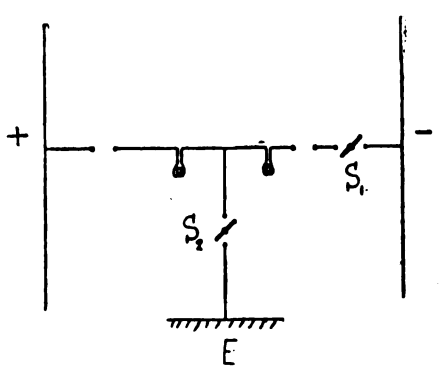

Fig. 3.

There is still a possible source of leakage that we have not yet considered, namely, that at the terminals of the glow lamp itself. These usually consist of two pieces of brass separated from one another and from the collar of the lamp by plaster of Paris. If they are not well made there may be considerable leakage taking place between the terminals, or even between the terminals and the collar, if the socket of the fitting be not insulated from earth. By buying lamps from well-known makers, however, the consumer can get lamps almost perfect in this respect. Leakage to earth through the collar of the lamp lowers the apparent fault resistance of a main, and by making the first test with the lamps in position, and then making another with them out, we can easily find out if the lamps are to blame.

The Institution of Electrical Engineers issued rules in July, 1897, for testing the wiring of a building. We take the following from the rule headed "Testing":—"The whole of the lamps or appliances for utilising energy having been connected to the conductors and all fuses being in their place, an E.M.F. equal to twice the E.M.F. which will be ordinarily used is to be applied, and the insulation resistance between the whole system and earth is to be measured after one minute's electrification. The insulation resistance should then be not less than ten megohms divided by the maximum number of amperes required for the lamps and other appliances." This rule is a very disappointing one. If we double the voltage (V) we need only double the insulation resistance (R). With voltage V the allowable leakage power for a given number of lamps is $\frac{V^2}{R}$ but with voltage 2V the allowable leakage power is $\frac{(2V)^2}{2R}$ *i.e.* $2\frac{V^2}{R}$. No distinction is made between a two-wire service at 110 volts and a five-wire service with 440 volts between the outers. No notice is taken of the insulation resistance between the mains.

From the revised rules of the Westminster Electric Supply Corporation we extract the following:—

"13. Testing.— . . . . The test is made from the Corporation's cut-out, and consists of an insulation test between the wires and between each wire and earth, when every branch fuse has been inserted, all switches turned on and the lamps removed.

Inspection.— . . . . If on such testing the officer discovers a leakage from the consumer's wires exceeding one ten-thousandth part of the maximum supply current to the premises, ... the Corporation shall forthwith discontinue the supply of energy due to the premises in question. . . . . " These are the most scientific rules we have yet come across in this country, but they are not quite explicit. The consumer ought to have the leakage between the mains tested when the lamps are in position and the switches open, as this is the ordinary state of the electric wiring in a house.

The Evershed ohmmeter mentioned above is a most useful instrument for measuring high resistances. It consists of a small hand dynamo D (in fig. 2) contained in a little box which will give a pressure of 200 volts when the handle is rotated about sixty times per minute, and another small box which contains two coils of wire A and B at right angles to one another and a small soft iron needle NS. The connections are as in the figure. If the handle of the dynamo be turned, a current will pass through the coil B, and if the insulation resistance of the cable C is infinite, then the needle will place itself along the axis of the coil, which is, of course, the direction of the resultant magnetic force, and the index will point to infinity on the scale of the instrument. Suppose, however, that the cable C is leaky, then some current will pass through A, and the needle will place itself in the direction of the resultant magnetic force due to the currents in the two coils, and the scale having previously been calibrated by means of known resistances, the index will point to the insulation resistance of the cable. The instrument does not easily get out of order, and can be trusted to within one or two per cent. By means of a two-way switch the resistance in series with B can be altered so that a double range can be given to the instrument.

A simple and efficient method of testing, called the "earth lamps" method, is sometimes adopted in private installations. Two 8-candle power lamps are connected in series (fig. 3) across the mains at the main switchboard, the middle point between them being connected to a water-pipe by means of the switch S_2. Now, if the switch S_1 be turned on, the lamps will burn with a dim red glow. If we now turn the switch S_2 on, then if one of the mains is faulty the lamp not connected to that main will burn more brightly than the other one. If both mains are faulty, both lamps will burn

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brighter when S_2 is closed, and if both mains have high insulation, there will, of course, be no difference in the light of the lamps whether S_2 is open or closed. In this case, connecting one of the mains to earth through a thousand ohm coil, the lamp in connection with the other got very perceptibly brighter. As the whole arrangement need only cost five shillings, and as the test can be made without trouble in half a minute, it ought always to be adopted in extensive private installations. The wiring should be tested at least once a week, and faults should be promptly localised and remedied. This method is not applicable when the current is got from the public mains.

The localisation of faults is, as a rule, much more troublesome than the measurement of insulation resistance. Faults may be divided into three classes :—

1. Contact between a conductor and the earth (earths).

2. Contact between two conductors (short-circuits).

3. Want of continuity of the conductor.

In house wiring the second is the commonest fault, and the third is luckily very rare.

Suppose that the insulation resistance of the wiring to earth has been found to be exceedingly low and we wish to find out the faulty section, then the method of procedure is as follows :—We will take the case of a two-wire system with a main switchboard and sub-divided mains going to distributing boards. We start at the main double pole fuse, and we will suppose that all the lamps are in their sockets and all switches closed. We test the insulation resistance first with the double pole switch closed, then with it open. If resistance now reads infinity we see that the fault is not on the main switch. If, on the other hand, the resistance still reads low, then probably slate with metallic veins in it has been used for the base of the switch, and contact with earth is made through the fixing screws. This could probably be remedied by bushing the fixing screws with ebonite. We now come to the mains leading to the switchboard. Turn off the switches on the switchboard one by one, testing the insulation after each ; if the fault still remain on, then it must be either on the mains or the switchboard itself. Disconnect the mains from the switchboard and test them ; if the fault is in them it must be located either by cutting them, or if the conduit system be used, by pulling them out altogether.

In order to test the switchboard for a fault we disconnect all the mains from it and connect all the metallic bars and switches on its surface by binding wire. We then test between this binding wire and earth. Bad slate and defective bushing of the screws, as in the main switch, might cause a fault. We then connect all the sub-mains together and test for faults. If the ohmmeter now reads very high, the fault might have been caused by one of the sub-mains actually touching the earth when fastened to the switchboard. If the fault be still on, then the particular sub-circuit can be found by testing them individually. Having located the sub-circuit in which the fault is, test the mains, then the distributing board, and finally the lamp circuits. It simplifies the test if all the point switches are tapped off the same main, and this ought always to be done. An earth is often caused by a switch screwed on to damp plaster or touching a gas-pipe. Ceiling roses, lamp-holders, and lamps are finally tested.

Testing for short circuits is very simple. We have simply to test each of the subsidiary circuits in turn. Then, having found the circuit in which the short is located, we examine the lamp, holder, ceiling rose, and flexible cord to find out where contact takes place between conductors of opposite polarity.

Actual inspection is the only satisfactory method of finding out how joints have been made. Most specifications insist that only resin is to be used as a flux. The use of soldering fluids containing hydrochloric acid, sal-ammoniac, or other corrosive substances ought never to be permitted. Some installations are wired with no joints at all except those through fuses on to the bus bars of the switch and distributing boards. Such an installation can be rapidly inspected, and will probably never give trouble. Jointed cables should never be hauled into metal pipes, and the joints should not occur in inaccessible or concealed portions of the wiring. Most of the trouble that arises from defective wiring is due to badly-made joints.

GENERAL BUILDING NEWS.

CONGREGATIONAL CHURCH, NEW TRANMERE, BIRKENHEAD.—The memorial-stone of the new Tranmere Congregational Church in Old Chester-road was laid recently. The church is being erected on a site to the east of Old Chester-road, facing the Liberal Club. The buildings are well set back, and a considerable area of land is reserved in the rear to be used in the future for building schools thereon. The elevations are Late Gothic in design, and a tower will be arranged on the north-east angle. The fronts to Old Chester-road will be of white Storeton stone, relieved by red Tranmere sandstone, while the remaining portion is faced with brick. The windows to the main road will be filled with lead lights, and the internal woodwork will be of pitch-pine varnished. The church will consist of nave and transepts and end gallery, provision being made in the chancel for an organ. The floor of the church is slightly sloped. Two vestries are provided, one for the minister and one for the deacons. The contract is being carried out by Mr. Richard Allen, of Birkenhead, and the cost, including all furniture, but exclusive of land, is expected to be about 3,000*l*. The whole work is being carried out under the superintendence of Mr. T. W. Cubbon, architect, of Birkenhead.

ST. EDWARD'S CHURCH, BARNSLEY, YORKSHIRE.—The foundation-stone of this church has just been laid. The architect of the new building is Mr. G. S. Packer, of Southport. The church consists of a nave 70 ft. long and 30 ft. wide, with north and south aisles, the total width being 46 ft. The height of the nave from the floor to the wall-plate is 34 ft., and to the ceiling 44 ft., and to the ridge 54 ft. The nave is divided from the aisles by granite columns into four bays. The roof is an open-timbered one. The walls on the inside will be finished in plaster. The chancel is 40 ft. in length and 20 ft. in width, and the height of the ceiling 34 ft. On the south side of the chancel is the organ chamber, and on the north side are vestries for the clergy and choir. A movable screen is intended so as to allow of the two vestries to be used as a parish-room. The chancel floor will be of marble. The accommodation is for 400 people. The seating will be of pitch-pine varnished, the bench ends being cut to shape and moulded. The choir seats will be of oak, the framing pierced and moulded. The nave is lighted on each side, by ten clearstory windows. The west and east windows are both five-light windows. Externally, the roof is covered with slates, with ornamental ridge. The walling is of Yorkshire parpoints, with stone dressings. The main entrances are at the west end of the church, on the north and south sides both doorways being deeply recessed with moulded arch-stones. The principal feature of the exterior will be the central tower, which rises over the chancel and is 25 ft. square; the height to the spring of the tower roof is 72 ft. from the ground, the height of the roof is 22 ft. Provision has been made for heating the church with hot water by the lower-pressure system.

BAPTIST CHAPEL AND SCHOOLS, LEICESTER.—The foundation-stones of the Robert Hall Memorial Chapel, Leicester, were laid on the 4th inst. The main entrance to the chapel and the two gallery entrances will be approached from the Narborough-road. Two other entrances at the north-west end will afford access to the other end of the chapel and galleries. The chapel is 48 ft. by 64 ft., with a transept on either side. The rostrums are placed at the north-west end of the building, and part of the lower one will be movable to give access off the chapel floor to the baptistry, which is sunk below. An exit from the latter leads into a wide corridor running the full width of the edifice. The organ and choir stalls will be placed at the rear of the rostrums and separated from the chapel proper by an elliptical chancel arch. The chapel will have seating accommodation, in pitch-pine, for 850 persons. A deacons' vestry will adjoin that for the minister at the north-west end of the buildings, and the two rooms will be convertible into a church parlour. A choir vestry is planned at the gallery level, and under it, on the ground floor, a similar vestry. Lavatory accommodation is provided at this end. The floor of the chapel will slope towards the rostrums, and be formed in solid wood blocks laid on cement and concrete. Above a wood dado the walls will be faced of red sand bricks, and a "closed" roof will span the whole width of the building. The schools, immediately adjoining the chapel, will contain a lecture hall, 35 ft. by 51 ft., with two classrooms at the north-west end, on the ground floor, each 14 ft. by 14 ft. 6 in., and capable of being added to the lecture hall as desired. An open timber roof will cover the lecture-hall, at each end of which there will be a gallery, designed to give accommodation for seven classes, divided by screens. A large classroom, which can also be divided, is arranged on the first-floor level, over the two classrooms already named, and on the same floor will be two other classrooms. The school will have two main entrances from Narborough-road, and an entrance from Upperton-road, the latter adjoining the kitchen—close to the lecture hall. At the south-east end of the latter an infants' classroom, 16 ft. by 28 ft., will be situated, with separate entrances from the corridor. The whole accommodation for the school will provide for 800 scholars. The heating of the buildings will be carried out on the low-pressure hot-water system, from a chamber in the basement. Electric lighting is contemplated. The building has been designed in the Early Tudor period, with external elevations in red sand bricks, with Costessey dressings. Mr. Walter Brand is the architect, and Messrs. J. E. Johnson & Son are the builders, both of Leicester.

METHODIST CHAPEL, MIDDLESMOOR, YORKSHIRE.—A Methodist chapel was opened at Middlesmoor on the 21st ult. The architects were Messrs. Bland & Bown, of Harrogate.

CHURCH, DRIFFIELD.—On the 8th inst., the Archbishop of York visited Driffield, and consecrated the Church of St. John, which has been in course of erection for over two years. The church is from plans prepared by Messrs. Hicks & Charlwood, of Newcastle-on-Tyne. It is built of Lincolnshire pressed bricks, and has been erected at a cost of over 4,000*l*., the work being carried out by Messrs. W. Season & Son, of Driffield, whilst the oak stalls and carved oak pulpit and lectern have been executed by Messrs. Shepherdson, Limited, Driffield.

SCHOOL, NEWMARKET.—The Bishop of Ely recently opened a new infant school, which has been erected adjoining All Saints' National Schools, Newmarket. The school has been built of red brick. Besides a large main schoolroom, there are three classrooms. The walls are match-boarded with pitch pine, and the floors are of wood blocks. Messrs. Holland & Son are the architects, and Mr. Cowell, of Soham, the builder. The total cost of the building and furnishing will be about 1,550*l*.

SCHOOL, BRAMLEY, LEEDS.—The new school erected in Broad-lane, Bramley, by the Leeds School Board has cost 10,016*l*., inclusive of the site (2,665 square yards) and the fittings. It has been built according to plans prepared by Mr. W. S. Braithwaite, architect to the Board, and is a two-storied building, with accommodation for 650 children. The infants' department is on the ground floor, and consists of a central hall and four classrooms. Three of the rooms accommodate sixty each, and there is a babies' room. The mixed department, on the upper floor, has a central hall and six classrooms, each accommodating sixty children. The staircases are fireproof, and there are ample cloakrooms, teachers' rooms, &c., whilst at the rear of the building a workshop has been erected wherein at each lesson twenty-four boys may be given manual training. The heating is effected on the low-pressure hot-water system. There are large playgrounds. The various contractors were :—Messrs. Appleyard Brothers, masons, &c. ; Messrs. Trickett & Sons, joiners ; Messrs. Sowry & Martin, plumbers ; Mr. S. McFarlane, concreter ; Mr. A. Marsden, plasterer ; Messrs. Taylor & Parsons, ironwork ; Messrs. Pickles Bros., slating ; Mr. J. A. Naylor, painting ; Messrs. Illingworth, Ingham, & Co., furnishing.

SCHOOL, ARMLEY PARK, LEEDS.—The new school erected in Stanningley-road, near Armley Park, by the Leeds School Board, occupies 5,052 yards of ground, and has been built to accommodate 1,180 children. On the ground floor, which is set apart for the education of infants, there is a room for 410 children, and in the mixed department, on the first floor, which comprises a large central hall and twelve classrooms, there is accommodation for 780 scholars. The ground floor comprises a large hall and six classrooms, two of which are to be set apart for the care of babies. Large playgrounds adjoin the buildings. Inclusive of site and fittings, the school has cost 19,400*l*. It has been erected from plans by Mr. W. S. Braithwaite, architect to the Board.

LITTLE PORTLAND-STREET CHAPEL.—The repairs and improvements of this chapel, recently reopened, have been carried out for the greater part by Messrs. Shoolbred & Co. under the direction and supervision of Mr. Edward Martineau. The chapel was built in 1833 for a Unitarian congregation which Mr. Agar had established in a proprietary chapel in York-street, St. James's, and which, since the recent migration of the Essex-street, Strand, Chapel (founded in 1774 by Theophilus Lindsey and Joseph Priestley) to Kensington, is, we understand, the only remaining congregation of Unitarian Christians in Central London. The interior and exterior of the fabric have been redecorated, the roof repaired, electrical lighting installed, and new seating substituted for the old pews, at a cost of about 1,000*l*.

CROYDON AND WIMBLEDON JOINT SMALL-POX HOSPITAL.—At North Cheam, Surrey, on the 1st inst., the foundation-stone of the new small-pox hospital was laid by Alderman C. C. Morland, J.P., Chairman of the Board. The buildings will comprise an entrance-lodge, administrative block with accommodation for doctor, matron, nine nurses, and eight servants, three ward blocks with accommodation for forty-eight patients, mortuary, stables, staff, and patients' laundry, disinfecting block, and discharging block. The architects are Messrs. Chart, Son, & Reading, of Croydon ; and the contractors are Messrs. D. Stewart & Sons, of Wallington, the amount of their contract being 23,448*l*.

GREAT CENTRAL HALL, BERMONDSEY NEW-ROAD.—This building, in connexion with the South London Wesleyan Mission, was formally opened on the 26th ult. The great hall will seat 2,000

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persons; it is octagonal in shape, and 92 ft. in diameter; entrances being obtained at each angle afford ample means of exit. The platform is placed forward, so that no person in the audience is over 60 ft. distant from the speaker. The seating is on the lift-up principle, one for each person. The heating is on the Musgrave Fan System of heating and ventilation combined, fresh cool air (or heated) being driven through tubes to the various parts of the building. The hall is lighted throughout with electricity by Messrs. Waring & Withers, of London. In the basement there is a hall capable of accommodating 600 persons, also classrooms, offices, and clubrooms, kitchen, &c. The total outlay has been about 30,000*l.*, and the contractor was Mr. W. Shepherd, of London. The architects were Messrs. C. Bell, Withers, & Meredith, of London.

Baths, Wandsworth.—The Lord Mayor (Sir Alfred James Newton), accompanied by the Lady Mayoress, visited Wandsworth on the 6th inst. for the purpose of laying the foundation-stone of the public baths to be erected by the Wandsworth Vestry. The baths will occupy a position facing High-street, and very near the Town Hall. The cost of the building will be 29,291*l.*, 3,800*l.* being paid for the freehold. The baths will have a frontage of 72 ft., and a depth of 207 ft., the style being English Renaissance. The number of men's first-class private baths will be six, and thirty second; women, four first, eight second. The first-class bath will be 100 ft. long by 30 ft. wide. There will be sixty dressing boxes, made of teak, and so fitted that, when needful, they can be folded back against the wall. The second-class bath is 85 ft. long by 30 ft. wide, and contains seventy-two dressing boxes. Both baths are lined throughout with white glazed bricks; the gangways are to be paved with ornamental tiling or granolithic pavement. The roof of the building will be covered with Broseley tiles. Mr. Walter Wallis, of Balham, is carrying out the work, under the supervision of the architects, Messrs. Spalding & Spalding, of Queen-street, E.C. The clerk of the works is Mr. Alfred Davies.

Congregational Hall, Woking.—Foundation-stones were laid on the 8th inst. of a Congregational hall in the York-road, Woking. The scheme includes a church, but at present only the lecture-hall and a kitchen are being erected. The architect is Mr. W. Howard Seth-Smith, and Messrs. Harris & Sons, of Woking, are the builders.

The Condition of the Sheffield Building Trades.—The building trade in Sheffield continues to slacken, and the boom which prevailed up to a couple of months ago has now quite disappeared. Although there has been no such utter collapse here as is reported from London and other large centres of population, the failures of speculative builders have occasioned heavy financial losses to firms who supply timber, stone, slates, bricks, hardware, and other requisites of the trade. The check to building operations has not been brought about because the demand for houses is satisfied, but solely because, on account of the dearness of all kinds of materials, houses do not now provide a profitable investment for capital. Cottage houses are still scarce. Instead of keeping lists of vacant dwellings, the agents have on hand lists of applicants who are waiting patiently for a vacancy. The decline in trade has appreciably relieved the scarcity of labour, which had become so acute as to cause serious inconvenience and loss. Never before have the men engaged in building operations earned so much money as during the past spring and summer. Employment being constant and overtime abundant, even labourers could easily earn more than a skilful cutler. Complaints were rife, however, that this unusual prosperity demoralised many of the men, and induced habits of unpunctuality and neglect, which delayed the completion of jobs, and rendered the employer liable for penalties.—*Sheffield Telegraph.*

Isolation Hospital, Leicester.—The isolation hospital which has been built on the Gilroes estate, Leicester, was opened on the 28th ult. A good deal of work remains to be done before the buildings leave the contractors' hands. In the competition for designs for the buildings, the first place was awarded to Messrs. Blackwell & Thomson, and the work has been carried out under the personal supervision of Mr. Thomson. The following description of the buildings is taken from the *Leicester Post*:—The site comprises about fourteen acres of the Gilroes estate, and adjoins the Groby-road. The administration block, a two-story building, faces the road at a short distance from the entrance. The hospital proper consists of four separate one-story pavilions for the treatment of scarlet fever, giving accommodation for twenty-six beds each; a similar pavilion for typhoid fever containing twenty-eight beds; two isolation pavilions—one a two-story building — containing twenty-eight beds, making accommodation for 100 adult patients. The buildings on the site have been so arranged that two additional scarlet fever pavilions can be added, and one additional isolation pavilion. The other buildings comprise the administration block, discharging block, mortuary, engine and boiler house, laundry, and porter's lodge. The total number of beds, if the full extension were carried out, would be 240. The several buildings are connected by macadam roads. Owing to the natural fall of the ground, north to south, terracing has been adopted to some extent, the earth removed from the higher parts being used to fill up the lower portions as terraces. The four scarlet fever pavilions are arranged alike, and consist of two main wards, 72 ft. long, and 26 ft. wide, to contain twelve beds each. In the central portion is provided a separation or observation ward of two beds leading out of the ward corridor, and having its own lavatory and water-closet. The nurses' kitchen is centrally placed, and can overlook the beds in the two main wards by means of observation windows. The ward linen storeroom is approached from the nurses' kitchen, and the coal-store for the wards is placed outside, near the entrance to the pavilions. At the distal end of each main ward is placed on one side the sanitary tower, containing the water-closets, slop and scalding sinks, disconnected by a ventilated lobby, and on the other side the bathroom, which contains two baths of porcelain and two lavatories. In connexion with the waste water from the bathroom a contrivance has been adopted for cleansing the drains, namely, an automatic flushing tank situated at the upper end of each pavilion. The typhoid pavilion is on similar plan to the scarlet fever pavilions with this exception—as the block will be used for two sexes it is necessary to provide two separation wards instead of one, as in the scarlet fever blocks. The one-story isolation block is based on the lines of the Local Government Board's suggestion, and provides for a total of twelve beds. The two-story pavilion is arranged on two floors, one half to face east, the other half west. On both floors in each half two two-bed wards are provided, leading on to the verandah, with nurses' kitchen and larder. The sanitary towers are approached from the verandahs. The first floor in each half is approached by an open stone staircase at the extreme end of the verandahs. The floors of the wards are of teak, laid in narrow blocks, herring-bone fashion. The administrative block contains on the right of the front main entrance committee-room, doctor's sitting-room, lavatory, &c., dispensary, laboratory store, waiting-room and telephone enclosure; and on the left of the entrance, matron's sitting-room, office, nurses' messroom, sitting-room, sewing-room, household linen-room, dry goods store, lavatory, &c., servants' hall. The servants' hall and nurses' messroom are placed in close proximity to the kitchen. The main corridor is 7 ft wide. At the west end of the administrative block, and leading at right angles from the main corridor, is another corridor, out of which lead the kitchen and stores, &c. The floors of the corridors, kitchens, &c., are of terrazzo. The first floor contains the nurses' and matrons' bedrooms, with bathrooms, water-closets, and linen store. The doctor's bedroom and bathroom is also on this floor, and is approached by a separate staircase. Twenty bedrooms for nurses are provided on this floor. The second floor contains ten bedrooms for servants, a bathroom, &c. The porter's lodge is situated on the right-hand side of the main entrance from Groby-road, and stands 15 ft. back. At the rear of the porter's lodge on the right-hand side of the entrance roadway is the discharging block, which is arranged in duplicate for male and female patients. The mortuary consists of a post-mortem-room, mortuary, and viewing chamber. The heating throughout the hospital is by low-pressure steam, with auxiliary heating arrangements of stoves and grates. In the wards are fixed ventilating radiators under some of the windows. Extraction flues are built in the outside walls for carrying away the vitiated air of the wards. The separation wards, bathrooms, corridors, &c., are warmed by radiators and coils. A separate apparatus is provided in each block to supply the necessary hot water for baths, lavatories, sinks, &c. The foul drains from the scarlet fever pavilions, typhoid pavilion, isolation block, and administrative block are each kept distinct and disconnected at a manhole before entering the sewage tank adjoining the ejector house. The sewage is then pumped up into one of the main carriers on the sewage farm by means of a Shones' ejector apparatus. The facings to all the buildings are Ellistown brick, with stone dressings, and the roofs are covered with green slates. Between all the buildings there will be telephonic communication. The hospital is lighted throughout by electricity, supplied by a dynamo and accumulators. The dynamo is driven by steam. The building contract has been carried out by Mr. J. F. Johnson, of Leicester, and Mr. F. W. Haskard, of the same place, executed the plumbing work.

Baptist Church, Newcastle-on-Tyne.—Building operations have been commenced in the erection of this church. The estimated cost is 4,383*l.* Mr. A. Bruce, of Newcastle, is the building contractor, and the architects are Messrs. George Baines and Reginald Palmer Baines, of Clement's-inn, Strand, London.

Statue to Admiral Blake.—The unveiling by Lord Brassey of the statue of Admiral Blake, subscribed for at a cost of about 1,200*l.*, took place on the 4th inst. on Cornhill, Bridgwater, Blake's birthplace. The bronze statue was executed by Mr. F. W. Pomeroy, sculptor, of Chelsea, and there are appropriate panels in high relief. One of these represents the taking of Santa Cruz, and another depicts the bringing home of Blake's body into Plymouth Sound.

FOREIGN.

Straits Settlements.—*Penang.*—The Municipal Commissioners of Georgetown, Penang, recently decided that more office accommodation was necessary, and secured an excellent site for a Town Hall, having frontages to the Esplanade and the sea and of sufficient area to allow the building to stand quite detached. The Municipal Engineer was then instructed to prepare a design, and this he has done, and the contract for the new building was recently let to a local Chinese contractor, the price being about 75,000 dols. The building now being erected is a long narrow block having slight projections at each end. The rooms for the most part are of the full depth of the building. A spacious verandah extends nearly all round it. The building is to be of brickwork stuccoed, some of the columns being in grey granite. The roof is to be covered with slates on steel trusses, and we understand a considerable amount of steel will be used in the construction of the building, which will hardly be an architectural success.——The Eastern Extension Australasia and China Telegraph Company are about to carry out extensive alterations to their premises, and plans have already been prepared by Messrs. Swan & Andover, of Singapore. ——The latter firm, in conjunction with Mr. James Stark, of Penang, prepared designs for a new Presbyterian Church in Penang, and the building has just been commenced. In plan it consists of a hall about 70 ft. by 35 ft., with verandahs at sides, and projecting vestries at the pulpit end, and at the opposite end an entrance porch with projecting bays on each side, that on the right hand being continued up as a tower. The style is late English Renaissance, the materials used being red brick with buff-coloured stucco dressings. It is proposed to pave the building with white marble tiles with a black and white border.——The harbour improvements are going on slowly.——The Hill Railway has made no progress yet beyond the initial stage.—— The building trade in Penang is flourishing at present, probably owing to a year or two of general success in the trade of the colony.——A competition was recently held for designs for a new Grand Stand for the racecourse, but so far nothing has been heard as to the result.

Singapore.—The new Teutonic Club recently erected by the German community is practically completed, and will very shortly be opened. The building, which was described in a previous number, is admitted by all to be a great success.——The Municipal Commissioners recently purchased the Hotel de l'Europe for 300,000 dols., and have occupied the building as new offices. The site is a fine one, facing the sea, with the Esplanade between it and the sea. The building, although not at all suitable for the purpose, is being used as offices, but it is probable that at no distant date new offices will be erected, and it is rumoured that as the site is larger than would be required for the new building, part of it will be reserved for a theatre.——The offices of the Eastern Extension Australasia and China Telegraph Company have recently been considerably enlarged, the architects being Messrs. Swan & Andover.——There is very considerable activity in the building trades in Singapore, but very few buildings of any interest are being erected, the buildings for the most part being shops, warehouses, and private houses.——Sketch plans for a Natural History Museum, to cost about 400,000 dols., have recently been prepared by the Colonial Engineer and sent home to the Secretary of State for his approval. There exists considerable doubt locally as to whether Mr. Chamberlain will sanction the expenditure.—— The railway to Johore was started as regards construction last April, and so far a few cubic yards of earthwork has been done. The acquisition of land has been a stumbling-block, and the estimated amount to be paid as compensation to owners of land is likely to be exceeded by several hundred per cent.

Johore.—It is now practically decided that the railway from Nezri Sembilan is to be continued south, through the state of Johore to Johore Bahru, and connected with the Singapore-Johore Railway by ferry. This would then connect Penang with Singapore. ——The Sultan of Johore is commencing a large hotel in Johore to take the place of the Rest-House which he has had working for some years past. As far as the present requirements of the place, the new building will be much too large; but the Singapore-Johore Railway and the railway from the north, when completed, must bring a considerable number of people to the place. The building will have a frontage to the sea of upwards of 400 ft., and a return frontage to the Esplanade and a side road. The building is two-storied, except the central block, which will be three, and consists, on the ground floor, of a large dining-hall with private dining-rooms, billiard-room for four tables, large bar and lounge, verandahs and lavatories, and usual offices, and a number of bedrooms. Upstairs there are four blocks of bedrooms, each bedroom having its own bathroom and each block a sitting-room and reading-room. The rooms are lofty, large, and well ventilated, and every convenience is provided. The architects are Messrs. Swan & Andover, who have adopted French Renaissance for the treatment of the building.

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MISCELLANEOUS.

Professional and Business Announcements.—Messrs. H. J. Skelton & Co., iron and steel contractors, have removed their offices from 12 Lime-street to 71 Finsbury-pavement, E.C. Their new telephone number is "1692 London-wall."

Electric Lighting, Dudley, Worcestershire.—On the 5th inst. Mr. H. Percy Boulnois held an inquiry at Dudley into an application by the Town Council to borrow 10,000*l.* for the free wiring of houses and premises for electric lighting.—Mr. R. P. Wilson (consulting engineer) stated that the Corporation intended to charge 6d. per unit for two hours and 1½d. for the remaining twenty-two.

Drinking Fountain, Stoke Edith, Herefordshire.—A drinking fountain, in memory of Lady Emily Foley, has been erected near the juncture of the cross roads at Stoke Edith. The fountain is of blue Forest of Dean stone, and has troughs for horses and smaller animals. The work was executed by Mr. A. W. Ursell, sculptor, Ross.

Reredos, Severn Stoke Church, Worcestershire.—A reredos of carved oak has been placed near the east window of this church. The work was carried out by Messrs. Boulton & Son, of Cheltenham.

Wembley Hill Land.—A sale of land in this suburb was held by Mr. Walter Hall, at the Willesden Junction Hotel, on Monday last, when eighty-three plots of freehold land were submitted to public auction. Shop plots facing Wembley Hill evoked spirited competition and were all sold at good prices. Villa plots fronting Mostyn-avenue found ready buyers at prices varying from 50*l.* to 60*l.* each, those situated at and near the top of the hill (whence the best views are obtained) being especially competed for. The total amount realised was about 4,700*l.*

East Riding Antiquarian Society.—On the 2nd inst. the members of this society drove to Hemingbrough. Arriving at the parish church the varied features of its architecture were pointed out by Mr. Boyle. After an interesting stay in the village the party proceeded to Wressle, whose castle and the history connected with the structure received attention from Mr. Bilson, who exhibited a ground plan of the original building, which was erected in 1345 by Sir Thomas Percy, brother of the first Earl of Northumberland. It was a very strong house, of quadrangle shape, practically of one date. At the castle there were five towers, one at each corner, and probably a gateway tower in the centre of the east front. In the civil war the castle was garrisoned for the Parliamentary forces, and in 1650 the order for its demolition was signed by Philip Saltmarshe, whose descendants now reside near Howden. The building, however, could not be considered a castle pure and simple, because the domestic idea was coming in much more strongly. It was probably erected at a time when Percy was in favour with Richard II. The visitors then journeyed to Bubwith Church. Mr. Bilson explained the details, and said the church had been very carefully handled, and, as far as he could judge, nothing of interest had been destroyed. The additions of the aisles took place later in the twelfth century—thirty or forty years after the church was built. The rebuilding of the nave may be dated early in the fourteenth century. Reference was made to an interesting fact that Nicholas of Bubwith was Bishop of Bath and Wells in 1424, and prior to his death bequeathed in all 266*l.* to be spent on the erection of a western tower, to the improvement of the bells, to heightening the walls, and for the insertion of three windows.

School Board Contracts and Wages.—A return just issued by the Board of Education shows in respect of each School Board district in England and Wales, whether the contracts entered into by the School Board for the execution of works specify any conditions as to the wages to be paid by the contractor, or other conditions with regard to persons employed by him, and, if so, what those conditions are. In eleven English counties—those of Bedford, Berks, Buckingham, Cambridge, Chester, Cornwall, Hereford, Huntingdon, Oxford, Rutland, and Westmoreland—no such conditions appear to be specified by any School Board; and in each of eight other counties only one Board imposes any such terms in its contracts, namely, Cumberland (Carlisle), Dorset (Kinson), Hertford (Watford), Lincoln (Grimsby), Salop (Shrewsbury), Wilts (Swindon), Monmouth (Newport), and Norfolk (Norwich). In the county of London also there is, of course, only one school board, but the wages clause of its contracts applies to the whole county. The numbers of boards in other counties imposing conditions in regard to labour are as follows:—In Hants, Leicester, and Suffolk, two each; in Gloucester, Somerset, Surrey, Sussex, and Worcester, three each; in Devon and Northamoton, four each; in Warwick, five; in Derby and Kent, seven each; in Durham, eight; in Middlesex, nine; in Essex, ten; in Northumberland, thirteen; in Stafford, fifteen; in Lancaster, eighteen; and in Yorkshire, twenty-five. In Wales ten boards insert clauses relating to labour in their contracts, but in only three instances do these affect the question of wages. The conditions imposed by the 155 English boards enumerated as having taken action in the matter vary, but in the majority of cases it is stipulated that contractors shall pay the "recognised" or "standard" rates of wages current in the district in which the works are to be performed, and in some instances a schedule of the rates of pay is inserted in the contract, while in others it is specified that they shall be the rates agreed upon between associations of masters and trade unions. In several cases a clause is inserted prohibiting the sub-letting of contracts or portions thereof, but in some localities this is modified by permitting sub-letting with the sanction of the school board for which the work is to be done. The Birmingham School Board, in addition to requiring its contractors to pay not less than the minimum standard rate of wages of the distrfct, and not to sub-let any work of the Board to persons not paying at least the minimum rate of wages, provides that the contractor, if a member of the Birmingham Master Builders' Association, shall undertake to submit to that associafion any dispute between himself and his workmen liable to lead to an interruption of the work in hand, with a view to an application being to the Boaid of Trade to take action under the Conciliation Act, 1896, for the settlement of such dispute, and that if not a member of the association, he shall, on the request of the School Board, undertake to apply to the Board of Trade on his own account. The Devonport Board stipulates that its contractors shall keep it indemnified against all claims which may be made by workmen under the Employers' Liability Act and the Workmen's Compensation Act. Several Boards require contractors to assent to the architect supervising the execution of the contracts having power to discharge any of the contractor's servants who may be incompetent or guilty of misconduct. The Walthamstow Board expressly extends the fair wages clause beyond the scope of contracts for building construction and repairs, and inserts it in contracts for the supply of raw material and manufactured articles.—*Birmingham Post.*

Proposed Restoration of St. Sidwell's Church, Exeter.—On the 9th inst. a meeting was held in the vestry of St. Sidwell's Church, Exeter, for the purpose of receiving plans from the feoffees of the proposed renovation and restoration of the church tower Mr. R. J. Mills, a churchwarden, proposed that the plans by Mr. Harbottle be approved, and that application be made to the Chancellor for a faculty. This was seconded by Mr. Harry Hems and carried.

New Building By-laws for Scarborough.—At a meeting of the Scarborough Town Council on the 8th inst. it was decided to adopt a new set of building by-laws as approved by the Local Government Board. The main changes are the substitution of the stock timber sizes used at Hull and Grimsby for the special sizes in force, leave to build cycle houses of wood within 10 ft of dwellings, modification as to beds of concrete where the foundations are of solid bed clay, and allowing the air space in semi-detached villas to be divided between the side and rear of the premises.—*Yorkshire Post.*

Building Trades' Gift to the Nation: Birmingham Fund.—The fund which was opened about four months ago in Birmingham in aid of the Building Trades' Gift to the Nation has now been closed. The total amount subscribed was 525*l.*, which is considerably more than has been contributed in any other provincial city or town. At the final meeting on Monday, over which Mr. F. G. Whittall (President of the Birmingham Master Builders' Association) presided, it was stated that the operatives had contributed nearly 200*l.* towards the sum realised. The homes, the Chairman stated, were primarily intended for those disabled soldiers who had been formerly connected with the building trade, and would stand as a permanent memorial of the patriotism of those engaged in the building industry.

Memorial Window, Chapel of Blundell's School, Tiverton.—A window has been placed in the chapel of Blundell's School, Tiverton, in memory of the soldiers and sailors in the war who had been to this school. The window is on the south side of the chapel and was made by Messrs. F. Drake & Sons, of Exeter.

Memorial Window, St. Augustine's Church, Victoria Park.—A stained-glass east window has been placed in this church in memory of the Rev. E. W. J. Bankes, the late vicar. The window was the work of Messrs. Burlison & Grylls.

LEGAL.

EMPLOYERS' LIABILITY ACT.

"VOLENTI NON FIT INJURIA."

Some points of considerable importance to builders were raised in a case which came before Judge Stonor and a jury on Friday the 5th inst., at Brompton County Court. The plaintiff, a builder's labourer, named Lewry, Walsall-street, Battersea, London, S.W., sought to recover 298*l.*, under the Employers' Liability Act, from his late employers, Messrs. Jones & Betts, builders and decorators, 37, Chester-terrace, Belgravia, S.W., the claim being in respect of personal injuries, said to have been caused through negligence on the part of the defendants or their foreman. The case first came before the Court a fortnight previously, but the jury could not agree, and had to be discharged without giving a verdict.

Mr. J. W. Moyses was counsel for the plaintiff, and Mr. E. F. Leaver, counsel, defended.

The plaintiff's case, briefly, was stated as follows:—On June 1 last he was assisting in some whitewashing at a job which the defendants had at 11, South Eaton-place, S.W. In order to reach the work it was necessary to mount a ladder some ten or twelve feet. Two other men were below, one of them standing on the foot of the ladder to prevent it slipping. Late in the afternoon Bowerman, the foreman of the job, came and took the two men away. The plaintiff—according to his own version—asked that one of the men might be allowed to remain, as he thought it would not be safe to work on the ladder without someone at the bottom. The foreman, however, expressed a belief that Lewry could manage very well, even if the work were halt as high again, and left him to finish it alone. Shortly afterwards the ladder slipped, and plaintiff fell to the ground, breaking five of his ribs. He had done no work since, and would never be able to do laborious work again.

In cross-examination, the plaintiff admitted that, when talking to the foreman about not taking the men away, he thought that the ladder would slip, as it afterwards did slip.

Counsel for the defence submitted that, after the plaintiff's last admission, there should be a nonsuit. He relied, he said, upon the general principle of law that a workman who knows and fully appreciates the risk that he may be running, has no cause of action.

Counsel for the plaintiff quoted the cases of Yarman *v.* France, and Smith *v.* Baker, which, he contended, were opposed to his friend's submission.

The Judge pointed out that Section 1 of the Employers' Liability Act referred to a general liability, and gave an employee similar rights to those possessed by a person not in the service of the master.

Counsel for the defendants then submitted that there should be a nonsuit, according to the doctrine *Volenti non fit injuria.* ("No injury is done to a consenting party").

Counsel for the plaintiff admitted that if the man had known of the danger, and said nothing to the foreman about it, he might not have been able to recover; but in the present case the plaintiff gave due notice that he believed it to be unsafe to work upon the ladder without some one to hold it.

The Judge intimated that he did not see sufficient grounds for a nonsuit, and the case would have to go on.

Mr. Christopher R. Griffiths, architect and surveyor, called as an expert witness, maintained that a ladder with a man working upon it more that 8 ft. high should be secured by wedges, or held by a man at the bottom. In the present case he considered that the foreman did wrong in taking the two men away.

Other evidence having been given in support of the plaintiff's case,

Mr. Richard Jones, of the defendant firm, was called. He considered that when a man was whitewashing from a ladder he should have a hook on the ladder by which to hold the pail or can. Such hooks were supplied to the men, but if a man could not find one on the job, he could get any appliances he might need at the workshop close by.

George Bowerman, the defendants' foreman, stated that when he suggested taking the two men away, Lewry said, "I can do the work myself—I could do it if it was three times as high." It was not true that the plaintiff spoke about the ladder not being safe. Other evidence was given to similar effect, one witness stating that the man overreached in getting to the pail of whitewash.

The jury found that the defendants' foreman was guilty of negligence in sending the plaintiff to do the work without ascertaining whether the ladder was properly secured; that the plaintiff was not guilty of contributory negligence in doing the work without the ladder being properly secured, but that he was guilty of contributory negligence in not using a hook, and in stretching over to reach the whitewash; and further that the plaintiff knew and fully appreciated the danger, and voluntarily undertook the risk.

This was a verdict for the defendants, and his Honour gave judgment accordingly.

The jury asked whether it would be consistent with their verdict to award the plaintiff some small damages.

The Judge, of course, replied in the negative, adding that he considered the verdict to be a very proper one.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

11,662.—Facing Tiles: *F. Pagnon.*—Upon the upper edge and one side of the tile is a trapezoidal or wedge-shaped projection for engagement with a recess in the adjacent tile's lower edge and sides, and cement or plastic material is filled into grooves or spaces.

11,607.—Partitions: *R. Gracey.*—Hinged leaves, mounted upon rollers and a rail, form a partition, the leaves being extended and folded with screwed rods that have right and left hand threads and are

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carried by bearings in the ceiling and the floor; the lower screw turns through nuts and bearings of pulley forks or axles that carry pivots which are mounted in brackets attached to the leaves, whilst the lower screw turns through nuts and loose sleeves or bearings pivotted on to the leaves. The leaves which are nearer to the walls have projections which slide within guide-grooves laid in the floor, and their bevelled edges touch fixed bevelled posts when the partition is extended.

11,707.—A "DANDY" FOR CONVEYING DRAIN AND SIMILAR PIPES: *F. R. W. Woodward.*—Under the pipe plate is placed the platform's swinging frame, the pipe is lifted by the depression of a handle which is to be held in position (for locking the frame) by the loop of a detaining-rod. The swinging frame and the rigid frame are both adjustable as to their widths, when large pipes are to be carried by the outside shoulders of their sockets, which will rest upon rubber pads affixed to vertically-adjustable blocks, the former frame is lifted from off the pins.

11,718.—STAIRCASES: *T. F. Wilkinson.*—The inventor's object is to afford more easy means of ascent and descent within limited spaces by two series of steps, one for each foot, so arranged that each tread of the one series shall be midway between the nearest two treads of the other series, and that the front of each step shall be midway between the front and the back of the tread of the next lower step; handrails or their equivalent will render the way narrow enough to cause the foot to be placed upon the proper steps in succession. The staircases may be used in conjunction with an ordinary staircase, or two sets together, for ascent and descent respectively, can be employed.

11,740.—POSTS FOR FENCING, TELEGRAPH WIRES, &c.: *F. A. Riggs.*—The post has an outside casing of metal, whose lower portion is so shaped as to prevent it from being turned round; a wooden filling is put into the casing, and is covered over with a thin sheath of metal opposite a slit in the outer casing, which extends from the ground to the top, on which is a screw cap; nails and staples for securing wires or rails to the posts are driven through the slits and the metal sheathing into the filling of wood.

11,768.—FIRE-HOSE NOZZLES: *W. F. Agnew.*—The nozzle is devised for the throwing of a straight stream, or a spray having a large diameter, at option. It is fitted with a middle steam pipe within an annular passage, and has two valves which will close either the steam pipe or the nozzle altogether; a small hole in one of the valves will serve for delivering a small stream, a screwed sleeve regulates the volume of the spray, and the annular stream can be turned down at any angle required by means of an adjustable ring carried by another ring which is mounted loosely upon the pipe.

11,805.—ARTIFICIAL STONE: *T. Rouse.*—With sand and gravel, or with broken granite, clinkers, coke breeze, &c., is mixed some Portland or other cement. After the compound has been wetted and mixed it is poured into moulds, and is consolidated by rocking; the moulds are exposed during some days within a closed chamber to the action of steam under pressure, and the temperature is caused to rise slowly to 212 deg. Fahr.; when the articles are taken out a solution of silicate of soda is applied to them; they are then dried and put into a bath of calcium chloride.

11,826.—HOT-WATER CIRCULATING TANKS: *Davies Bros. & Co. and E. A. Davies.*—In order to facilitate access into the interior of the tank for cleaning or other purposes it is formed with a top and bottom which have annular grooves that pass over the shell's plain edge, the ends being tightened on to the body with a middle bolt. The shell's vertical joint may be after the seamed, folded, rivetted, or welded kind, and packing can be used for rendering the top and bottom joints fluid-tight.

11,828.—APPLIANCE FOR MOULDED BRICKS: *H. Grimbleby.*—The carrier is intended for holding soft bricks or blocks; to its back are hinged side wings and a handle or lever; on the latter are arms that will operate in inclined staples affixed to the side wings, which are forced outwards by the lifting and inwards by the lowering of the handle.

11,857.—LOCKS: *R. Bentzsch.*—The bolt is for a lock which can be shot by any one of a number of keys and drawn back by only the particular key that was used to shoot it. In one adaptation of the invention levers, pivotted on to a fixed pin, act conjointly with a stump upon the bolt, and some of them are raised whilst others remain down when any one key is used for shooting the bolt; the stump then engages with slots in the raised levers and passes over the ends of the other levers, thus, whilst a key which has bits that work any of the unlifted levers cannot be turned a key which does not raise all the levers which have been raised will not avail for liberating the bolt. The illegitimate employment of a pick is frustrated by the stump that is close to the right-hand side of the keyhole when the bolt is shot, and more combinations are provided for by means of a second stump upon the bolt so that each lever can assume three, instead of two positions.

11,865.—MOULDING OF LAVATORY BASINS: *G. H. Rowley and T. Till.*—After a sheet of the plastic material has been laid against a plaster or other form or pattern, it is rolled into shape with a recessed moulding-roller or cylinder-shaped segment turned by a crank or handle; in one form the pattern is made upon a cylinder-shaped segment, and the plaster mould is mounted upon india-rubber tubes at the bottom of a tray, a cylinder or segment rolling over a fixed tray might replace the sliding pattern tray and the cylinder or segment which turns around a fixed axis.

11,889.—CONNECTIONS FOR BRANCH AND MAIN PIPES: *O. Siedentopf.*—The invention applies to connexions whereby the branch pipe is pressed directly against the main pipe; around the main pipe is a collar made in two parts with one of which will engage screws or fork-shaped wedges which bear upon the flange or saddle-piece of the branch pipe.

11,892.—A GRIP FOR ROPES, RODS, &C.: *W. Swinburn.*—A wedge and a frame or bracket grip the rope, which, together with the wedge, is inserted into an opening made in the frame, a pivotted latch having an inner projection shuts the opening, there is an eye upon the wedge which bears against a roller.

11,924.—A CIRCULAR SAW GUARD: *R. Peacock.*—Cross-bars, which join two curved end-pieces, have their lower ends inserted into sockets upon a plate which will slide lengthwise upon the saw-bench, a lever that is pivotted upon a bracket clamped to one of the cross-bars guards the rear of the saw, and the wood as it passes the saw raises the lever's free end.

11,954.—BRICK KILNS: *T. Lloyd.*—In order that cold air may become heated by contact with the screen the fire-holes are divided into two passages at their inner ends, at each side of each fire-hole are made sight-holes through the brickwork, of the escape-flues those at the ends of the kiln are diverted so as to pass through the ends beyond the outer tie-bars.

12,027.—TIPPING TANKS: *M. F. Adams.*—The tank may be tipped with a handle into a hopper. The discharge overflows into a container, which holds the discharge siphon, whose bell is hung upon an arm. The tipping of the tank causes a pin that projects from its side to strike against a tongue upon the arm, and thereby to lift the bell. The bell drops as the tank resumes its position, so that siphonical action is thereupon started, the container is emptied, and the float sinks to open the inlet.

12,070.—LAVATORY FITTINGS: *O. Mattsson.*—In order that the basin may be readily tilted for its removal when desired, the sides of the basin-holder are provided with pivots which engage with slotted bosses that are formed upon the tipping basin.

12,081.—SOCKETS FOR RAIN-WATER PIPING, &C.: *A. B. Gee.*—Fastening-ears are fashioned upon detachable sockets whose channels will take the piping and the joint packing and a flange inserted into the pipe can be secured with a bolt and nut; slots, slanted or corrugated, are made in the ears of the sockets, or the ends of the ears may be formed in a corrugated or waved shape.

12,163.—INDOOR WATER-SUPPLY APPARATUS: *M. M. Brophy.*—One spout, or nozzle, serves for the delivery of both hot and cold water, the former being obtained by heating the latter with steam. The heater comprises, at its lower end, a perforated pipe within wire gauze through which the steam passes, and at the other end, two twin controlling cocks, as specified in No. 12,162 of 1899, worked with cams. The column or stem for the water-supply has passages through which steam and water flow to its top, whence they pass to the heater through ports from which the hot or cold water flows up to the outlet spout.

12,169-70.—LIFT-VALVES: *W. E. Case.*—A crank is devised for working a valve, which has a swivel-form connexion and spiral plates set around its spindle, whereby the valve will be caused to rotate as the water flows through; when the tap is closed the valve bears against its seating, and so maintains the working-surfaces in good state. (12,170).—The object of this latter invention is to effect a uniform wearing of the valve and its seat and to obviate leakage. A swivel-joint joins the valve to its spindle, and the valve's rotation is brought about by the water's impact against spiral plates which it carries underneath.

12,173.—A SAW GUIDE: *C. O. Seavey.*—For clamping a saw-guide upon the wood and for setting it at any angle desired, the plates, of which it consists, are joined to a split vertical rod pivotted on to the clamping-plate; the plates of the guide may be clamped at any angle with an arm and a set screw; the arm is notched at 45 deg. and other customary angles upon its under side; the saw's teeth, after the wood has been sawn, are stopped with a piece of wood screwed in a slot cut in the vertical rod.

12,189.—LOCKING-VALVES: *E. Bronsdon.*—An arm, which is pivotted on to lugs fashioned upon the tap, locks the handle in position, and is made secure with a bolt to be pressed by means of a spring into a socket in the tap. When it is desired to unlock the tap, the arm is liberated by the insertion of a ribbed key into a hole in the arm and turning it round. In another form a separate support, to which the arm is pivotted, is affixed to the tap.

MEETINGS.

FRIDAY, OCTOBER 12.

Sanitary Institute (*Lectures for Sanitary Officers*).—Dr. H. R. Kenwood on "Infectious Diseases." 8 p.m.

Architectural Association (*Discussion Section*).—Opening meeting of session. Mr. Geoffry Lucas on "Logical Building and its Influence on Design." 7 p.m.

SATURDAY, OCTOBER 13.

Sanitary Institute (*Demonstrations for Sanitary Officers*).—Inspection at the Southwark and Vauxhall Water Works, Hampton. 3 p.m.

Architectural Association of Ireland.—Visit to St. Patrick's Cathedral, under the guidance of Sir Thomas Drew. 2.30 p.m.

MONDAY, OCTOBER 15.

Sanitary Institute (*Lectures for Sanitary Officers*).—Dr. H. R. Kenwood on "Methods of Disinfection." 8 p.m.

WEDNESDAY, OCTOBER 17.

Builders' Foremen and Clerks of Works Institution.—Quarterly meeting of the members. 8 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Dr. H. R. Kenwood on "Water: Composition, Pollution, and Purification." 8 p.m.

THURSDAY, OCTOBER 18.

Carpenters' Hall, London Wall (*Lectures on Sanitary Building Construction*).—Mr. A. Buchanan, Instructor at University College, London, on "Plumbers' Work Connected with Dwelling Houses." 7.30 p.m.

FRIDAY, OCTOBER 19.

Architectural Association.—Annual Conversazione, King's Hall, Holborn Restaurant. 8 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Dr. H. R. Kenwood on "Elementary Statistics." 8 p.m.

Institution of Mechanical Engineers.—Mr. Bryan Donkin on "An Improved Glass Revealer for Studying Condensation in Steam Engine Cylinders and Rendering the Effects Visible." 8 p.m.

SATURDAY, OCTOBER 20.

Sanitary Institute (*Demonstrations for Sanitary Officers*).—Inspection at Leyton Sewage and Destructor Works. 3 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 20.—By BRADY & SON (at Sheffield).

Grindsbrook Booth, Derby.—Enclosures of land, 19 a. 2 r. 20 p., f.
- Field Head and 12 a. 3 r. 7 p., f. £865
- Freehold farmhouse and 43 a. 0 r. 37 p. 2,200
- Ibbotson's Bank Closes, 24 a. 3 r. 14 p., f. 1,800
- A freehold house and 7 a. 3 r. 30 p. 1,000

September 26.—By J. PRITCHARD & PORTER (at Llanrwst).

Trefriw, Carnarvon.—Three plots of land, 1 a. 0 r. 30 p., f. 360
- Five plots of land, f. 520
- House and 1 a. 2 r. 21 p., f. 345
- Enclosure of land, 28 a. 2 r. 7 p., f. 450

September 27.—By J. M. LEDER & SON (at Swansea).

Swansea, Glamorgan.—St. James' Crescent, North Hill, u.t. 64 yrs., g.r. 43*l.* 8s. 900

By WINCH & SONS (at Maidstone).

Yalding, Kent.—The Moat Farm, 85 a. 2 r. 19 p., f. 1,500
- Freehold house and shop, area 0 a. 2 r. 17 p. .. 9,100
- Boaslands, and 2 a. 2 r. 7 p., f. 185
- Little Boaslands Orchard, 6 a. 2 r. 34 p., f. 440
- Mockbeggar enclosures, 21 a. 1 r. 1 p., f. 600
- Marden, Kent.—Merriams, and 26 a. 3 r. 35 p., f. 650

September 28.—By W. INGRAM SELWYN (at Reigate).

Reigate, Surrey.—Reigate Heath, Jupp's cottages, f. 1,100

By A. J. SHEFFIELD.

Walthamstow.—22 to 28 (even), Clarendon-rd., f. 455

Leytonstone.—120 and 122, Birkbeck-rd., u.t. 78 yrs., g.r. 8*l.* 1,200

Herne Bay, Kent.—The Grand Drive &c., 12 plots of land, f. 195

By HALL, WATERIDGE, & OWEN (at Shrewsbury).

Marton, Salop.—Marton Grange Farm, 246 a., f. 355

Two plots of meadow land, 10 a. 0 r. 3 p., f. 7,500

By CLEMENTS, SON, & HUGHES (at Coventry).

Fillongley, Warwick.—The Hungerlands Estate, 44 a. 2 r. 14 p., f. 350
- Arley House and 32 a. 3 r. 2 p., f. 2,350
- Various enclosures, 42 a. 3 r. 26 p., f. 3,000
- Fillongley Mill and 5 a. 2 r. 15 p., f. 3,990

Arley, Warwick.—Slowley Hall Estate, 88 a. 0 r. 26 p., f. 2,120

October 1.—By CASSIN & CO.

Catford.—84, Catford Hill, u.t. 95 yrs., g.r. 8*l.*, r. 40*l.* 5,800

Dulwich.—78, Glengarry-rd., u.t. 80 yrs., g.r. 6*l.* 6s., r. 36*l.* 450

By W. W. READ & CO.

Ealing.—Murray-rd., three plots of building land, f. 340

Broadstairs, Kent.—2, Wrotham-rd., u.t. 164½ yrs., g.r. 5*l.*, r. 25*l.* 115

By R. DALTON & SON (at Carlisle).

Bewcastle, Cumberland.—Bewcastle Demesne Estate, 312 a. 2 r. 4 p., f. 260

October 2.—By C. H. BROWN.

Pimlico.—73, Pulford-st., u.t. 37 yrs., g.r. 1*l.* 7,000

Putney.—54, 56, and 58, Deodar-rd., u.t. 85 yrs., g.r. 24*l.*, r. 100*l.* 565

Ashford, Middlesex.—Albert-rd., a plot of land with stable premises, f. 825

By DUNCAN & KIMPTON.

Stoke Newington.—85, Lordship-rd., area 1 acre, u.t. 25 yrs., g.r. 15*l.* 120

By NOKES & NOKES.

Gray's Inn-road.—Nos. 230 and 232, u.t. 10 yrs., g.r. 54*l.*, r. 195*l.* 745

Barnsbury.—46, Sonning-st., u.t. 59 yrs., g.r. 7*l.* .. 635
- 5, Bryan-pl., u.t. 43 yrs., g.r. 5*l.*, r. 36*l.* 420
- 28, Bryan-st., u.t. 44 yrs., g.r. 4*l.*, r. 31*l.* 4s. 325
- 28, All Saint's-st., u.t. 45 yrs., g.r. 6*l.*, r. 33*l.* .. 300
- 34, Huntingdon-st., u.t. 49 yrs., g.r. 7*l.*, r. 50*l.* .. 300
- 95, Hemingford-rd., u.t. 42 yrs., g.r. 6*l.*, r. 52*l.* 690
- 8, 10, and 46, Brooksby-st., u.t. 84 yrs., g.r. 15*l.* 5s. 505

Holloway.—17, Benwell-rd., u.t. 63 yrs., g.r. 8*l.*, r. 44*l.* 295
- 16, Medina-rd., u.t. 60 yrs., g.r. 4*l.* 10s., r. 34*l.* 440

[See also next page.

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COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Chapel, Brynmor Estate, Penmaenmawr	.....	J. S. Coverley, Architect, Penmaenmawr, North Wales	Oct. 16
Store Premises, Soothill Upper	Batley Co-operative Society	B. Watson, Architect, Bradford-road, Batley	do.
Stables, Stenhouse Muir	Stirling County Council	A. & W. Black, Architects, Falkirk	do.
Road Metal (500 tons)	Carshalton District Council	W. W. Gale, Civil Engineer, High-street, Carshalton	do.
Broken Granite, &c. (990 tons)	Bishop's Stortford U.D.C.	T. Swatheridge, North-street, Bishop's Stortford	do.
Post Office, Dalkeith, N.B.	Office of Works	Secretary, H.M. Office of Works, Storey's Gate, S.W.	do.
Drainage Works	Alton (Hants.) Guardians	A. F. M. Downie, Alton	do.
Paving, Sibthorp-street	Tynemouth Corporation	J. F. Smillie, Surveyor, Town Hall	do.
*Kerbing, Tarpaving, &c. Oaksford Avenue, Sydenham	Lewisham Board of Works	Surveyor, Town Hall, Catford, S.E.	do.
*Kerbing, Tarpaving, &c. Whitburn-road, Lewisham	do.	do	do.
*Sewerage Works	Wembley U.D.C.	Clerk, Public Offices, Wembley, Middlesex	Oct. 17
Sewers, &c.	Fulham Vestry	C. Botterill, Civil Engineer, Town Hall, Walham Green, S.W.	do.
Street Works	Watford U.D.C.	Engineer, 14, High-street, Watford	do.
Waterworks	Annan (N.B.) Commissioners	W. R. Copland, Civil Engineer, 146, West Regent-st., Glasgow	do.
House, Aldin Grange, Northumberland	North-Eastern Railway Company	W. Bell, Architect, Central Station, Newcastle	do.
Boundary Walls, &c., Barry County School	.....	W. H. D. Caple, Architect, Cardiff	do.
Street, Roa Island	Barrow Corporation	Borough Engineer, Town Hall	do.
Street Works, Bradshaw-street	Nelson Corporation	B. Ball, Civil Engineer, Town Hall	do.
Granite Kerbing, &c.	Watford U.D.C.	Engineer, Council Offices, Watford	do.
Ambulance Station, Goulden-street	Manchester Corporation	City Surveyor, Town Hall	do.
Club Premises, Norfolk-street, Nelson	.....	W. & J. P. Dent, Architects, 47, Railway-street, Nelson	do.
Cast-iron Mains, &c., at Workhouse	Hambledon Guardians	E. L. Lunn, Surveyor, 36, High-street, Guildhall	do.
Filter Bed, Wombwell, Yorks.	.....	J. & T. Mitchell, Civil Engineers, Regent-street, Barnsley	do.
*Making-up Roads	Ealing U.D.C.	Engineer, Public Buildings, Ealing, W.	Oct. 18
Road Works, Moat Estate	Rugby Freehold Land Society	J. T. Franklin, Bridget-street, Rugby	do.
Fire Station, Lingard-street, Saltley	Birmingham Corporation	City Surveyor, Council House, Birmingham	do.
Road Works, Ramsden-road, &c.	Friern Barnet U.D.C.	R. J. Reynolds, Civil Engineer, Friern Barnet	do.
Stores, Gawthorpe, Yorks.	Ossett Co-operative Society, Ltd.	J. Kirk & Sons, Architects, Dewsbury	do.
Banking Premises, Killybegs, Donegal	Ulster Bank, Ltd.	Lepper & Fennell, Architects, 83, Waring-street, Belfast	do.
Retaining Wall, New Frystone	Pontefract R.D.C.	J. P. Senior, Surveyor, Carlton, Pontefract	Oct. 19
Waterworks, Dalrymple, N.B.	Ayrshire County Council	J. & H. V. Eaglesham, Engineers, Ayr	do.
Alterations, &c., to Inn, Coventry	Messrs. Phillips & Marriott, Ltd.	H. W. Chattaway, Architect, Coventry	do.
Sewers, &c.	Bristol Waterworks Company	J. & C. Hawksley, Civil Engineer, 30, Great George-street, S.W.	do.
Sewers, Mills-road, North	Walton-on-Thames U.D.C.	C. J. Jenkin, Civil Engineer, Church-street, Walton-on-Thames	Oct. 20
Shed, &c.	Banbury Town Council	N. H. Dawson, Civil Engineer, Town Hall, Banbury	do.
Offices, &c., Arthur-street, Clayton-le-Moors	.....	J. W. Cooper, Co-operative Society's Offices, Clayton	Oct. 22
Offices, Trinity-road	Bootle (Lancs.) Corporation	H. Hartley, Architect, 8, Harrington-street, Liverpool	Oct. 23
Drainage Works, Bushmead-avenue, Bedford	.....	J. Lund, Borough Engineer, Town Hall, Bedford	do.
Widening Bridge, Yatton	Great Western Railway Company	G. K. Mills, Paddington Station, W.	do.
*Brick Sewer Culvert	Croydon County Council	Borough Surveyor, Town Hall, Croydon	do.
*Engine Shed	Great Western Railway	Engineer, Paddington Station, W.	do.
*Road Making, &c.	Willesden District Council	Engineer, Public Offices, Dyne-road, Kilburn, N.W.	do.
*Road Making and Paving Works	Hammersmith Vestry	Surveyor, Town Hall, Hammersmith	Oct. 24
Granite, &c.	Bexhill U.D.C.	.....	Oct. 26
Additions to Workhouse	Warwick Guardians	F. P. Trepess, Architect, 8, Jury-street, Warwick	do.
*Hospital	Fylde, Preston, &c. Jt. Hos. Com.	See Advertisement	do.
*Corrugated Iron Buildings	Walthamstow U.D.C.	Engineer, Town Hall, Walthamstow	do.
*Furnishing Council Chamber	do.	do.	do.
*Hot Water Heating	Ilford School Board	C. J. Dawson, Architect, 7, Bank-buildings, High-street, Ilford	Oct. 29
*Alterations to School Buildings	Waltham Holy Cross Sch. Bd.	Clerk, School Board Offices, Waltham Abbey	do.
*Making-up Roads	Windsor R.D.C.	See Advertisement	do.
Sewers, &c.	Long Crendon R.D.C.	J. Taylor, Sons & Santo Crimp, C.E., 27, Great George-street, S.W.	do.
Sewerage Works	Guildford R.D.C.	J. Anstee, Civil Engineer, Commercial-road, Guildford	do.
*Stores, Workshops, &c.	Shoreditch Vestry	J. Rush Dixon, Town Hall, Old-street, E.C.	Oct. 30
*Caretaker's House, &c.	Tunbridge Wells Corporation	Borough Surveyor, Town Hall, Tunbridge Wells	Nov. 1
*Galvanized Corrugated Building	Cotton Powder Company, Ltd.	See Advertisement	No date
Alterations to Premises, 33 and 35, Bank-st. Carlisle	Messrs. R. Gibson & Co.	T. Taylor Scott, Architect, 9, Lowther-street, Carlisle	do.
Converting Bldgs. into House & 2 Cottages, Tedbergh	Mr. C. E. Taylor	J. Hutton, Architect, Kendal	do.
Three Villas, Hall-lane, Walton-on-Naze	Mr. D. Webb.	F. J. Nunn & Co., Architects, Walton-on-Naze	do.
Saw Mill and Engine House, Workington	Messrs. J. & W. Jackson	A. C. Scoular, Fleatham, St. Bees	do.
Paving Setts	Heaton Norris U.D.C.	J. E. Banks, Council Offices, Heaton Moor	do.
House, Hessel, near Hull	Mr. A. Spring	J. M. Dossor, Architect, 2, Manor-street, Hull	do.
Farmhouse, Blackhall Mill	Mr. A. T. Watson	J. E. Parker, Architect, Post Office Chambers, Newcastle	do.
Buildings, Gallowgate, Aberdeen	.....	Brown & Watt, Architects, 17, Union-terrace, Aberdeen	do.
Factory, &c., Great Victoria-street, Belfast	.....	Freeman, Son & Gaskell, Architects, 11, Carr-street, Hull	do.
Staircases, &c., People's Palace, Bradford	.....	W. Longley, Architect, 15, Richmond-road, Bradford	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Cardiff Corporation	250*l.* per annum	Oct. 17
Junior Clerk	London County Council	.....	do.
*Clerk of Works	Beckenham U.D.C.	3*l.* 3*s.* per week	Oct. 18
*Builder's Timekeeper and Material Clerk	Battersea Vestry	30*s.* per week	do.
*City Architect	Bradford Corporation	400*l.* per annum	Oct. 31

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. —. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xix. & xxi.

King's Cross.—4 and 18, Delhi-st., u.t. 58 yrs., g.r. 12*l.* £700
5, Charlesworth-st., u.t. 51 yrs., g.r. 6*l.*, r. 30*l.* .. 305
Caledonian-rd.—41, Bingfield-st., u.t. 40½ yrs., g.r. 4*l.* 10*s.* 410
Kentish Town.—52, Wellesley-rd., u.t. 65 yrs., g.r. 6*l.*, r. 36*l.* 305
Regent's Park.—Berkeley-rd., i.g.r. 50*l.*, u.t. 47 yrs., g.r. 18*l.* 570
Hornsey.—2 and 4, Haringey-rd., u.t. 69 yrs., g.r. 10*l.* 10*s.* 355
Southall.—25, 27, and 29, Portland-rd., u.t. 98 yrs., g.r. 18*l.* 625
Hornsey.—11, 15, and 17, Haringey-rd., u.t. 69 yrs., g.r. 15*l.* 535
Barnsbury.—1 and 2, Grace-st., u.t. 40 yrs., g.r. 20*l.* 365
Holloway.—24, Palmerston-rd., u.t. 65 yrs., g.r. 6*l.* 275
Haggerston.—11, Cester-st., u.t. 41 yrs., g.r. 4*l.* 10*s.* 170

October 3.—By Andrews, Holland & Hitch.
Chelsea.—49 to 55 (odd), Ovington-st., u.t. 31 yrs., g.r. 24*l.*, r. 177*l.* £1,025
26, Sydney-st., u.t. 25 yrs., g.r. 6*l.*, r. 81*l.* 600
69a, 71 and 71a, King's-rd., u.t. 39 yrs., g.r. 6*l.* 5*s.*, r. 152*l.* 10*s.* 1,330
By E. Holsworth.
Haggerston.—11, Trafalgar-rd., u.t. 39 yrs., g.r. 4*l.* 300
By Mark Hubbard.
Kentish Town.—2, Dartmouth Park-rd., u.t. 52 yrs., g.r. 10*l.* 10*s.*, e.r. 80*l.* 1,060
By Alex. Phillips.
Barnsbury.—35 and 36, Charlesworth-st., u.t. 51 yrs., g.r. 11*l.* 520
Willesden.—28, Windsor-rd., u.t. 92 yrs., g.r. 5*l.* 10*s.*, r. 33*l.* 325
By R. Price & Son.
Kennington.—53, Bird-st., f., r. 39*l.* 405
Hammersmith.—43, Margravine-rd., u.t. 90 yrs., g.r. 5*l.* 195

Wandsworth.—35 and 36, Trewint-st., u.t. 97 yrs., g.r. 10*l.* 10*s.* £175
October 4.—By Alder & Co.
Norwood.—4 and 6, Colby-rd., u.t. 66 yrs., g.r. 15*l.*, r. 64*l.* 500
By Chesterton & Sons.
Knightsbridge.—7, Trevor-sq., u.t. 12½ yrs., g.r. 7*l.*, r. 50*l.* 310
By Newbon, Edwards, & Shephard.
Canonbury.—48, Canonbury Park South, u.t. 35½ yrs., g.r. 2*l.*, e.r. 80*l.* 1,060
Kentish Town.—223, Kentish Town-rd., and 1 and 2, Angler's-lane, u.t. 43 yrs., g.r. 9*l.* 1,350

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 15 0	per 1,000 alongside, in river.
Rough Stocks and Grizzles	1 11 0	" " "
Smooth Bright Facing Stocks..	2 28 0	" " "
Shippers	2 2 0	" " "
Flettons.....	1 9 6	" at railway depôt.
Red Wire Cuts ..	1 15 0	" " "
Best Fareham Red	3 11 6	" " "
Best Red pressed Ruabon Facing.	5 5 0	" " "
Best Blue Pressed Staffordshire ..	4 7 0	" " "
Do., Bullnose	4 12 0	" " "
Best Stourbridge Fire Bricks	4 4 6	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers.....	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers..	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamfered, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers..	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamfered, Squints	14 0 0	" " "
Seconds Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	" "
Best Portland Cement	37 6	per ton "
Best Ground Blue Lias Lime..	24 0	" "

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt
Bath "	1 7	" "
Farleigh Docon Bath ..	1 8	" "
Beer in blocks	1 6½	" "
Grinshill "	1 10	" "
Brown Portland in blocks	2 2	" "
Darley Dale "	2 1½	" "
Red Corsehill "	2 5	" "
Red Mansfield "	2 4½	" "
Hard York "	2 10	" "
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super.
" " 6 in. Rubbed Ditto..	2 10½	at rly. depôt. " "
" " 3 in. sawn both sides slabs (random sizes)	1 3	" "
" " 3 in. self-faced Ditto	0 9	" "

SLATES.

in. in.	£ s. d.	
20 x 10 best blue Bangor..	12 5 0	per 1000 of 1200 at ry. dep.
" best seconds "	10 15 0	" "
16 x 8 best "	6 2 6	" "
20 x 10 best blue Portmadoc	10 18 0	" "
16 x 8 best blue Portmadoc	6 0 0	" "
20 x 10 best Eureka unfading green.....	11 2 6	" "
16 x 8 " "	6 15 0	" "
20 x 10 Permanent green	10 0 0	" "
16 x 8 " "	5 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles..	41 6	per 1,000 at rly. depôt.
Hip and valley tiles....	3 7	per doz. " "
Best Broseley tiles	48 6	per 1,000 " "
Hip and valley tiles....	4 0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 " "
Do. ornamental Do.	60 0	" " "
Hip tiles.....	4 0	per doz. " "
Valley tiles.....	3 9	" " "
Best Red or Mottled Staffordshire Do. (Peakes) .	50 9	per 1,000 " "
Hip tiles.....	4 1	per doz. " "
Valley tiles.....	3 8	" " "

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0	" " "

PRICES CURRENT (*Continued*).

	At per load of 50 ft. £ s. d.	£ s. d.
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0
JOINERS' WOOD.	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
" " 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens.....	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens.....	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens.....	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
" " 3 in. by 9 in. ..	14 0 0	15 0 0
Battens.....	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
" " 3 in. by 9 in.	13 0 0	14 0 0
" " battens	11 0 0	12 0 0
Pitch pine: deals.....	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small " "	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
½ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6
Compound Girders " "	12 5 0	13 10 0
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	11 7 6	12 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	10 0 0	10 10 0
Staffordshire Crown Bars, good merchant quality	10 15 0	11 5 0
Staffordshire "Marked Bars" ..	13 5 0	- - -
Hoop Iron, basis price.....	11 0 0	11 10 0
" " galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 5 0	- - -
" " to 24 g.	12 10 0	- - -
" " to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14 15 0	- - -
" " 22 g. and 24 g.	15 5 0	- - -
" " 26 g.....	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.....	18 0 0	- - -
" " 22 g. and 24 g.	18 10 0	- - -
" " 26 g.....	20 0 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 15 0	14 10 0
" " 22 g. and 24 g.	14 10 0	15 10 0
Cut nails, 3 in. to 6 in.....	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 10 0	- - -
Pipe in coils	21 0 0	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	28 0 0	- - -
Silesian.....	27 0 0	- - -
COPPER—		
Strong Sheet..... per lb.	0 1 1	- - -
Thin ..... "	0 1 3	- - -
Copper nails ..... "	0 1 3	- - -
BRASS—		
Strong Sheet..... "	0 0 11	- - -
Thin ..... "	0 1 1	- - -
TIN—English Ingots ..... "	0 1 6	- - -
SOLDER—Plumbers' ..... "	0 0 8	- - -
Tinmen's ..... "	0 0 10	- - -
Blowpipe ..... "	0 1 0	- - -

PRICES CURRENT (*Continued*).

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft. delivered.
" fourths	2¾d.	" "
21 oz. thirds	3¼d.	" "
" " fourths.....	3d.	" "
26 oz. thirds	4¼d.	" "
" " fourths	4d.	" "
32 oz. thirds	5¼d.	" "
" " fourths	5d.	" "
Fluted sheet, 25 oz.	3½d.	" "
" " 21 "	4¼d.	" "
½ Hartley's Rolled Plate.....	3d.	" "
⅝ " " "	3½d.	" "
¾ " " "	4d.	" "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes.....per gallon	0 3 2
" " " in barrels ..... "	0 3 2
" " " in drums ..... "	0 3 4
Boiled " " in pipes..... "	0 3 4
" " " in barrels ..... "	0 3 5
" " " in drums ..... "	0 3 7
Turpentine, in barrels ..... "	0 2 6
" in drums..... "	0 2 8
Genuine Ground English White Lead ...per ton	27 10 0
Red Lead, Dry..... "	25 0 0
Best Linseed Oil Putty.....per cwt.	0 9 6
Stockholm Tar ..... per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish or outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work.....	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

J. J. (We cannot advise as to what the legal position may be, but we think the contractor ought to have communicated with the architect before making the alterations. He might consider that the sanitary authorities had exceeded their powers). W. L. N.—A. S. (Amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items), which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BRADFORD.—For new outlet staircase from stage of Princes Theatre. Mr. T. Brough, superintendent of works. Mr. William Longley, architect:—

Wade Bros., Leeds* £245

New Outlet Staircases from People's Palace under the Princes Theatre.

F. Robinson	£477 10	B. Kershaw	£450 0
Wild & Dennison ..	462 0	Wade Bros.*	446 15

DEVONPORT.—For taking down and rebuilding retaining wall, Exmouth-road. Mr. John F. Burns, Borough Surveyor, Municipal Offices, Ker-street, Devonport:—

Thos. May	£463 0 0	Jenkin & Son..	£329 0 0
R. H. B. Neal..	437 0 0	W. Blake	323 0 0
A. Roberts	405 18 6	Thos. Squires*	282 0 0

DURHAM.—For laying pipe sewers, &c. (1,900 yards); for the Urban District Council. Mr. H. W. Taylor, A.M.I.C.E., St. Nicholas'-chambers, Newcastle-on-Tyne:—

J. Manners..... £8,956 0
J. Carrick, Crossgate Peth, Durham* 1,942 8

GREAT YARMOUTH.—For rebuilding the Duke of York, Great Yarmouth, for Ind, Coope, & Co., Limited. Messrs. Harrington & Ley, architects, 65, Bishopsgate-street Without, E.C., and Corn Exchange, Romford:—

J. F. W. Bray, Great Yarmouth* £788

[*See also next page.*

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LINCOLN.—For the erection of boiler-house, laundry, &c., at the County Hospital. Messrs. W. Watkins & Son, architects, Silver-street, Lincoln :—

Halkes Bros.	£3,431 8 10	H.S.&W.Close	£2,817 0 0
Lincoln Co-op. Building Society, Ltd.	2,977 0 0	Main, Kendall, & Main, Loughboro'*	2,575 0 0
W.&M.Halkes	2,964 14 0		

LONDON.—For the erection of a school, West Hampstead, for the Managers of Aske's Haberdasher's Schools. Mr. Henry Stock, architect, 9, Denman-street, London Bridge, S.E. Quantities by Messrs. Widnell & Trollope, 20, Tothill-street, Westminster, S.W.:—

Vigor & Co.	£27,162	F. & H. F. Higgs	£24,350
Snewin & Co.	25,985	Dove Bros.	24,265
B. E. Nightingale	25,753	Bowers & Co.	23,910
H. J. Williams	25,633	Turtle & Appleton	23,780
S. F. Halliday	25,178	Gough & Co.	23,754
King & Son	25,058	Chessum & Sons	23,651
Godson & Sons	24,875	Patman & Fotheringham	22,871
Allen & Sons, Ltd.	24,545		

LONDON.—For the construction of 1,220 yards sewers, Bushey Heath, for the Hendon Rural District Council. Mr. J. A. Webb, engineer, Stanmore-hill, Stanmore :—

	Stanfords Joints.	Yarn and Cement Joints.
E. W. Hollingsworth	£2,961	£2,888
G. R. Mann	2,918	2,845
H. Brown	3,166	3,066
Clift Ford	3,216	3,150
F. W. Killingback & Co.	3,763	3,681
R. Ballard & Co.	2,882	2,717
S. Saunders, Earl's Court-square*	2,747*	2,672
Johnson & Langley	3,700	3,615
W. Jackson	5,160	5,130
E. T. Bloomfield	3,449	3,379
Wilkinson Bros.	3,200	3,049
T. Adams	5,416	5,216

LONDON.—For the erection of house, stabling, &c. at rear of Town Hall, for the Bermondsey Vestry. Mr. R. J. Angel, C.E., Town Hall, Spa-road, Bermondsey. Quantities by Mr. A. F. Wrightson, 26, Budge-row, Cannon-street :—

W. Shurmur	£31,350	F. & H. F. Higgs	£22,430
Todd & Co.	30,969	Foster Bros.	22,365
Johnson & Co.	25,560	Wilson Bros.	22,169
W. Wallis	24,431	H. L. Holloway	22,100
Martin Wells & Co.	24,300	Smith & Son	21,869
H. J. Williams	24,175	Chessum & Son	21,700
Balaam Bros.	24,138	Killby & Gayford, 87, Worship-st.*	21,214

LONDON.—For additions to master's house at workhouse, Notting-hill, for the Kensington Guardians. Mr. Ernest Flint, architect, 80, Coleman-street, E.C. Quantities by Mr. V. Annesley Edlin :—

Head & Son	£729 0	Wilson Bros.	£541 0
Higgs & Co.	723 0	E. & A. Williams	541 0
Foster Bros.	664 0	J. W. Jones	522 0
W. Webber	588 10	Weibking & Son	489 0
Gen. Builders, Ltd.	558 0	E. Wall*	442 0

TUNBRIDGE WELLS.—For the erection of six houses and a shop, Queen's-road, Tunbridge Wells, for the Tunbridge Finance and Investment Company, Limited. Mr. H. Elwig, Jun., architect :—

Marshall	£2,020	Leney & Son	£1,770
Funnell Bros.	1,870	Goodwin Bros.*	1,735

PRESTON.—For reconstructing the Princes Theatre, Tithebarn-street, Preston, for Messrs. Sawyer & Woodruff. Mr. William T. Munford, architect, 12, Guildhall-street, Preston. Quantities by the architect :—

		Time for Competion. Weeks.
Charles Walker	£4,555 0 —	15
William Hothersall	4,490 0 ..	not stated.
Croft & Sons	4,416 0 ..	"
Cartmel & Son	4,357 5 ..	"
William Whiteside	4,350 0 —	15

WORCESTER.—For the erection of an engine-house at waterworks for the Corporation. Mr. T. Caink, C.E., Guildhall, Worcester :—

Thomas Vale	£2,580	Bromage & Evans, Worcester*	£2,168
Wood & Sons	2,457	Watts & Bray	2,135
Stokes Bros.	2,289		

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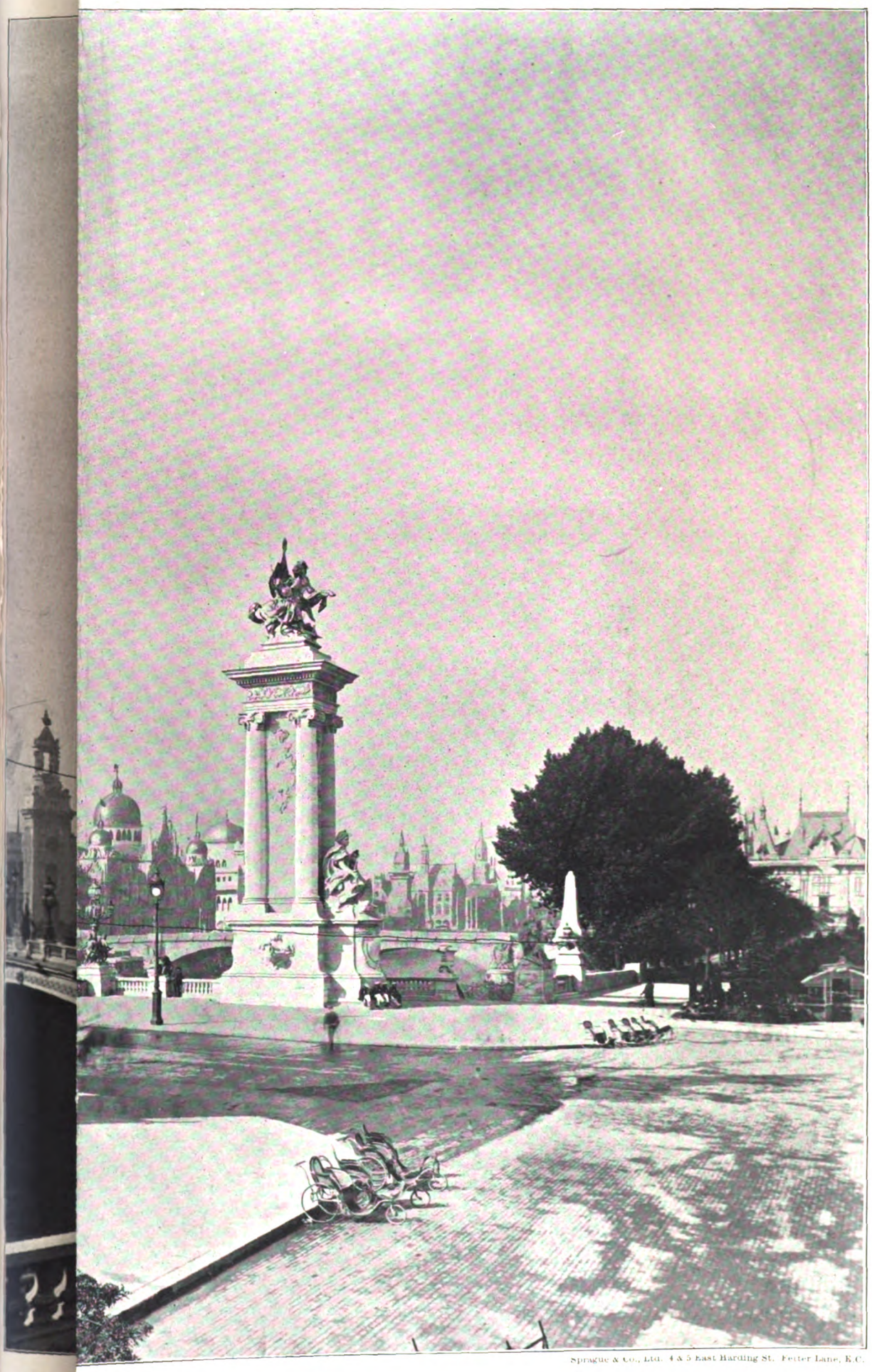

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VOL. LXXIX., No. 3011 OCTOBER 20, 1900.

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Illustrations of Italian Renaissance Ornament.

THE ornamental work connected with Italian Renaissance architecture—leaving out of consideration the immense number of decorative objects which are complete in themselves, and have no connexion with architecture—is such an immense subject that adequate illustration of it in books and drawings is all but impossible, or at all events could only be achieved by a kind of syndicate of artists and publishers prepared to make and issue portfolios of drawings by the thousand, regardless of time, labour, and cost. No single publication could do justice to the subject, because the more we study Italian Renaissance detail, the more we are struck with its great and unexpected varieties. There are types of carved foliage, of capitals, which are familiar to us as essentially Renaissance; and as far as strictly architectural details are concerned, such as capitals, cornices, &c., there is a tolerably close adherence to general types. But in the design of decorative carving and inlay there is such an immense variety of fancy and detail that one never seems at the end of it.

There is, however, a certain prevailing quality in Renaissance ornament which is readily perceived, and which may be defined as representing a combination of Greek delicacy and refinement of design and execution with a freedom which is more mediæval in character. There is something of the severity of line of classic art, combined with a far greater riot of fancy. The Romans suggested idealised animal forms, winged quadrupeds with eagles' heads perhaps, classified as "griffins," or female forms which run off into sumptuous scrolls of foliage; but these were simply and easily grouped elements of decoration compared with the endless and bewildering fancies of the Renaissance artists in the creation of *mélanges* of odds and ends of men, animals, fishes, and grotesque masks, into a system of decoration. With all this eccentricity, however, there is always a sense of style and of harmony of design about this kind of work, which leads one to overlook the grotesqueness of much of the detail in admiration of the general effect. In the use of foliage in ornament, without the human or animal element, the characteristic of the Renaissance ornament is again found to be a singular delicacy and grace of line and execution, reminding one of Greek work, yet with a freedom and an occasional approach to naturalism which is hardly ever found in Greek work. And yet the work hardly ever comes too close to realism. In most of it a distinctly conventional character is preserved, but it is a conventionalism different from, and more free than, that of either Greek or Roman art.

The best modern illustration of these qualities in Italian Renaissance detail is found in Mr. Oakeshott's "Detail and Ornament of the Italian Renaissance," published a few years ago. The examples in this collection have been very well selected; they are mostly typical of the best qualities of design of the period. Nicolai's remarkable collection of photographed examples ("Das Ornament der Italinischen Kunst") brings out still more remarkably the best side of Renaissance detail, and shows moreover how little the most careful and painstaking draughtsmanship avails to convey the true impression of the richness and exuberance of the period of the Renaissance treatment of conventionalised foliage. The finest examples in these two books are to be found in the drawing of the inlaid ornament of a pilaster from Sta Maria dei Miracoli, plate 9 in Mr. Oakeshott's book, and the carved pilasters of San Michele, Venice, in plate 97 of Nicolai's collection. These two show the Italian Renaissance foliage ornament at its perfection; and nothing more beautiful and delicate in the shape of ornament could be found. There is probably much more, equal to these examples, to be found, as yet unillustrated. It is not likely that any one publication could do justice to it—at all events, any publication by one artist. But there must be many sketches of work of this type in existence; sketches at present isolated and unpublished in various portfolios and sketch-books. It would surely be worth while for those who possess such illustrations to arrange together, through some common correspondent, for a joint publication of their various drawings, as a contribution towards the more adequate illustration of Italian Renaissance ornament. In thus consecrating their efforts towards a common object they would be doing a service to art, and especially to architects and decorative artists.

The latest contribution to the illustration of Italian Renaissance work comes in the shape of a folio volume of fifty sheets of drawings, by Messrs. G. A. T. Middleton and R. W. Carden,* who state, as the justification for such a publication, that such works of this kind as have previously appeared are out of print and no longer to be met with. Is this really the case? We should have thought that some books of illustrations of Italian Renaissance ornament were still attainable. In the permanent preface to the book (for the above remark is quoted from the separate announcement sheet) the object is said to be to find as much variety as possible in Italian detail, and that in fact this has been achieved without, it is believed, repeating subjects which have been illustrated elsewhere in English books. This is a better plea, for the wealth of the Italian Renaissance is, as the authors observe, greater than has been yet realised, and it is still possible to draw many things which have not been drawn before; and also to find characteristics of Renaissance detail which are at all events not familiarly known.

The Marsuppini tomb at Santa Croce, which is the subject of one of the

* Ornamental details of the Italian Renaissance, measured and drawn by G. A. T. Middleton and R. W. Carden. London: B. T. Batsford; 1900.

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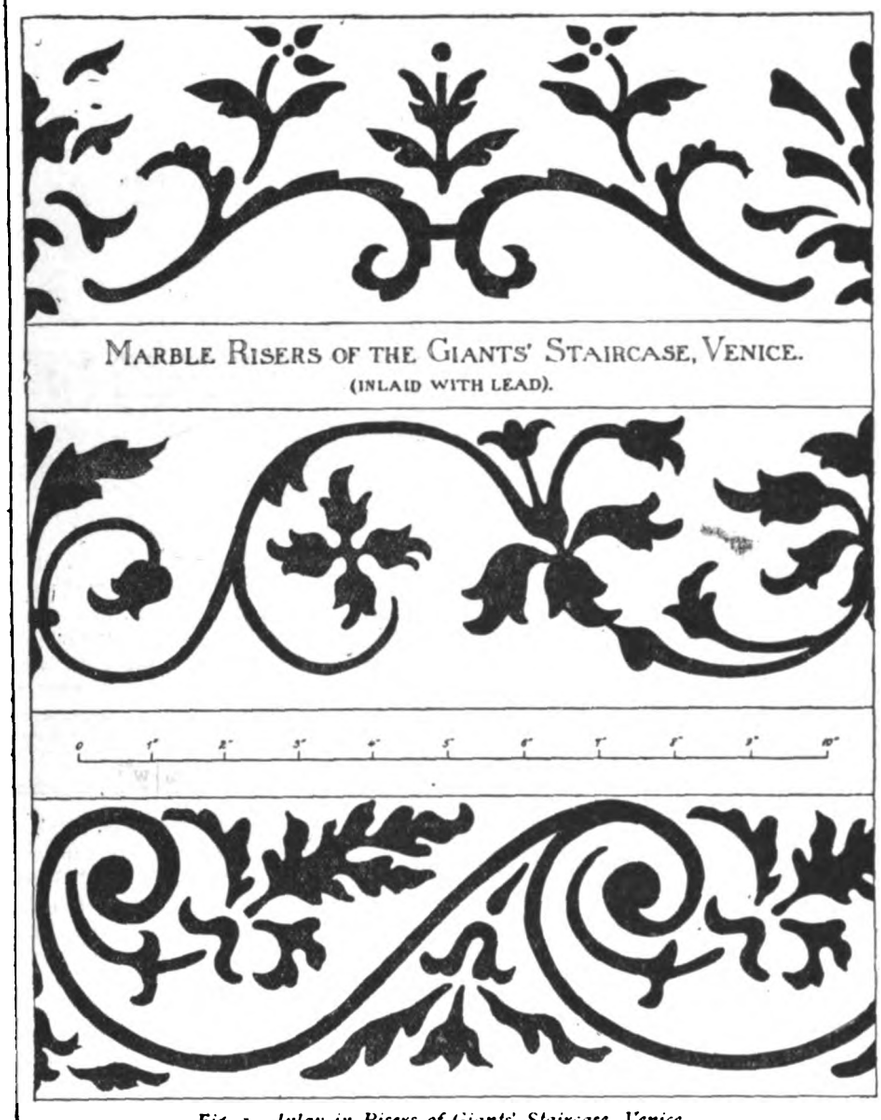

Fig. 1.—Inlay in Risers of Giants' Staircase, Venice.

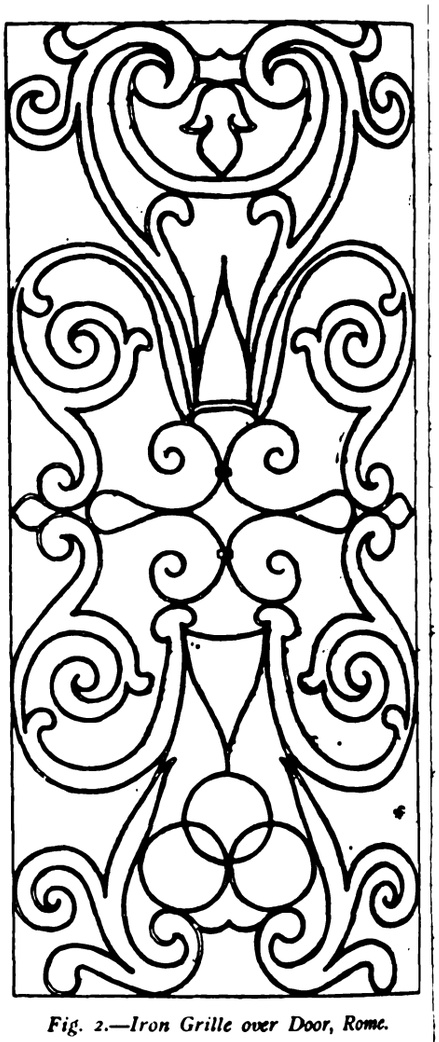

Fig. 2.—Iron Grille over Door, Rome.

plates, can hardly, it is true, be regarded as a novelty; and in some of the other illustrations, if the place and name are not familiar, the design seems so much what one has seen before that we can hardly regard it as a new experience. The "Frieze from a Corner House in Florence" (plate 19) is charming, but is an old enough motive, except perhaps that the foliage scroll is a little more naturalistic than usual. But there are other illustrations which do seem to open new features in Renaissance detail. We do not remember to have seen before, for instance, any illustration of the inlay decoration in the marble risers of the Giants' Staircase at Venice, of which we have given here a reduced copy from the plate (fig. 1). The authors observe also that Italian Renaissance wrought-iron work has been a good deal overlooked, which is perhaps true, though we may observe that Mr. Oakeshott's book contains (on plates 22 to 24) some beautiful examples, superior to any in Messrs. Middleton and Carden's publication. They give, however some examples which are of rather unusual character. There is the gateway in the atrium of San Sisto, Piacenza, with its effective contrast of straight and flowing lines (plate 48); also the grille over this gateway in the following plate; a fanlight from Vicenza (plate 41) rather too formal in design; a very characteristic balcony railing from Via Serena, Padua, with the upper and lower panels formed with oblique lines meeting in scrolls, and a kind of free ribbon border on each side of the straight lines, as if scribbled along them; a curious iron grille in the Calle delle Rasse, Venice; another from the Riccardi Palace, Florence, which, in spite of its being Italian Renaissance, we cannot admire and which we hope will not be imitated; and a very freely-treated and graceful panel over a door in Rome, of which we give a reduced representation (fig. 2).

Among other special features in these illustrations may be mentioned the bands of decorative marble inlay round the bases of the apses in Sta. Maria della Grazie, Milan, four of which are shown in two plates, and which differ a good deal from the most usual types of Renaissance floral design; and a portion of the pavement of Milan Cathedral, printed in colour (the only colour-print in the book); the colours are black, white, and a bright red, the black being used in bands and quatrefoil borders, the red forming a ground for white ornaments of a rather Greek character, while in the centre panels the white forms a ground for red flowers. The design is somewhat mechanical in quality, and if made by a modern artist would hardly pass for more than second-rate; but it affords a suggestion which may be worked out with different detail.

We gather from the results that, in regard to carved ornament, the authors have rather aimed at selecting and illustrating work which is more naturalistic in character than the central type of Renaissance carved design. This gives the illustrations a special interest, as being rather out of the beaten track; but the real glory of Renaissance carved ornament, after all, lies mainly in its conventional leafage; they do not seem to have had the feeling for the best treatment of natural foliage in carving, and something is produced, as in several of these plates, which is a kind of compromise between conventional and naturalistic, and misses the best qualities of both; not being free enough for nature, nor severe enough for convention. It is well to look at ancient examples of this kind dispassionately, and consider how we should regard them if we saw them as modern work. Not all that is old is good or worthy of imitation, even in a great period of art. Among other illustrations that are of special interest and illustrate really fine work are the half of an octagonal well-head in the courtyard of the Doge's Palace—this, we think, has often been drawn or photographed as a whole, but the drawing here shows the detail on a larger scale; the head of a doorway in the Chiesa dei Servi, Padua, where some familiar classic ornaments are treated in an unfamiliar manner; the arch-mould and frieze on plate 43, from Verona; two pilasters from the Certosa at Pavia; and the curious detail of the doorway from the Palazzo de Diamanti Ferrara, with its facetted quoins in the battered plinth and in the jambs; a feature which perhaps has a playful reference to the "Diamanti."

We may thank the authors for giving us a

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collection of Italian detail of some novelty, though the collection as a whole cannot be regarded as a typical or central illustration of Renaissance ornament; it rather illustrates exceptional work. The drawings are executed in a rather heavy and coarse style, but they serve their purpose as illustrations. It is a pity that Mr. Middleton's "note" on Renaissance work, which was printed as an advance notice and was sent us with the book, was not bound up with it as a preface, as it contains some good remarks, and there is at present no letter-press at all beyond a mere formal introductory notice. He observes that the study of the mouldings of Renaissance work shows that they were a great deal more free and varied than is sometimes supposed, and that the architects were by no means bound down to the orthodox profiles of the orders. In regard to the iron work, he suggests that the study of it leads to the conclusion that the source of the patterns employed is to be found in the twisted wire ornaments of the goldsmith. This idea is borne out by the kind of design shown in fig. 2, and by some of the others given in the book. Others of them, however, show no trace of such an influence.

THE LONDON WALL AND ITS MORTAR.

FROM time to time remnants of the massive wall with which the Romans, *circa* 360 A.D., encircled the city of London or Augusta are uncovered during the progress of excavations by modern builders. Quite recently a portion of the wall has been unearthed by Mr. J. Terry, the able Clerk of the Works to the Corporation, when excavating for a drain at Old Bailey. The City Surveyor, Mr. A. Murray, under whose supervision the alterations at Old Bailey are being carried out, has kindly given us two specimens of the mortar for analysis, while Mr. Terry has furnished an account of the work discovered, which will be valuable to future historians and archæologists as an authoritative record.

Before proceeding to give Mr. Terry's description the following paragraphs, relating mainly to other portions of the wall uncovered by earlier builders, may be of interest:—

"William Fitz-Stephen writing, in the reign of King Henry II., of the walls of this City hath these words: 'The wall is high and great, well-towered in the north side, with due distances between the towers. On the south side also the City was walled and towered, but the fish-abounding river of Thames, with his ebbing and flowing, have long since subverted them.'" (Strype's *Survey*, 1720).

Dr. Woodward, referring to remains found at Bishopsgate in 1707, writes:—

"The foundation of the wall here lay eight foot below the present surface; and from that up to almost ten foot in height it was compiled of ragstones, with single layers of broad tiles interposed, each layer at two foot distance. To this height the workmanship was after the Roman manner. And these were the remains of the ancient wall, supposed to be that built by Constantine the Great. In this it was very observable that the mortar was (as usual in the Roman works) so very firm and hard, that the stone it self as easily brake and gave way, as that. It was thus far from the foundation upwards, nine foot in thickness."—(Strype's *Survey*.)

Mr. Craik, referring to remains found near the Minories in 1841, says:—

"Behind the south-west corner of America-square the workmen . . . came upon a wall seven feet and a-half thick, running a very little to the west of north; or parallel to the line of the Minories. The principal part of it consisted of five courses of squared stones, regularly laid, with two layers of flat bricks below them and two similar layers above—the latter at least carried all the way through the wall. The mortar, which appeared to be extremely hard, had a few pebbles mixed up with it, and here and there were interstices, or air-cells, as if it had not been spread, but poured in among the stones," &c.

The following is Mr. Terry's description of the present discovery at Old Bailey:—

"The remains recently discovered in the rear of No. 8, Old Bailey, probably formed a portion of the wall of the Roman City of Augusta, in the length that extended in a northerly direction from the river to the first land gate, through which the Watling Street emerged from the City.

This piece of wall, which is 8 ft. high and 8 ft. 3 in. in thickness, was unearthed last March about 6 in. below the present level of the pavement in the Old Bailey. The construction of the wall, the foundation of which is on the ballast, is as follows:—Commencing at the bottom, there is 3 ft. 6 in. in height of random rubble, composed of large rag stones; then three courses of tiles *sesquipedales*—viz., $17\frac{1}{16}$ in. by $11\frac{5}{16}$ in. by $1\frac{3}{16}$ in., above which is 2 ft. 7 in. of rag stone of a smaller size; then two courses of tiles, followed by more rubble work. The interior of the wall is composed of rag stone, roughly tumbled in, and then grouted in with lime mortar of an excellent description, the whole forming a hard concrete mass.

The inner face of the wall is in a good state of preservation, but the outer face shows to a marked extent the action of the water of the mediæval ditch."

Two samples of the mortar were taken from the interior of the old wall in Old Bailey, and may reasonably be regarded as genuine specimens of Roman work. One sample was a piece weighing rather more than one pound, the other a piece weighing rather more than half a pound. Both samples contained a number of water-worn pebbles, varying in size up to a maximum of about 2 in. by 1½ in. For analysis the whole of each sample, including pebbles, was crushed to powder, except one small piece which was treated with dilute acid, in order that the uncrushed sample might be examined after the removal of the lime. From the appearance of the sand and pebbles thus separated, it was concluded that *unscreened* river sand was the description of sand employed. The lime and sand had been well mixed, for the mortar was almost entirely free from those small isolated lumps of lime or lime carbonate which are an indication of faulty mixing. Both samples were in excellent condition, and of great strength.

The following results were obtained by analysis, and it will be seen that the two samples were practically identical in composition:—

	No. 1 per cent.		No. 2 per cent.
Water (lost at 212 deg. F.)	1·05	...	1·84
Combined water and organic matter	2·51	...	3·03
Earthy matter, after ignition (Dibdin & Grimwood Test)	4·87	...	4·11
Sand, including pebbles	64·75	...	66 46
Silica, soluble in 10 per cent. HCl	1·00	...	1·57
Oxide of iron do.	0·00	...	0·00
Alumina do.	0·44	...	0·14
Lime do.	15·15	...	13·80
Magnesia do.	0·04	...	0·04
Carbon dioxide	8·46	...	7·95
Sulphur trioxide	0·15	...	0·18
Other matter and loss	0·32	...	0·22
	100·00		100·00
Silica soluble in 10 per cent. soda (Hughes' Test)	8·95	...	10·85
Caustic or slaked lime uncombined	None.	...	None

The "earthy matter" and "sand" in the above analyses were obtained by treating the mortar by the method advocated by Messrs. Dibdin & Grimwood, the chemists to the London County Council, in a paper communicated by them in 1896 to the Society of Public Analysts. The earthy matter and sand, dried at 212 deg. Fahr., thus obtained from sample No. 1, were subsequently analysed, and were found to have the following composition:—

	Earthy Matter per cent.		Sand per cent.
Combined water and organic matter	6·88	...	0·20
Oxide of iron, soluble in concentrated HCl	4·01	...	2·65
Alumina, soluble in concentrated HCl		...	trace
Oxide of iron, as insoluble silicate	1·72	...	0·96
Alumina do.	2·67	...	
Lime do.	0·57	...	0·76
Silica, soluble in 10 per cent. soda	59·11	...	5·00
Silica, crystalline or as insoluble silicate	21·27	...	89·98
Other matter and loss	3·77	...	0·36
	100·00	...	100·00

Before proceeding to calculate the relative proportions of lime and sand employed, it is necessary to consider the composition of the earthy matter and sand. The substances vaguely described as "earthy matter" are substances which, when tested by the Dibdin and Grimwood test, which consists in repeatedly stirring the mortar with dilute hydrochloric acid and decanting off with the solution all insoluble matter which does not fall to the bottom of the containing vessel in one minute, are supposed to be deleterious to the strength of the mortar. The analysis of the earthy matter, however, shows that in the present case more than half the earthy matter consists of silica, soluble in caustic soda, which is a valuable constituent of a mortar instead of an objectionable one. The Dibdin and Grimwood test is an excellent one if the earthy matter obtained be examined before assuming that it is wholly composed of matter injurious to the building quality of the mortar.

Hitherto two mistakes have commonly been made regarding the chemistry of lime mortars. It has been assumed that (1) only that form of silica in lime which is soluble in hydrochloric acid is capable of combining with the lime to form a silicate, and (2) no chemical reaction takes place between the sand and the lime. In Portland cement the whole of the silica is soluble in acid, but good building lime and building sand both contain a certain quantity of silica in a form that is neither crystalline, as quartz sand, nor soluble in hydrochloric acid. This form of silica is soluble in caustic soda solution, and is found in all lime mortars of great strength in comparatively large proportion.

In June, 1892, Mr. John Hughes published in the *Builder* a number of analyses of mortars taken from the various ancient abbeys and castles of the United Kingdom. In this paper he clearly showed the importance of the presence of this silica soluble in soda. [For convenience, this soda-soluble silica will be referred to in this paper as *amorphous* silica, while that soluble in hydrochloric acid will be termed *soluble* silica.] Mr. Hughes, however, wrongly assumes that "it is in this form that most of the silica exists in Portland cement, the actual figures being from 20 to 22 per cent." A glance at the analyses of these Roman mortars will show that there is a difference of

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8 or 9 per cent. between the quantity of the two forms of silica. That not only is the *amorphous* silica present in the mortar in a different form to the *soluble* silica, but also is present in much larger proportion. Mr. Hughes also regards the amorphous silica as being present with the lime rather than with the sand, whereas, as a matter of fact, it should be present in both the lime and sand. Quite recently a paper has been published by E. Donath in the *Thonindustrie Zeitung*, which confirms this statement that building sand almost invariably contains more or less of this amorphous silica.

The quantity of carbon dioxide present in the Roman mortars is sufficient to combine with about two-thirds of the lime only; therefore about one-third of the lime must be present in combination, since practically no lime in an uncombined condition remained in the mortar. By deducting the lime required for combination with the carbon dioxide, Mr. Hughes obtained the following striking figures:—

	Constructed Circa.	Amorphous Silica.	Lime as Silicate.
Rochester Castle	1088 A.D.	1·6	1·7
Corfe Castle	1000 „	7·5	1·5

Thus showing that the Corfe Castle mortar, which is referred to as of extraordinary strength, has a large proportion of its amorphous silica uncombined with any base, for neither the iron nor the alumina present amounted to 1 per cent. The Rochester Castle result negatives the theory that in course of time the lime may react upon the crystalline silica.

Reference to the analysis of the "sand" obtained from the Roman mortar will show that 5 per cent. of *amorphous* silica remained with the crystalline sand and crushed pebbles. By Mr. Hughes' test the whole of the chemically active silica—both *soluble* and *amorphous*—is obtained.

The analyses indicate that the proportion by *weight* of the lime to sand used by the Romans in manufacturing the mortar for the London Wall was about one to four. The conversion of parts by *weight* to parts by *volume* is, in a case of this description, more or less a matter of guesswork, but accepting the figures given in Hurst's handbook, showing that one cubic foot of stone lime in lump weighs 55 lbs., and one cubic foot of Thames sand weighs 103 lbs., then the proportion of lime to sand becomes about one to two.

Chemically considered, the mortar is good, because (1) the proportion of lime to sand by volume is about one to two; (2) the proportion of silica soluble in sodium hydrate is high; and (3) the proportion of clay and organic matter present is very small.

There is, however, nothing mysterious about the Roman mortar. Mr. Hughes observed that in all his analyses of ancient mortars "in no case did the proportion of sand to lime exceed in round numbers that of two to one, which is very much less than that found in modern mortars." The Roman mortars in existence at the present day are mostly found in military or government work, which was, no doubt, constructed under strict supervision. Probably jerry-builders were as well known to the Romans as they are to us. Indeed, it may be argued that the jerry-builder is a blessing in disguise, for it is good to know that those monotonous miles of "desirable villas" cannot long endure as specimens of British architecture of the nineteenth century. So far from being more ignorant than the Romans of the art of mortar manufacture, we possess in the fine grade Portland cement of to-day, cementing material of much greater utility than anything they ever knew; and where our lime mortars are inferior to those of the Romans, or of the mediæval builders, the inferiority is not usually the result of ignorance but of what has recently become known as "slimness."

NOTES.

Competition in Building Work.

We should like to draw attention to the remarks at the close of the address by the President of the Architectural Association of Ireland (printed on another page) in reference to the effect on building, and indirectly on architecture, of the system of builders competing for doing work at the lowest prices. More than once we have given expression to our own conviction that it is impossible that the highest class of architecture or the best building can be realised under a system of giving the work to a contractor who has gained the honour of selection by cutting down estimates to the lowest point possible with any profit at all, sometimes to a point inconsistent with any profit except by shirking the proper execution of the work. Under such a system it is impossible that we can ever have such solid and monumental building and detail as that which we admire in, for example, the great houses of the Renaissance period. But Mr. Batchelor, the President of the Association of Ireland, goes further than this; he urges that the competition system is injuring the whole training and perception of the architectural craftsman, from the degeneration of workmanship which has followed in its train. The object is no longer, in fact, to do the best work, but the cheapest. The system has so got hold of all building work in the present day, that people talk and act as if competition tendering and the supplying of quantities to tender on (a builder will hardly condescend to look at a drawing now!) were an integral part of architecture, instead of a mere concomitant of what Mr. Batchelor calls "the real plague spot in our system." He mentions one instance where the clients—the Belfast Banking Company—refused to put a new bank up to competition, and simply commissioned their architect to select the best contractor he could, and arrange a fair price. We have no doubt they got better work than they would otherwise have done. We wish the example were more often followed.

The Housing Problem.

Mr. William Tallack, the secretary of the Howard Association, contributed a temperate and thoughtful letter to the *Times* a few days ago on the Housing Problem. It is the more interesting because it is written by a person who has given careful attention to some aspects of the social question, and stands in an impartial position as regards the matter of housing. Shortly put, the gist of Mr. Tallack's communication is that the County Council should, rather than spend the ratepayers' money in new working-men's dwellings, compel the owners of existing dwellings to keep them in proper condition. There is no doubt that to a great extent the point requires urging on Local Authorities. The existing law is not sufficiently strictly applied. But new dwellings are needed, and there is a clear intention and tendency on the part of the Legislature to give Local Authorities more and more power to become landlords of workmen's dwellings. That being so, the main point is to see that these dwellings do not become a burden on ratepayers generally. But if Mr. Tallack will use his influence to have the present law enforced both in town and country, he will be doing a public service.

An Eight-story Concrete Building.

A concrete office-building, containing seven stories and a cellar, is now being erected in Washington from the designs of Mr. Leon E. Dessery, architect, and, according to an account in *Cement*, possesses numerous interesting features. The building regulations of the city specify that the maximum load on concrete shall not exceed fifteen tons* per square foot, and the walls have been designed to comply with this regulation. The basement wall is of solid concrete about 11 in. thick; above this the walls (with the exception of the front wall) are hollow), having an outer skin 3 in. thick, and an inner skin 5 in. thick for four stories, and 4 in. thick for the three uppermost stories. The inner and outer skins are tied together by vertical "withs" 3 in. thick, spaced from 30 in. to 36 in. apart. The walls are fortified by ⅜-in. twisted wrought-iron bars on the Ransome system, two horizontal bars being inserted at the level of each floor, window-sill, and window head, and these are crossed by similar vertical bars running the whole height of the building in the piers between the windows. The front wall is of solid concrete, faced with brick and terra-cotta. The internal partitions, stairs, girders, and floors are also of concrete, with tension rods of Ransome twisted iron. The partitions vary in thickness from 8 in. in the basement to 5 in. in the top story, and the floors are nearly all 6 in. thick. The twisted rods in the floors are 6 in. apart. Shrinkage joints are formed at intervals right across the building. The concrete throughout is composed of one part cement, two parts sand, and three parts blue gneiss, broken to pass a screen with ¾-in. meshes. Such a structure as this would not be permitted in any town in England, as it contravenes the by-laws as to thickness of walls, but it is an interesting and instructive example of what can be done with concrete when the designer is allowed a free hand. Whether our building regulations ought to be modified to allow such erections in this country is another matter.

Bradford Water Supply.

One of the papers read before the British Association at Bradford was prepared by Mr. James Watson, M.Inst.C.E., the Waterworks Engineer of that city, and has now been published under the title of "Water Supply; with a Description of the Bradford Waterworks (Old and New)." The essay on water-supply is too brief to be of much service, and so is the description of the waterworks; but the thirty-six illustrations, reproduced from excellent photographs, suffice to give an admirable idea of the magnitude and variety of the work involved in the construction of the four modern reservoirs. The dam of the Gouthwaite

* The U.S.A. ton of 2,000 lbs. is no doubt referred to.

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reservoir is of masonry, with a maximum height (from foundation to highest water-level) of 105 ft. and a thickness of 70 ft. at the base. It is on the same general lines as the well-known Vyrnwy dam, the roadway being carried on fourteen arches above the crest of the dam, and the overflow waters of the reservoir passing under the arches. Two valve-towers are picturesque features of the structure, and Mr. Watson must be congratulated on having given to the work an architectural character of considerable merit.

Saalburg.

MANY besides visitors to Homburg know of the famous Roman fort, as it is called, at Saalburg, on the summit of the Taunus range, looking over the wide valley of the Maine. It was described in the *Builder* on January 23, 1895, and it was there told how the remains of this important military station were gradually being brought to light. Last week the Emperor of Germany laid the foundation-stone of the museum which, it seems, is to be erected at Saalburg itself. We confess that in our opinion the museum would have been better at Homburg, where it could be visited in all seasons and in all weather. Too much restoring has, in fact, been done at Saalburg. It is preferable to have such important remains as this uncovered, and left as time has affected them. To rebuild the walls and to make the fort look as much like the original as possible is to reduce a suggestive and a remarkable ruin to a mere copy. It is much the same as if Melrose or Tintern Abbeys were to be rebuilt in those parts where the old structure has departed. The German Royal Family have for many years shown a great and commendable interest in the Saalburg ruins, but the present Emperor has exhibited *trop de zèle*. The placing of the museum at Saalburg and its rebuilding is all in the same vein as having an actor dressed as a Roman prefect—for such is the newspaper version—to welcome the Emperor and Empress, and then a Roman legate to recite the ode.

The Rowallan Estate, Ayrshire.

THE Rowallan Estate, which covers 6,100 acres, comprising the old castle, dairy farms, woodland and moorland, and yielding a gross rental of 6,350*l.*, will be offered for sale by auction at the upset price of 150,000*l.* on the 24th inst. in Edinburgh. The Castle, or Craig of Rowallan, distant three miles from Kilmarnock, stands upon an eminence by Carmel Water, and presents some striking features in its planning and design that illustrate the change from defensive to domestic architecture in the course of more peaceful and comfortable times. The plan consists of the three sides and (west) curtain-wall of a quadrangle measuring 86 ft. by 72 ft. 6 in., within which the level of the courtyard, which is 53 ft. by 33 ft., is one floor higher than that of the sides as seen from without. The castle is entered from the east by steps which lead up to a round-arched doorway between two circular towers 8 ft. 6 in. in diameter, which rise by four stages divided by string-courses, and have conical roofs capped with finials. The east front is 62 ft. long, but originally extended some 22 ft. further northwards. In the southern block, on either side of the hall, are the dining and withdrawing-rooms; the former apartment is panelled and has an ornamented door, out of it opens a smaller withdrawing-room or boudoir fitted with a wooden screen and wardrobe, both richly carved, and having two stone seats in the east window. A turret stair within a recess of the dining-room—the recess projects into the angle of the courtyard—gives access to the floor above, which contains a room opening into the two drum-towers. The kitchen, well, and vaulted cellars, are in the basement of the southern block. In the court's north-western angle is a gabled building which is now separated from the eastern block—the intervening portion being in ruins—and contains a circular staircase. The dismantled portion, on the north side of the court-yard, seems to be "the new work in the north side of the close," erected by Sir William Muir (*obiit* 1657), author of the "Historie and Descent of the House of Rowallane," and to mark the site of the tower built by Gilchrist Muir, after 1263. To Mungo Muir, who fell on Pinkie Field, 1547, are ascribed, *teste* the "Historie," the basement and hall in the southern block; the east block, with its two towers, was erected by John, son of Mungo Muir, in 1567. Between the towers and above the doorway is a panel carved with the royal arms and supporters, and the coat-arms of Muir; on the frontal, above, is an inscription, with date "1567" between the coat-arms of Muir and Cunningham, for John Muir and his wife, Marian Cunningham. Sir William Muir, *obiit* about 1686, erected the entrance gateway of the courtyard, on which are repeated the date "1661," and a monogram of his own and his wife, Elizabeth Hamilton's, initials. Some further interesting features of the buildings are described and illustrated in Volume II. of Messrs. Macgibbon & Ross's work upon the "Castellated and Domestic Architecture of Scotland."

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

IV.—CATALOGUE RAISONNÉ OF EXAMPLES.

THE geographical arrangement of the examples under notice has been indicated on the sketch-map already given (see page 287 *ante*). To have grouped them under counties in alphabetical order would have been convenient but unscientific. In the arrangement adopted contiguous counties are united together so as to form larger districts. It is true that local differences in pre-Conquest work are not very strongly marked; but, in most cases at any rate, the districts do, on the whole, correspond with differences in style of building, though these are not of an absolute character. The districts may be thus enumerated:—I. The South-Eastern counties from Kent to Hampshire. II. The South-Western counties from Wilts and Somerset to Cornwall. III. The Eastern counties, including Norfolk, Suffolk, Essex, and Cambridge. IV. The Midlands, from Notts and Derby in the north to the valley of the Thames. V. The West Midlands from Gloucestershire to Stafford and Cheshire. VI. The district west of the Pennine Chain from the Mersey to the Scottish border. VII. Lincolnshire and Yorkshire; and VIII., the counties of Durham and Northumberland. The general character of each district will, as far as possible, be indicated as a preliminary to a succinct notice of examples. It must be understood that the notices are summary and, only mention points of outstanding importance. Save in one or two cases which will be mentioned when they occur, the information is derived from personal inspection. References are given where a building or a group has formed the subject of an important monograph or paper.

Within each district the examples which have come under the writer's notice ar enumerated in a geographical, not alphabetical order, and the direction in which the particular district is traversed is in each case indicated. Those examples which, when tested by the criteria already passed in review, present a decided pre-Norman character are printed in italics, while in cases that seem doubtful the name is enclosed in brackets. The names of other buildings, which it was necessary to discuss, but which do not maintain their claim to Saxon origin, are printed in ordinary type. The compendious expressions "strip-work" and "mid-wall work" will, no doubt, be allowed; and "l. and s." permitted to stand for "long-and-short work," "r.h." for "round-headed."

DISTRICT I.—KENT, SUSSEX, SURREY, BERKS, HANTS.*

KENT, as that part of Britain in closest touch with the Roman world, and one of the earliest centres of Saxon Christianity, might be expected to exhibit early examples of ecclesiastical architecture with strong traces of Roman influence. A group of such buildings is found at Canterbury and its neighbourhood and makes this one of the most important localities in the whole country. Surrey and Sussex, on the other hand, were in the early days of Christianity comparatively remote and wild, and the Saxon examples, though numerous, are on the whole comparatively late. Building stone is not generally plentiful in the district, and flint rubble is largely used for wall construction. For the same reason l. and s. quoins are very uncommon, especially in Kent, and strip-work does not occur till we pass west of this county. It is not a district remarkable for pre-Conquest towers, though Sompting, Sussex, possesses the most interesting Saxon tower in the country. The most important monuments next to the Canterbury group are Reculver and the church in Dover Castle, Kent; Arlington, Sompting, Worth, in Sussex; Bosham, Boarhunt, and Breamore, Hants. In Kent and Sussex the enumeration is from east to west.

Whitfield, near Dover, is a small, fairly complete, nave-and-chancel church with modern additions. The walls of the nave, of unusual height, are 2 ft., of the chancel 1 ft. 9 in. thick. The latter is little more than 9 ft. square internally. There is a double-splayed r.h. light in the south wall of the nave.

In the same neighbourhood are several early churches, claimed as Saxon by Mr. Loftus Brock and other writers, which do not, however, seem to present those special characteristics which entitle them to a place in the list. They are, or the parts of them in question are, at any rate, of the eleventh century. For example, East Langdon, near Dover, has internally-splayed r.h. windows in the walls of the nave, pierced at a later period by a Norman south arcade. Staple, near Sandwich, has an old window visible in the east wall of the west tower, which is quoted to show that this wall is a relic of an earlier building than the present handsome fabric. St. Margaret-at-Cliffe, near Dover, exhibits remains of earlier masonry at the north-west extremity of the Early Norman chancel. Coldred, in the same neighbourhood, is an interesting early church standing within the lines of a probably Roman fort. The nave-quoins are worked in the flint rubble of the walling, and have been in places repaired with stone showing Norman tooling. This is hardly enough to prove the pre-Conquest date of the fabric.

Dover, St. Mary in the Castle. A spacious cruciform church, with central tower, largely composed of Roman bricks. There are big stone quoins visible in nave transept and chancel, and an interesting blocked south door. There is a plan and description in Canon Puckle's monograph,† but a far too early date is there assigned to the edifice. Its plan is enough to show that it comes comparatively late in the style.

[*Cheriton*] near Folkestone. Here is a slender west tower, the lower part of which may be pre-Conquest, though there is no Saxon cha-

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* Among the most valuable papers on the district may be mentioned:—Rev. Greville M. Livett, "Early Norman Churches In and Near the Medway Valley," *Archæologia Cantiana*, xx. 137, xxi. 260; E. P. Loftus Brock, F.S.A., "The Saxon Church at Whitfield, near Dover," *Arch. Cant.*, xxi. 301, and the same writer on "Sussex Churches," *Journal of Archæological Association*, xlii. 35. Since the list for Sussex was drawn up, a paper by Mr. P. M. Johnson, in vol. xliii. of the "Sussex Archæological Collections," has given several other churches in the county that may be of pre-Conquest date.

† "The Church and Fortress of Dover Castle. London. 1864.

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rather in the quoins. The tower arch, rudely constructed in rubble, 8 ft. 8 in. high by 3 ft. 6 in. wide, with opening above to the church, looks like pre-Conquest work.

St. Oswald, Paddlesworth, on the down above Cheriton, in spite of its dedication, is not to be reckoned pre-Conquest. It is a very interesting and consistently-built Early Norman church. The same must be said about that important example, the present church at Lyminge. This building, constructed of small rag-stones and flint set in abundant mortar, with much herring-bone character, is so like the work of Gundulph at West Malling and Rochester that it is probably of Early Norman date. The quoins and window jambs, &c., are of cut stone with Norman tooling. The walls are 3 ft. to 3 ft. 6 in. thick.

Lyminge (the Apsidal Church). This building, of which the foundations are to be seen south of the present church, dates back to the seventh century (*circa* A.D. 633), and is one of a group that includes the first cathedral at Rochester.

Canterbury Cathedral has been supposed to possess, in some masonry at the west end of the existing crypt, a portion of the pre-Conquest edifice, but there is no valid ground for the ascription, and the same may be said more decidedly of some rubble masonry with herring-bone courses on the west side of the cloister at St. Augustine's, which is certainly Early Norman.

St. Martin, Canterbury, is a monument of the first importance. The pre-Conquest portions consist of the nave and the west part of the chancel. The latter is constructed of Roman bricks, more evenly laid than in any of the examples under notice, except, perhaps, St. Pancras, Canterbury, and Britford, Wilts, and there is some evidence that it once ended apsidally. The former has some red plaster, like Roman, on the walls, and at the west end some newly-discovered windows, r.h. and internally splayed, the arches of which are turned with red mortar, resembling that used in the Roman Pharos at Dover. The masonry of the nave is, however, so mixed and irregular that it is probably of later date than the chancel, which may be Romano-British (Bede, "Eccl. Hist.," i., 26).*

St. Pancras, Canterbury.—Here are the foundations of an aisleless apsidal church, with a porch to the west and what was probably a projecting chapel to the south, constructed of re-used Roman bricks carefully laid with mortar joints averaging 1½ in. in thickness. The mortar contains sea-shells, as does that in the Roman Pharos at Dover. The character of the ground plan makes it doubtful if it is earlier than the seventh century. The nave measured internally about 42 ft. 6 in. by 26 ft. 6 in., but the walls are less than 2 ft. in thickness.

St. Mildred, Canterbury.—The south wall is pre-Conquest, and the big-stone quoins at the east and west extremities of it are among the finest existing examples of the kind. The lowest stone of the south-west quoin is 4 ft. high, 2 ft. 8 in. wide, and 1 ft. 5 in. thick. The north wall, 2 ft. 1 in. thick, is cut through with a later arcade. The west part of the south wall of the chancel is also old. The Saxon church was a large one, the nave measuring internally about 55 ft. 9 in. by 24 ft.

Reculver.—Within the Roman walls of the ancient Regulbium are the ruins of the dismantled church of Reculver, the towers of which are well-known land-marks of the Thames estuary. The west part of the chancel with the foundations of the apse, the nave, and the aisles, are pre-Conquest, and probably date in the seventh century. Whether any part is Romano-British or Roman depends on the view taken of the two fine columns of stone that once stood between nave and chancel, and were discussed in a previous paper.

Stone-by-Faversham.—The west part of the chancel and south-east wall of the nave of this ruined church are so evenly constructed of courses of tufa and Kentish rag alternating with Roman bricks, that it may put in a claim with some other Kentish examples to Romano-British origin (see *ante*, fig. 3).

One or two mid-Kent churches are of doubtful date. One is Westwell, near Ashford, where two small internally splayed circular lights in the west wall are signs which suggest an early origin for that part of the fabric. Kingsdown, near Farningham, has been claimed as Saxon, but bears no sign of such origin. At [*Leeds*] near Maidstone, and [*Shorne*] above Strood, small r.h. lights exist in the walls of the nave above later arcades, and the fact that these openings are double-splayed is strong, though perhaps not conclusive, evidence that the walls are Saxon. The widths of the naves (at Shorne 21 ft.) show that the churches would have been large ones.

Aylesford, near Maidstone, is a fine church on a historic site, but nothing here is pre-Norman. Cliffe-at-Hoo, east of Gravesend, in an outlying region, but well worth the trouble of a pilgrimage, has marks of an old doorway in the north wall that have been pointed to as Saxon.

Rochester (the Saxon Cathedral).—Remains of an early apsidal Saxon church, probably of the beginning of the seventh century, have been disinterred here at the west of the present edifice.

Swanscombe, near Gravesend, has unmistakable signs of pre-Conquest origin in its west tower, and also, perhaps, in the walls of the nave. The tower has some l. and s. feeling in the west quoins, the only example of the technique in the county, and to south a good double-splayed window with the head turned in Roman brick. There are early r.h. internally splayed lights above the south-east arcade. There is Norman work in the chancel, the walls of which are much thicker than those of the nave.

Lydd.—At the opposite extremity of the county near the Sussex border, the north-west corner of the north aisle of this well-known church is now seen to consist of part of the north and west walls of an early basilican oratory. Some of the arches and piers of the north arcade of its nave are visible in the present wall. The span of the arches was about 4 ft., the width of the piers about 3 ft. 4 in. An arched opening about 7 ft. wide can be traced in the west wall, now the end wall of the north aisle of the mediæval church. This, it has been suggested by Mr. Micklethwaite, who was the first to call attention to the remains,* may be the arch of triumph opening into an original west apse. This would furnish an interesting parallel to Silchester, to which perhaps should be added Ripon and the earliest Canterbury. A r.h. opening, evidently double-splayed, and hence not of the earliest type like the windows at Brixworth, exists in the old clerestory. A plan of the remains with details is here subjoined (fig. 11). A little excavation to

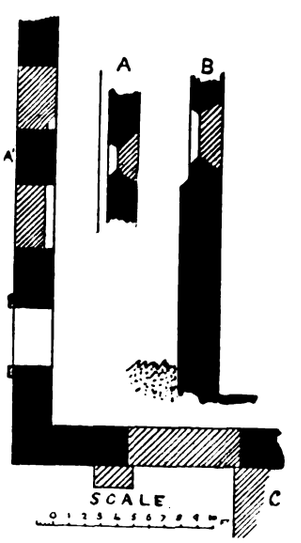

Fig. 11.—Plan of Old Work at Lydd, Kent: N.W. Corner of North Aisle.

A. Plan of Old Window, in North Wall at A'.
B. Section of North Wall at Window. C. Tower.

west might settle the interesting question of the west apse. The other examples where there is evidence of this feature, Silchester, Canterbury, Ripon, are all very early, but the window at Lydd suggests a middle or late Saxon date.

Sussex.

Bexhill.—The walls of this church above the (partly Norman) nave arcades have been claimed as pre-Conquest, but the distinguishing marks (herring-bone work) point rather to an Early Norman date. The presence here of a fine Saxon carved tombstone is a fact to be taken into account.

Arlington.—The nave exhibits l. and s. work on all four quoins, and there is a small double-splayed r.h. window in south wall with arch turned in Roman brick. The example is an important one.

Friston, by Eastbourne, is a small nave-and-chancel church, probably of the eleventh century, but not necessarily pre-Conquest.

Bishopstone is notable for its fine and well-preserved Saxon porch with sundial. This porch must be the largest Saxon structure of the kind in the country. It has l. and s. in the quoins.

St. John-sub-Castro, Lewes.—A very good Saxon doorway is preserved in the east wall of the north transept of the reconstructed church.

Ovingdean, near Brighton, is an eleventh-century church without any distinct pre-Conquest features, and the same remark applies to Hangleton, near Brighton. At [*Old Shoreham*] part of the nave walls, lengthened in Norman times, are probably Saxon; while at [*St. Botolph*] the chancel arch may be late Saxon, as it bears a certain resemblance to the work at *Sompting.* This latter is a monument of the first importance, and has the only Saxon tower in the country that preserves its ancient finish—a pyramidal helm of the type common in the Rhineland. It is said that the height of the spire was shortened 25 ft. in 1762, but this evidently did not involve any alteration of the masonry of the gables. The tower-arch below has a soffit half-column and enriched capitals and imposts of interesting character (*ante*, fig. 8). Externally the tower has half-round pilaster strips and an enriched horizontal string course. The belfry openings exhibit the mid-wall work not met with in Kent, and the caps of the central shafts are of pronounced corbel form, some of them closely resembling early caps common in parts of Germany.

Bolney.—The most pronounced Saxon feature here is the south doorway of the nave, with reeded archivolt in two orders. Other parts of the fabric are probably contemporary.

Rumboldswyke, by Chichester, is an early nave-and-chancel church, perhaps of the first half of the eleventh century, but with no distinguishing pre-Conquest marks.

West Hampnett.—The chancel is partly Saxon. A r.h. slit internally splayed in its south wall, has inclined jambs. The chancel arch, now destroyed, was of early character.*

Bosham is one of the most complete Saxon churches in the south of England, interesting as being figured in the Bayeux tapestry. There are a Saxon tower and tower arch, early circular windows in the side walls of the nave pierced with later arcades, and a fine moulded chancel arch with angle and soffit shafts, and very interesting Saxon work in the jambs—one of the best specimens of this feature in the country.

[*Singleton*] may be placed in the list in virtue of double-splayed windows in the west tower.

Stopham has good enriched doorways of early character north and south of the nave, and indications of Saxon work in the quoins and walling. Fig. 12.

Woolbeding has a particularly good equipment of pilaster strips, 7 in. wide, which occur on both sides of the nave, and are a clear indication of Saxon origin. The south side of the nave (fig. 13) is indeed one of the best examples of this treatment in the whole country.

Lurgashall has nothing to show but some herring-bone work in the walling.

Worth.—A very valuable and complete example of the Late Saxon period. It is a large church, 94 ft. in internal length, apsidal and cruciform in plan, but without central tower. The chancel arch, 22 ft. high by 14 ft. span, is nobly massive in construction. The nave possesses original double windows with dividing baluster shaft, and narrow north and south doors. Externally there are l. and s. quoins and pilaster strips. The apse is roofed with wood.

Surrey.

The pre-Conquest remains are fragmentary and unimportant. The best example is the (now central) tower of *St. Mary, Guildford,* which exhibits pilaster strips on the four sides, and between them, to north and south, small r.h. double splayed lights.

Godalming has some pre-Conquest indications in the (now central) tower and an old doorway inserted in the wall of the north transept.

* See "The Church of St. Martin, Canterbury," by Canon Routledge. London: 1898.

* *Archæological Journal,* lv.

* *Archæological Journal,* xxiv.

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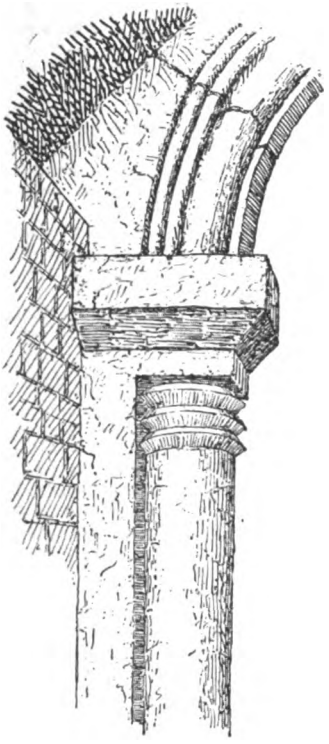

Fig. 12.—South Door of Nave, Stopham, Sussex.

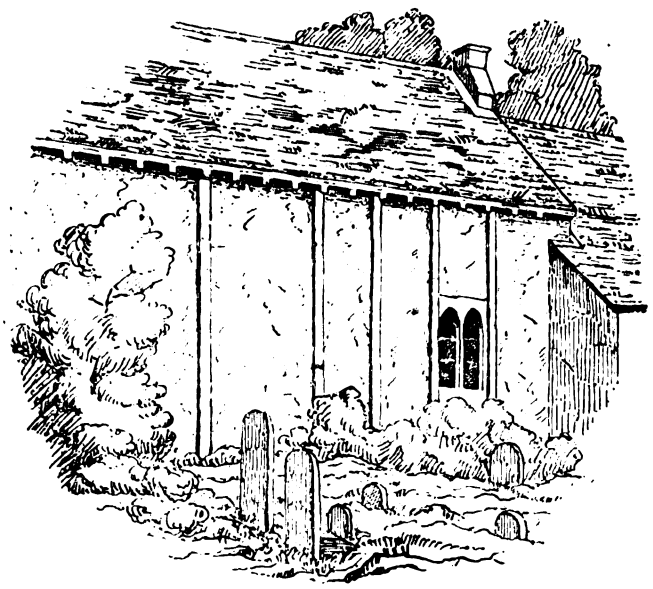

Fig. 13.—Woolbeding, Sussex: South Side, with Saxon Pilaster-Strips.

Fig. 15.—Arch into South Transept, Breamore, Hants; with Old English Inscription.

Fig. 14.—Breamore, Hants: View from South.

Of the other Surrey churches claimed as Saxon, Chipstead and Fetcham have early r.h. internally splayed windows in walls broken through by later arcades, and Wotton an early, but not necessarily Saxon, tower arch, *Stoke d'Abernon* some old walling on the south side, with a Saxon sundial apparently *in situ*, and Abinger, an Early Norman nave with well-preserved narrow r.h. windows on both sides. Finally, Albury is a partly-ruined building of the most picturesque beauty. A church here is mentioned in Domesday, but there is nothing of earlier date than Norman to be seen in the present fabric.

Berkshire.

Our examples are confined to Cholsey, a building we have seen reason to regard as Norman, in spite of the l. and s. work in the tower quoins, and *Wickham*, near Newbury. Wickham possesses one of the square west towers characteristic of Lincolnshire and the North, but rare in the southern counties. It has l. and s. quoins, double splayed r.h. lights, and on the old belfry stage double openings north and south with mid-wall work, the through-stones being supported on Roman shafts, figured in the *Builder*, December 13, 1898.

Hampshire.

We find at *Boarhunt*,* in the country north from Fareham, a complete nave-and-chancel church of Late Saxon date. The nave was originally divided by a partition wall towards the west end. An excellent double-splayed Saxon window opens north of chancel, with double cable ornament carved round the exterior opening in the mid-wall slab. A pilaster strip runs up the east gable.

Corhampton.—A nave-and-chancel church, with the east end altered. Saxon character is attested by external pilaster strips, 6 in. wide, and a characteristic blocked north door to nave, by l. and s. in quoins, and a Saxon chancel arch with strip work. There is also a Saxon sundial and, perhaps, font.

Hinton Ampner has been rebuilt, but some of the old Saxon features survive in the form of l. and s. work in quoins, and pilaster strips.

[*Tichborne*] exhibits the puzzling combination of double-splayed windows in the north and south walls of the chancel, with clasping corner buttresses of Norman fashion and wide pilaster strips (13½ in.).

Headbourne Worthy.—Pilaster strips show that at least the south wall of the chancel and north wall of the nave (l. and s. at north-east quoin) are pre-Conquest, while the west door of the nave, measuring 3 ft. by 7 ft. 6 in., is of characteristic Saxon work, and has above it, cut back flush with the wall, the remains of a carved stone crucifix with figures of Mary and John at the sides. There is a west adjunct of the fifteenth century which it is interesting to compare with the similar feature of Saxon date in the church of Barton-on-Humber.

Little Somborne.—This small and dilapidated church consists now only of a nave, on the north-west quoin of which there is l. and s. work. A pilaster strip occurs on the north wall.

Warnford. The name of Wilfrid is by tradition (attested by an inscription) connected with this place, but the interesting church and the ruins hard by present no Saxon indications

* See paper by J. T. Irvine in *Journal of Archæological Association*, xxxiii.

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Silchester.—If the small building south-east of the Forum of the Roman city, of which the foundations were laid bare a few years ago, is really an early Christian Basilica, it is of extreme interest as the only certain relic in the form of a building of Romano-British Christianity. It is basilican in plan with narthex and apse, the latter at the west end, a peculiarity suggestive of an early date. It may be ascribed to the third or fourth century A.D.*

Breamore.—This church, only recently recognised as Saxon, is one of the largest and most complete pre-Conquest buildings in the country. It consists of nave with indications of some west adjunct, chancel, south transept, and south porch which is a later addition. The fabric is of flint rubble with l. and s. ashlar quoins and pilaster strips. The old windows are r.h. and double-splayed. There is the beginning of a central tower, and the monument is of great interest in connexion with the development of this feature and of the cruciform plan.

It will be observed in the view in fig. 14 that the tower is distinctly a growth from the nave wall, not, as in some other cruciform Saxon churches (Stow; and Norton, Durham), an independent structure from the ground upwards. It is not, however, merely a part of the nave wall heightened, as at Dover Castle, but is distinctly prepared for by a thickening of the walls of the nave and by courses of l. and s. work embedded in and flush with the face of the walls. As soon as the height of the nave roof is reached these courses become regular quoins and the tower proclaims itself as a distinct feature. The transept is in process of development out of the side-chapel, or, as the Early Mediæval writers call it, *porticus*. The arch into this transept has over it a Saxon inscription, which on linguistic grounds has been pronounced to be not much earlier than the middle of the eleventh century. The words (fig. 15) are explained to mean, "Here the covenant becomes manifest to thee," and may refer to the fulfilment of some vow. If the vow was for the building of the church it would fix the date of this somewhere about 1050.†

District II.—The South-Western Counties. Wilts, Dorset, Somerset, Devon, Cornwall.

In this district Wilts furnishes us with two very important examples at Britford near Salisbury, and Bradford-on-Avon, and with several others of less outstanding value. The list from the other counties is extremely meagre, and no doubt might be supplemented.

Wilts.

It is no great distance from the example last noticed to *Britford* by Salisbury, where we find a mediæval church of cruciform plan, with no external marks of great antiquity, possessing in the nave three arched openings of a very curious character. One of these encloses the present south door, while the other two face each other north and south at the east end of the nave. In comparison with the width of the nave, more than 20 ft., they are very small, about 5 ft. 8 in. in span by 8 ft. in height and, as they are elaborately enriched on the jambs and have no rebates for doors, they must have opened into side chapels of some kind or embryo transepts. Roman brick is employed with neatness and skill in their construction; in that to south the jamb is mortised into the impost in Roman fashion (*ante*, fig. 4), and in that to north the jambs are enriched with carved stone slabs exhibiting both knot-work and conventional vine foliage. A little excavation on the north side, where there are no interments, might solve the question of the original intention of the openings.

North Burcombe.—All that is left here is l. and s. in the two east quoins of the chancel.

[*Netheravon.*]—The square west tower is all we are concerned with here. This has a west portal and a tower arch (with angle shafts) that in themselves would date the tower in Early Norman times. Mr. Micklethwaite, however, finds in it traces of arrangements characteristic of pre-Conquest days. According to the editor of the Domesday for Wilts, the Survey reports at this place a church in a very dilapidated condition—"*vasta est et ita discooperta ut pæne corruat*"—and it will probably be best to regard the tower as due to a rebuilding after Domesday date. The case is, however, a doubtful one.

Avebury.—A well-identified Saxon nave still retains some of its original windows in two tiers, *i.e.*, r. h. lower windows with inclined jambs, and circular upper lights; l. and s. at the north-west quoin. The walls are high and thin.

Bremhill, near Calne. L. and s. on exterior quoins of nave.

Broad Hinton, near Swindon, only exhibits a small r. h. light in north wall, but *Somerford Keynes*, near Cricklade, has retained one mark of great antiquity in a very characteristic Saxon enriched north doorway to the nave. Tall and very narrow (8 ft. 4 in. by 2 ft. 6 in.), it is one of the best specimens of its kind to be seen (fig. 16).

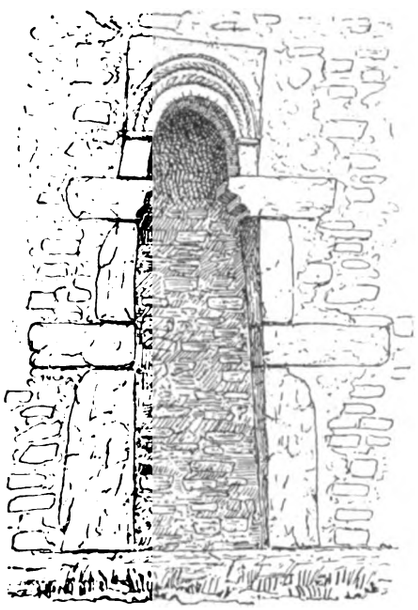

Fig. 16.—North Door of Nave, Somerford Keynes, Wilts.

Bradford-on-Avon.—A very small, well-constructed stone nave-and-chancel oratory, with a north porch possibly once balanced by a porch on south, has been rescued here from a subdivided and desecrated condition, and, much restored, presents now a very attractive spectacle. There is strong, though perhaps not conclusive, external evidence that it is the building spoken of by William of Malmesbury as an *ecclesiola* erected by St. Aldhelm about the year 800. The good stonework is native in the district and would agree with an early date; the proportions of the building, with nave walls 25 ft. high on a width of about 13 ft., and of its openings—the chancel arch is only 3 ft. 4 in. wide—are early, and the enrichment shows classical reminiscence. On the other hand, the shallow arcading cut in the stonework on the exterior bears a remarkable resemblance to a similar feature in the interior of the Late Saxon church of Dunham Magna in Norfolk, and throws a doubt on the early date. Sir J. Parker, it is true, made the suggestion that the arcading might have been added at a later date. The old window in the chancel is double-splayed.

In leaving Wiltshire it must be noted that the apsidal church of Manningford Bruce is clearly of Norman, not Saxon date.

Dorset

furnishes us at *Wareham* with a well-preserved Saxon church, dedicated to St. Martin, but not so old as this ascription might seem to suggest. It has various marks of pre-Conquest date, including l. and s. quoins and remarkable height and thinness of walls. The chancel arch has soffit shafts.*

Sherborne Minster has scanty remains of a Late Saxon doorway that in this position has special interest as part of a Saxon church that once held cathedral rank. The Minster presents the same combination of Perpendicular architecture superinduced on Norman as Winchester Cathedral, and the only pre-Norman part is to be found at the exterior of the western wall of the present north aisle. Here is a built-up doorway of undoubtedly Saxon character, with a little of the contemporary masonry to the south of it. It had l. and s. work in the jambs and chamfered imposts, and there was strip work in the form of a half-round moulding encircling it. It was 3 ft. 9 in. wide, and seems to have formed the west door of the Saxon bishop's church. It should be noticed that its architectural character denotes a date far later than that of St. Aldhelm.

No other examples in Dorset have come under the writer's observation.

Somerset.

The two that are noted—Milborne Port and Cranmore—do not seem to carry a pre-Conquest stamp.

Devon and Cornwall.

Here the only example which the writer has seen is the recently-discovered early crypt under the twelfth-century Norman chancel of *Sidbury* Church, in the former county. The special interest of this small chamber is the fact that it presents yet another plan of crypt later in type than even Repton. It was directly accessible by open steps from the nave like the crypts at San Zeno, Verona, and San Miniato, Florence. Part of the jambs of the doorway to the crypt at the bottom of these steps remains, and the masonry of that to the north is of Saxon character. This is not very pronounced, and the stones show diagonal tooling, but that, as we have seen, does not preclude a pre-Norman date. The jambs look, at any rate, more like Saxon than Norman work. The dearth of Saxon churches in this region is all the more striking when we turn back from the west to the east of England, and begin to traverse the country again from east to west upon a more northerly line. The first of these districts is one of particular richness.

In answer to an inquiry, the following note may be added on the thickness of wall in the churches the comparative sizes of which were indicated in fig. 2, p. 288, *ante*. (The dimensions there given, it should be explained, are of the naves only, and are internal ones). Whitfield; Wareham; St. Martin, Canterbury (north and south walls); St. Pancras, Canterbury; and Monkwearmouth, have walls about 2 ft. thick. Coln Rogers is 2 ft. 3 in.; Escomb, 2 ft. 4 in.; Deerhurst Chapel, Bassingham, Bracebridge, Avebury, Ropsley, and Rochester, are about 2 ft. 6 in.; Greens Norton, 2 ft. 8 in.; Kirk Hammerton, nearly 3 ft.; and Rockland, 3 ft. 5 in.

COMPETITIONS.*

(Continued from page 318.)

It appears to me that in certain cases something almost approaching an infatuation takes hold upon some architects who compete for public work. I have known instances of men who were so entirely unable to believe that the design they had made was not really the best, that they have for the time lost all self-control and have said unjustifiable things; and I regret to add that I have known other cases where men who did not come out top have intrigued and schemed, with the object of displacing the architect who has won the competition and substituting themselves. Nothing can be more reprehensible and unprofessional than this attempt to play the part of the cuckoo. As to the man who finds himself too much wrapped up in his design to be able to accept defeat with dignity, I think the best thing would be to refrain from architectural competitions for the future.

One word as to the successful competitor. He occupies a pleasant position, because the design of the future building is in the main settled, and because, at a stroke, he has gained the confidence of a set of clients. Both these advantages can, however, easily be lost. He should strive to retain them. It is wise, if the architect be asked to modify his design, to do so with reluctance and not readily. It is quite possible that efforts may be made to put the execution of the design into other hands; but the successful competitor always has it in his favour that he is the author of the design; and generally speaking, the majority of any committee or board of Englishmen has a strong

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* Figured and discussed in *Archæologia*, liii. p. 563.

† For an account of the church see *Archæological Journal*, lv.

* "The Church of St. Martin, Wareham, Dorset." By Charles Lynam, F.S.A. *Builder*, March 12, 1898.

* Address delivered to architectural students at University College, October 8, by Professor Roger Smith.

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sense of fair play, and will, by instinct, support him.

If the successful competitor be commissioned to erect his building, it is to be hoped that he will not allow himself to be so puffed up as to be above learning the endless minutiæ of his calling as they affect the building in question. I write these words in a seaside hotel which has every appearance of having been a successful competitive design, and which is really handsome and well-grouped externally, and parts of which are fairly well arranged; yet it is full of faults in the practical adaptation of the building to its purpose—*e.g.*, the kitchen is remote from the rooms where the food is consumed. There is a most convenient external balcony, but the windows giving access to it are sash windows, and so heavy, that it takes a strong man to lift them, and when they are at the widest the shortest person has to stoop to get out. There is no lift. The staircase has only a handrail on one side, and is of wood and enclosed by wooden panelling so that in case of fire it would be of little avail. The windows of some of the bedrooms have their sills so high up that it is impossible to see out. Those of others are at the floor level and can hardly be opened without kneeling down, and so on with other blemishes.

The risk of failure in these matters of detail is very considerable. Should any one of you find himself early in his career appointed architect to a building which he has won in competition, let him assure himself that there are many points in the working of such a building that he has yet to learn, and let him set himself indefatigably to learn them in some other way than by making mistakes at his clients' expense. Far better get a thoroughly experienced honest clerk of works and not be too proud to learn practical details from him.

I propose now to turn for a moment to another side of the question and to ask you to look at the assessor and his work. You may, some of you, become assessors yourselves by-and-by, and, on the other hand, if you are competitors you are likely enough to entertain a feeling of hostility to the whole race of them, which, perhaps, will be lessened if you consider what they have to do.

In a few cases the assessor is called in from the beginning, and has the duty—often a most troublesome one—of stating the requirements. I will not trouble you with any remarks upon this part of his duty, except to say a word upon the question of cost. The paper of suggestions issued by the Institute says that it is part of his duty "to advise upon the question of cost." I cannot avoid expressing regret that this memorandum does not put more strongly his duty in this respect. I take it that if a limit of cost is stated he is bound to satisfy himself that such limit is fully sufficient; or, if that cannot be done, then to stipulate that such limit be stated only as the amount which the promoters do not wish to exceed—or in some similar way left elastic. The mistake commonly made by promoters who have not called in the assessor at this stage is to fix the requirements and the cost, and to do this on such a scale that the money will not suffice to pay for the necessary building. The assessor, therefore, ought to be perfectly certain that the money is sufficient. Failing that, if the accommodation is rigidly fixed the money should be left, as I suggest above, elastic; otherwise, if the money must be definitely limited then the accommodation must be left elastic.

We will now suppose our assessor about to begin work on a series of designs. If he is wise he will have stipulated that he is to have them entirely to himself and not to be expected to advise the committee or consult with them till he has made up his own mind. This stipulation will be felt to be reasonable and will be agreed to.

He will also have stipulated that the drawings be hung up or set out in some roomy place so that he may readily get access to them, and these preliminaries being settled may set to work. Probably various men work upon varying lines. I can only describe to you the methods of one architect who has filled the office a good many times.

We will suppose the most common case—namely, one where the designs have been invited by public advertisement and a good many have been received.

It is good first to take stock of the whole series, which we may suppose to be twenty or thirty in number, and if there is a list of them, to check it, but whether there is or not to walk slowly through the series, note-book in hand, and note the motto and number of drawings in each in turn; giving, perhaps, one page or two pages of the book to each design with a view to subsequent memoranda.

The first entry might probably run thus:—"Experience" seven strainers, brown mounts, no perspective; report; estimate," and so for the whole. By the time this has been done the assessor has something of an idea of what he has to deal with. He must next take the designs one by one, beginning by preference at one which has obviously been prepared with care and must go through all the conditions and instructions, step by step, and see how they have been carried out. He will soon begin to feel that he has more or less filled his mind with the requirements and knows the nature of the problem both in relation to the planning and the architectural treatment of each individual design. It may not be necessary to examine every design in the same detail.

Our assessor will in time have completed a critical first inspection of the designs. If he has been the author of the instructions to architects, that circumstance will help him, as the requirements must be fairly present to his mind.

It is convenient in examining a series of designs to have a few leading heads, and to employ a system of marks. A low number of marks, say four or six, for each head will suffice. The first head should, of course, be:—

1. Conformity to instructions.

Then may follow:—

2. Planning of individual parts, rooms, wards, or sections.

3. Planning of internal communications and staircases, and of the approaches.

4. Lighting and ventilating.

5. Exterior elevations and grouping.

6. Sections and interior architecture.

7. Special points (if any), such as decorations, details, indications of care in preparation of design, draughtsmanship.

8. Economy and sufficiency of estimate.

Should any design unquestionably fail in its conformity to the instructions it must be thrown out, but the failure must be unquestionable and unmistakable to justify this. For instance, I remember many years ago in a competition for a church to seat 500, the best and most compact design turned out only to provide 450 sittings. Of course, there was an end of that design, but I do not think it would have been right to turn it out if its sitting had come to 495 instead of 500.

One of the perplexities of an assessor is the case which often occurs when a design *partly* fails to conform. It is best not at this stage to throw it out, but to mark it under the head of "conformity" with less than full marks. In all probability it will relieve the assessor of anxiety by proving itself inferior in other respects as well as in conformity to instructions.

If the points I have enumerated be taken one after another and marks corresponding to the merit of each design in respect of provision made for each one be carefully awarded, the marks will form a very fair approximate guide, though not a final guide, to the relative excellence of the designs.

At this stage it may not be necessary to look into the estimate of each competitor, but it will be of importance to determine how far each design is expensive or economical, lavish or careful in character, and to award marks under the last head, that of economy, accordingly. The more troublesome business of examining and checking estimates will come on a little later.

An assessor's duty is by no means always easy. It is especially difficult if he finds himself called upon to apply a set of instructions to competitors which cannot possibly be carried out perfectly. This, if it occurs, places him, as it must already have placed the competitors, in a position of no small difficulty and in which he has to do the best he can to be fair to them.

When he has completed the first round our assessor will find that some designs have not gained half marks, some two-thirds, and so on. He is probably justified in at once striking out all that have not got half-marks, but it is wise in doing so to enter in his book some one or more points in which each design so removed fails. Such an entry as the following, for example, may be made:—"Spes," "only thirteen marks out of twenty-eight; defective approaches, much space lost in corridors, part of interior badly lighted, exterior deficient in grouping and tame when compared with several other designs, not economical, fails." If the committee ask the assessor why "Spes" did not seem to him worthy of a premium, he has in this way, the material for a reply ready.

The designs having been once reduced in number, those left must be gone over critically a second time, and perhaps a third or a fourth time; each time throwing out the weakest of those left. Each of these reductions will be more troublesome and difficult than the last, because what are left are the better designs. Sooner or later the assessor will probably have reduced his total to a manageable number, say from half-a-dozen to half-a-score, and will be sure that the one he will at last select is among these. It is now time carefully to read the reports of the authors of these designs, and then to examine the estimates.

In many cases the cubing is asked for in instructions. If it is given it is quite right for the assessor to check it, for one man's idea of cubing is to take his heights from the ground-floor line to the wall plate, while another, who is more candid, takes them from the bottom of the footings to half way up the roof, and then adds for turrets and chimneys. The result of a comparison of the cube contents with the stipulated sum will probably strike out two or three of the remaining designs—perhaps more. Possibly the finest as architecture will be among these; certainly the most liberal are likely to be so. It is, however, only fair to those architects who have loyally and bravely struggled with the difficulty which is presented by the estimate question that they should not see men who have disregarded this condition preferred before them. No feature of the work of an assessor is so difficult and trying as this, for he as often as not will feel obliged to set aside the drawings with which, as an architect, he has the most sympathy, and which would turn out the finest architecture, and to fall back on something far more moderate and modest. The assessor is fortunate who has to deal with a set of conditions which do not rigidly prescribe a limit of cost.

It is not infrequently the case that to keep within the limit of cost is impossible. Under such circumstances, the suggestions of the Royal Institute direct that "the assessor or assessors shall not be bound in the selection of a design by the amount named in the instructions, but the question of cost shall nevertheless be a material element in the consideration of the award." This is, no doubt, the fairest course to pursue when dealing with a serious difficulty.

This work has almost all to be done personally. It is an undertaking in which assistance is of little help. Of course, a competent assistant can check the cube estimates of designs requiring to be so checked, and he can do something in the way of examining critically whether instructions have been minutely carried out or not; but beyond this I doubt if there is any advantage to be obtained by employing assistance.

At length, after reconsideration and a balancing of conflicting claims, it is, I believe, always possible to arrive at a decision that a certain design is the best and that some other is the next best.

My advice would be either to report verbally or to prepare a short report in writing stating what the assessor's selection is, and to give an account of the good points of what is selected, and then to stop. It is wise not to say a good word for any other design submitted, though you may feel inclined to do so. It is even more prudent not to say a bad word, either about any design not selected or about any part of either of the premiated designs. Silence is golden. The assessor will probably have a meeting with his committee, and it may be his duty to give *viva voce* the reasons for no premiating or praising this, that, or the other design. This his notes will enable him to do, but a written report is apt to get into print, and either praise or blame of a design, successful or not, may very possibly do harm.

I am bound to add that this office of assessor is a very anxious and responsible one. He who fills it has to be careful to do no injustice to the members of his own profession who have competed. He is equally bound to do justice to the employers who call him in and pay him, and who rely upon his honesty and skill to guide them.

I have nothing to say about the unfortunate but possible case that the committee may fail to agree with the opinion of their assessor and

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may award the premiums differently to his report. I have no experience of such a situation, either in my own experience or in that of my professional friends, and I am of opinion that it very rarely occurs.

There is, however, another unfortunate result which must from time to time be reached when the upshot of the competition is to convince everybody, including the promoters or their assessor, or both, that a radical mistake had been made at the outset; that something different from what was described in the instructions really meets the case best; and perhaps that some competitor, who had deviated from the instructions, had divined the real wants of the employers, and designed something to meet them better than the successful design. This is a perplexing situation, and I can only say that it is exceptional, and that if it occurs it must be dealt with on its own merits. Usually the fairest course and the one which in the majority of cases promises to lead to the best results will no doubt be to assume that the competition has settled the question of the choice of an architect, and to proceed to settle with the aid of the successful competitor what had best be done. Sometimes there are, unfortunately, good reasons against this course. Occasionally a second competition among the architects who had distinguished themselves in the first has been resorted to. At others the premiums have been paid and the whole matter dropped.

It must be remembered that a committee, as a rule, promises nothing more in its advertisement than to pay the premiums, and that when it has done this it has discharged its legal obligations, and may proceed to do things which are harsh or even unjust without being easily amenable to remonstrance.

The whole procedure is more or less modified in the case of a limited competition; *i.e.*, one when designs are invited from a small number of architects known to those who promote the competition. This has become a very usual course, and in the interests of those who have large undertakings in hand it may often be more prudent than inviting all the world, but it does not open to us the same chances of distinction. It is often usual in such a case to pay something to each competitor towards the expense of preparing his designs and to offer the position of the architect of the intended building as the one prize. This course has been lately adopted in several competitions where important and costly buildings were contemplated.

I ought not to pass unnoticed the complaints, far more common formerly than now, that undue and underhand influence led to the decision of most competitions. I believe that formerly there was a good deal of nepotism in such matters, and that the customary employment of a professional assessor has done a great deal to put a stop to it. I do not fancy that the general tone of morals has altered for the better, but I do believe that it has become much more difficult than once it was for an intriguing or an overbearing member of a building committee to secure that the first premium shall go to his nephew or to the son of a good customer.

It may be a little interesting to refer to a few famous competitions and their upshot. There was one in the fifteenth century which, though it was a competition among sculptors, indirectly affected the whole course of Renaissance architecture. I refer to the one for the gates of the baptistry at Florence. The early Italian artists, many of them, practised more arts than one, and among the competitors was Brunelleschi. Happily he failed—happily on more accounts than one, for the prize was given to Ghiberti, who executed a noble work, and followed it by the great pair of gates, which are an unrivalled work of their kind and occupied the best years of his life. Meanwhile Brunelleschi, who might have given himself up to sculpture had he gained this competition, devoted his life to architecture, and is rightly regarded as the father of Italian Renaissance architecture.

The most important competition of the nineteenth century was, no doubt, that for the rebuilding of the Houses of Parliament, held in the year 1835. It was an open competition—that is to say, designs were invited by public advertisement. A large number were received, and fortunately the ultimate result was that the most important building erected in Great Britain during the century was put into the hands of unquestionably the greatest English architect of the century, Sir Charles Barry. But during the many years which the structure took to complete, there were so many disputes and complaints and so much wrangling, that the general position of architects as a profession was seriously compromised. The unfortunate choice of a scientist who did not know his own mind, to arrange for the ventilation of the building, added to the difficulties and did much to discredit the cause of scientific ventilation and, indirectly, of sanitation. The building is erected generally on the lines of the competition ground-plan, but the exterior was entirely redesigned in the course of its execution, and is incomparably finer than as originally proposed.

Perhaps the most unusual incident in connexion with the competitions of the century was the success of William Burges (I think in co-operation with Mr. Clutton) in the competition for the Roman Catholic Cathedral at Lille, in France. Burges was a perfect master of French Gothic and made a superb design, but he was so convinced that nothing which was known to come from England would have any chance of success, that he wrote and printed to his design in French—and in French handwriting—and dimensioned it in metres, and then took the drawings across to a town in France, from whence they were forwarded to Lille; every indication of English origin, like labels or marks being most carefully removed. The designs gained the first premium, but it was a barren success, as Mr. Burges was not employed to erect the Cathedral. Sir Gilbert Scott was more fortunate, as he gained a competition for a great public building in Hamburgh and built it. He was in his earlier days a very keen and constant competitor, and to the close of his life enjoyed with the utmost zest in limited competitions for important work, such as the Law Courts and the Albert Memorial. The first of these he did not gain, the second he did.

The competition for the Law Courts was one of the most considerable of the latter part of the century. It took place among invited architects only. Each man was paid a very handsome sum for the preparation of his design, and the drawings were publicly exhibited before the decision. The judges originally recommended that Mr. Street and Mr. E. M. Barry should be appointed joint architects, but the Government referred the recommendation back to them and required that only one architect should be named, with the result that Mr. Street was appointed, and erected the building. It is probably the last secular monument in London of the great Gothic revival, as the Palace of Westminster was the first. It has the indications of a true artist's work all over it, but not an artist of the calibre of Sir Charles Barry, and it has very great practical defects, which probably an architect with a larger experience of public buildings would have known how to avoid.

Success in competitions has contributed to found the practice of many of the more prominent architects of the present day; but I do not propose to discuss with you the competitive works of living architects. They would range from Mr. Waterhouse's Manchester Law Courts, won probably forty years ago or thereabouts, to Mr. Mountford's recent success in the competition for rebuilding Newgate. Open competition has not been the way in which many of the important works of the leaders of our profession have been of late years won. In many cases limited competitions have been resorted to, while recently the Government has shown a disposition to do what private clients mostly do, and place a public building directly in the hands of a single architect, nominated on account of his known ability. The new Government office in Whitehall should in time show how far this succeeds, but I confess that I should expect a man of ability to do better for a great work so put into his hands than for even the most important one gained in competition. Of course, it is partly a matter of personal temperament. One man works best under the stimulus of a struggle; another finds the responsibility of a great undertaking, looking to him from its inception to mould and form it, as calling out his highest powers in the best way.

Let me in conclusion remind you, gentlemen, that especially in a crowded community like ours all professional life is a life of competition. There are a number of buildings in the future the erection of many of which will be entrusted to architects of the standing of your own selves. Why not to some of you? In the struggle for existence which Mr. Darwin has shown us as going on among all animals and all plants, and which equally goes on among architects, no property, no quality, no peculiarity which can be of advantage to the animal, or the plant, or the architect but helps its possessor. It is emphatically so with our own profession. There is nothing which you can learn, in this college or elsewhere, bearing upon your profession that will not help to render you more fit for the exercise of it, and remember, gentlemen, that success in life means "*the survival of the fittest.*"

THE ARCHITECTURAL ASSOCIATION OF IRELAND.

OPENING MEETING.

The opening meeting of the session of this Association was held on the 9th inst. in the Grosvenor Hotel, Dublin. Mr. Frederick Batchelor, F.R.I.B.A., President of the Association, occupied the chair, and there was a large attendance. Mr. Frederick G. Hicks, one of the hon. secretaries, read a report dealing with the work of the last session. The report stated that progress was maintained during the session, and several lectures, both of historical and practical interest, were delivered at the meetings. The report was adopted. The President announced that the prize of 10*l.* 10s., offered by the Royal Institute of Architects of Ireland for the best sketch design of a town hall for a provincial town, was won by Mr. Edwin Bradbury. The Institute had consented to offer a similar prize for next year, but it would be given in the form of a travelling studentship. The President then delivered his inaugural address, dealing with the subject of "The Technical Education of the Architectural Student," of which the following is the most important portion:—

"The day when a Department or State-aided institution of Imperial education shall foster and formulate all educational effort and choice, mapping out the whole region from infancy to maturity and the various courses suitable for all ranks and capabilities, and offering the best and cheapest facilities for direction and advice at all cross-roads, is as yet far distant. It is only of late that the teaching guild has begun to codify its haphazard methods and to build up the belated science of education that should guide and foster its art. As its methods are mainly empirical, gained through the garnered wisdom of years, sweeping changes are fraught with great danger. Our system of general education, such as it is, has been reached only through the failure of the unfit and the survival of the fitter, and we can only feel our way to the fittest by affording facilities for all degrees and kinds of technical education, grafting new branches on the stem to the best of our judgment, and watching results here and in other countries. Already we have many bodies working on independent lines, but in the hope of a *rapprochement* that may produce a common policy if not the State-aided amalgamation towards which legislation is gravitating. The University of Dublin did much in preceding Oxford and Cambridge in the establishment, however much it may leave to be desired, of a Faculty of Engineering. The Royal Hibernian Academy, the Department of National Education, the Science and Art Department and its recent local outcome, the Department of Agriculture and Technical Instruction for Ireland, and our municipalities and townships have been by no means idle, but none have done enough to preach. Were they, however, patriotic enough to join in a torchlight procession into the darkness where each would contribute to the general illumination we would have every right to be sanguine.

The elements of some such movement are at hand, and the publication last June by the Department of Agriculture and Technical Instruction for Ireland of 'Suggestions for the Guidance of Local Authorities and Others in Preparing Schemes of Technical Education,' and the 'Statement of the Views of the Technical Education Committee for the City of Dublin on the Future Position and Functions of the Royal College of Science for Ireland with reference to Technical Instruction as related to Industries and Agriculture in that Country,' which appeared about the same time—pamphlets well worthy of your study—are prophetic of the *nexus* that is so much needed. I include in these elements not only those that have already found definite expression, but that desire to co-operate, latent or patent,

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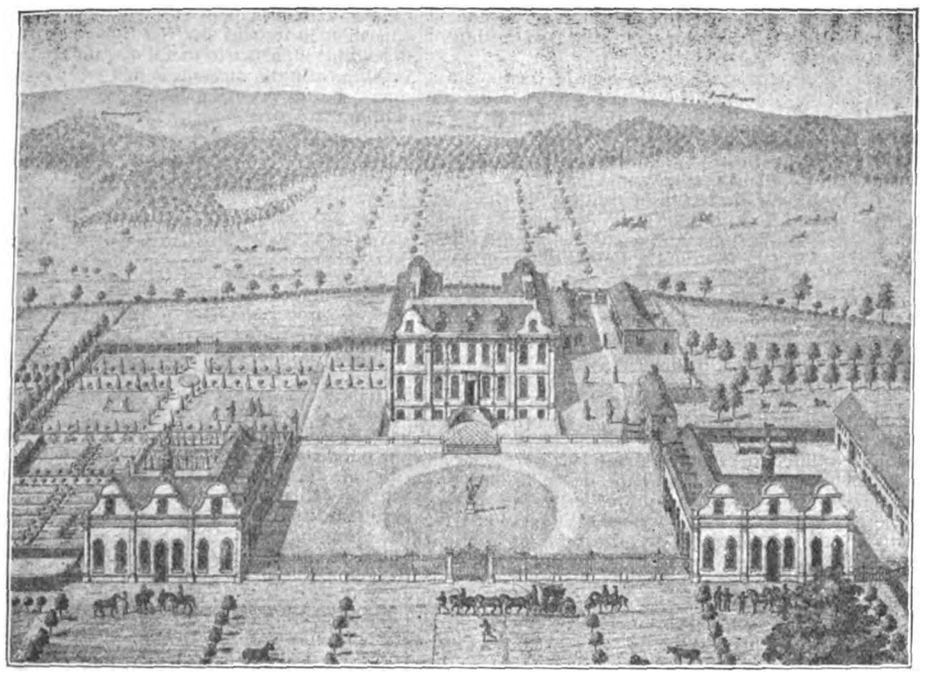

Four Oaks Park: Designed by Sir William Wilson. (See "Builder" of September 8.)

OLD HOUSE OF FOUR OAKS PARK, WARWICKSHIRE.

IN our issue of September 8 we published a short article from a correspondent on the life and work of Sir William Wilson, architect and sculptor, and once draughtsman and assistant to Sir Christopher Wren. It was mentioned in that article that the house called Four Oaks Park, built for Lord Ffolliott, of Ballyshannon, and since swept away, was the only one of Wilson's undoubted works of which an illustration remained. The engraving is in Dugdale's "Warwickshire," and the accompanying illustration is copied from it.

The most interesting part in it is the laying out of the ground and buildings. It is to be presumed that the two blocks pushed forward in front, and flanking the courtyard, are buildings for practical or "service" purposes, though so far detached from the house. The stables are easily recognisable in the low block on the extreme right.

which is undoubtedly growing in all professional and commercial bodies in any way interested in technical education. When we realise the extent to which this is growing in Dublin alone; how in the case of the Corporation of Dublin under the patient advocacy of Mr. Arnold Graves this latent desire has become patent to such good effect in the building and organisation of the City of Dublin Technical Schools and Science and Art Schools in Kevin-street; how our own Association has arisen with its growing need for further classes, demonstrations, and lectures; how similar movements have been afoot amongst Irish bankers, chartered accountants, and land agents, it is clear that public opinion is becoming saturated, and that we have but to strain a thread around which these fast forming crystals may gather and build up a solid scheme of coherent and duly related parts.

I do not essay to stretch that thread. The friendly co-operation of years has yet to spin it, and a liberal legislation to provide the *points d'appui*. I can only hasten the formation of a few more crystals in our own little corner of the great solution, in the hope that they may soon trend to their own place in the scheme I have sketched.

Writing recently on the suggestions of the Agricultural Department, the *Irish Builder* stated that the old system of training by apprenticeship to a master had seen its best days, and that, incomparable as it was for laying the solid foundation of a trade or handicraft, it needed nowadays to be supplemented by external training if the artisan or mechanic was to keep abreast of the workers of other countries, such as Germany and America. The remarks apply very aptly to our own profession, where we have only to take a leaf from the book of our surgical brethren and work out a system of lectures, classes, and demonstrations not merely practical but 'clinical.' The Association has already done much to supplement such of these things as are elsewhere available for the pupil and junior assistant, but much more in all branches remains to be done, and I propose, with your help, in the coming session to organise a regular series of technical demonstrations, both at works in progress and also in the workshop. A pupil may know the four volumes of 'Rivingtons' Building Construction' by heart, and have visited all the works on which the staff in his office are engaged, and yet be unfit to supervise for three reasons—firstly, that every class of work does not necessarily find a place in the practice of even a very busy architect during the pupil's *quinquennium*; secondly, that a run of contractors have occasionally been known to do such good work as to deprive the pupils of their legitimate experiences in the rejection of materials and work; and that visits to workshops and manufactories are quite as important as those to works in progress. I propose to meet the first want by arrangements such as have already been made with various architects, and occasionally engineers, to visit the works in progress under their supervision. In this I look for the co-operation of the members of the Royal Institute of the Architects of Ireland and of the Institution of Civil Engineers of Ireland in providing the opportunities, and making the selection as representative and the visits as instructive as possible. It is sometimes forgotten that in many instances architects and engineers are served by the same artisans under the same contractor, and that they have much to learn, especially in their earlier evolution, from one another's work and methods. I do not anticipate insuperable difficulty in meeting the second want, but what we have yet to provide is a systematic series of demonstrations of good and bad materials and workmanship, and the means of distinguishing and appraising them at sight and by applied test, taken, say, in the usual order of a specification. To meet the third want I look for the co-operation of the master craftsmen, merchants, and manufacturers in the neighbourhood of Dublin. So far as I have been able to consult them in the matter, my proposals to throw open the resources of their yards and workshops have been met with such courtesy and approval that I am concerned for nothing but the attendance and appreciation of the members. Let none run away with the idea that I am proposing to run a lot of nursery 'shows' for the benefit of the babes of the profession! I am no Uriah Heep, but I know that I have learnt more since I got out of leading-strings than ever I learnt *in* them, that I have much more to learn than I ever will, and that I and a few other 'grown-ups' hope to learn some of it at these shows! Let none stay away because they think they know too much. We shall want them to teach. We want no drones in the Association Hive. I have been tempted to work out a classification of crafts, showing the order and relation of each in the scheme of their development, like the beautiful Hierarchy of the Sciences which Auguste Comte has bequeathed to us, but it 'won't work,' and if it did I could not fit it to the opportunities, necessarily odd, which have been so kindly held out to us. We must take *what* we can get, *when* we can get it, and all that we can at present hope to do, exclusive of the inspection of works in progress under the supervision of architects or engineers, is to make a series of visits to workshops, stores, and manufactories, in the order most convenient to those principally concerned, during which all processes, tests or 'tips' having to do with our work ordinarily or specially available on the premises will be duly demonstrated.

The timber trades alone will entail several pilgrimages. I question whether the most didactic among us would care to speak *ex cathedrâ* on the article itself. The stereotyped specification founded on the relations, at one time rife, between qualities, uses, ports of shipment, and market forms and marks, is out of date, and the dearth of the dry red deals which stocked Dublin sheds in the good old days has not only introduced a new cult, that of the American balk, but largely increased the demand for second Quebecs, whilst new departures, such as Kauri and Oregon pines, sequoia, canary, maple, and cypress, are courting attention and making new demands on technical demonstration. From the timber yards we might, perhaps, turn to the creosoting works and fill a few pages with notes on the process, the pound per cubic foot injected for various uses, the pressures applied, and the depths of penetration. A visit like this, where we could handle the stuff, compare a few sawn sections, and pump the showman for all we were worth, would teach us more than a dozen text-book descriptions. After such a pleasant diversion, our attention should be ripe for the saw-mills and the carpentry and joinery shops.

The variety of sawn scantling now imported, especially from the Baltic, renders the appreciation of market forms in the importer's yard less problematical than when it was more confined to the log and the balk, but it is in the saw-mills, perhaps, that we have most to learn from technical demonstration. Here we have not only to note how the log and the balk cut up, but to study the diagnosis of the sawn face, new and old, and the judicious bestowal of a modest fee on the yardman who is told off to see that we don't pick our boards. I imagine that one of the chief advantages of technical demonstration in the joinery shops to a Science and Art pass-man would be the dispelling of his little illusions in regard to the present use of framed floors and tongued and grooved back linings in cased frames. What a shock to discover that the girder and the binder have been ousted by the steel section; that the insinuating steel nail makes a better edged joint than the time-honoured tongue; that the tenacious tusk-tenon, the darling of his prettily shaded isometrical details, is practically confined to trimming; and that so great a man as Viollet-le-Duc would drive it even from that refuge. What object-lessons might be afforded in the glueing up of the several parts of doors, sashes, and frames, with a running commentary on the selection of the 'stuff,' the various effects of shrinkage or swelling, and the many little ways of 'slimming' the job. What is even more wanted, because of its comparative neglect in this branch of technical education, is a similar demonstration in the shop-fitting and cabinet-making crafts, crafts whose niceties are only

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worked out by the specialist who can get a fair price and escape the demoralisation of the cut-throat competition now being fostered by Government departments. The joiner, too, has much to learn from them, notably the spreading use of the dowel, which seems destined to drive the tenon from all framed woodwork and prove itself a better and a cheaper job. I would conclude the series by an examination of some of the best examples of genuine old joinery and fittings in the last century houses of Dublin, such as still linger in Henrietta-street, Rutland-square, Sackville-street, Kildare-street, or Ely-place, and of the old furniture in the Science and Art Museum, much of which might be measured and drawn with advantage. Few technical studies are so refining in their influence upon the design of architectural joinery as that of the good old furniture of the sixteenth, seventeenth, and eighteenth centuries, and there can be little doubt that the coarseness of the Gothic revival was largely due to its neglect. Another series of demonstrations which would very materially increase our stock of practical knowledge may possibly be arranged in connexion with stonemason's work. In these yards the various building stones in common use for constructional purposes, and also those employed in decoration and in sculpture, could be exhibited, and, I hope, a number of valuable hints obtained from the master-mason's ripe experience as to what quarries have produced the stones best able to resist the disintegrating effects of our Irish climate. We would expect, too, that the flaws and defects peculiar to each description of stone would be pointed out. The methods of setting out the work and the subsequent operations of sawing, dressing, carving, and polishing the stones would be demonstrated.

Then, again, we have in Dublin quite exceptional opportunities for seeing, in well-equipped workshops, art metal work, constructional steel work, and foundry work in all stages of production—where all the processes peculiar to this branch of industry, such as casting and annealing, forging and welding, riveting, galvanising, and what not, could be shown each in proper relation to the other, and where the various tests for castings and steel work could be applied. Most of these shops, too, combine the work of the brassfounder, and the student would therefore be able to investigate the mysteries of casting, turning, finishing, polishing and lacquering of brass and copperwork of all descriptions. I venture to think that if the young architect would avail himself of the opportunities now held out to him to increase his stock of practical knowledge, that knowledge would re-act most beneficially not only on the morality of the master-smith, but on the pocket of his clients. He would no longer create designs, presumably for wrought iron, which could be produced only at excessive cost in that material, or else in the form of a malleable casting which might deceive both architect and client alike.

In the details of plumber's work the average architectural student or assistant is lamentably ignorant. He is probably acquainted with the first principles of sanitary plumbing; he will not, for example, leave a soil pipe without ventilation; he will arrange for the disconnexion of the house drain from the sewer; and he may even provide for a proper current of air through the drains, but when questions are put to him by the ingenious plumber concerning the laying out of the hot water circulating pipes or the connexion of the water-closet trap with the soil pipe he is liable to be placed in a position not entirely compatible with his dignity. A visit to some of the excellent plumbing shops in Dublin would materially increase his knowledge. He would see there the latest types of sanitary appliances, those for domestic use and those specially designed for use in hospitals and asylums, he would learn the best methods of soldering, brazing, and coupling joints of lead and copper pipes, the construction of cylinders, pumps, cooking appliances, &c., not that he would be likely to be called upon to design such articles, but in order that he might be able to distinguish the good from the indifferent or bad.

From plumbling work it is not a far cry, in Dublin at all events, to enter the establishments of the master painters for, in more than one instance, these trades, curiously enough, are combined. From the prominent part the Guild of Master Painters takes in the promotion of technical education in the Kevin-street Schools I have little doubt but that every facility would be afforded for the student to learn much that could not be acquired from books.

Pilgrimages of similar scope, to the haunts of all the crafts that an architect calls to his aid in ecclesiastical, civil, or domestic work are in contemplation.

I have tried to put before you the paramount need of general education, of improved opportunities in the technical training which is our special stock-in-trade, and of the culture which refines their use and combines them to their best ends. Without a full measure of these things ambition is heavily handicapped. I speak, of course, of ambition in its broadest sense—the ambition to deserve and fill a niche in the temple of fame—not the mere instinct of self-preservation and successful plunder which we share with the domestic animal or the beast of prey—the desire to swell the store of wisdom already laid up in technical achievement and record, to raise and maintain the status of our calling, to extend without fear or favour the benefits of our ripe experience, to bear with and live down the prejudices or jealousies of our clients or fellows, and to feel ourselves efficient factors in private, social, and national life—citizens, in fact, of no mean city.

I have not spoken of personal gifts; but without a fair heritage of aptitude, fostered in the hope of something better than bye-ends, the seed may fall on barren soil. If we cannot choose, we can at least cherish them, so that, when our barns and armouries are fuller than those of the less gifted or thrifty, we can at least draw upon ripened grain, or take down a burnished weapon from the rack.

I have pointed out that we have much to enlist both gratitude and hope in the New Department, sop though it be, and I have suggested the ultimate establishment of a vastly more far-reaching scheme of State aid. Charles Lamb has shown us that to look at a gift horse in the mouth is a virtue rather than a vice, and this is especially true of State aid. Those who run the State have in addition to their ingrained aptitude for muddling, and the utter want of anything like business capacity in their nominees, have a pretty habit especially in dispensing political charity of undoing with the left hand what they do with the right. It may be a mistaken interpretation of the divine injunction, 'Let not thy left hand know what thy right hand doeth,' but it is certainly neither business nor charity to set up a standard with one hand and besmirch it with the other. And yet this is what an enlightened government are doing in the matter of technical education!

It is good for reflection to see on the one hand the feverish and belated efforts to provide the technical education which will place the failing artisan on equal terms with his better taught German or American neighbour, and on the other the degradation of both master and man, on which year by year the Government are putting heavier premiums. I have already drawn attention to the inevitable result of cut-throat competition on the conscientious work that alone can train artisans worthy of the honourable name.

How is the master craftsman to get a living price when strikes and the incapacity bred of the Government demand for jerry-work gnaw at one end of his profit, and indiscriminate calls for competition at the other, except by yielding to the temptation, mercilessly held out, of privity in the fraud? It is the knowledge that the degeneration which has followed in the wake of all the crafts that are prone to this evil, namely, those that are commonplace rather than *de luxe*, dates from the introduction and thrives under the curse of competition. It is this knowledge I say that has often induced concerns run on business lines to eschew competition and to act, as notably the Belfast Banking Company did some years ago when they asked their architect, Mr. W. H. Lynn, R.H.A., to select the best contractor he could get for their new bank in College Green, and settle a fair price. They knew that it was folly to put supervision to the test of getting what Mr. Ruskin has very properly termed 'loving work' out of the signatories to the lowest tender, or to expect culture enough in a casual jury, possibly content with railway station standards, to uphold the condemnation of work not obtrusively moribund or coarse, and they acted on their knowledge, with the result that the building is an object-lesson in material and workmanship.

I believe that this is the real plague spot in our sytem, and that it behoves every good citizen who has the progress of technical education in Ireland and the Empire at heart to lend his influence to root it out, and render it less increasingly difficult to find what should never be divorced, namely, conscience and skill in the worker."

Illustrations.

WALSALL MUNICIPAL BUILDINGS: COMPETITION DESIGN.

WE give this week the perspective views, elevations, and plans, of the design submitted by Mr. W. A. Pite and Mr. R. S. Balfour in the competition for Walsall Municipal buildings.

In regard to the general intention of the design, the authors write:—

"The disposition of the plan was governed by our reading of the conditions, which asked for the principal entrance from Lichfield-street. This a very important thoroughfare. Leicester-street is an insignificant street, and any entrance would not be seen well, and there would be a long flank wall.

Ancient lights also restricted the plan.

We considered our extension—*i.e.*, in the very spacious internal court—a novel and very important point, as each department, or most of them, could be extended on their immediate floors."

The design is the one which was described and criticised as "No. 4" in our review of the drawings; but this was only a distinguishing number; in order of merit this design was placed third.

From the architect's Report, sent in with the design, we take the following further particulars.

It was made an object to keep the buildings within an angle of 45 deg. from the lowest window adjacent (see elevation to Lichfield-street), and with this object also the tower, suggested as a future addition, was placed at the further end of the main front. These considerations led to the remodelling of the municipal apartments on the Lichfield-street front. The assembly-room is kept separate, with an entrance-hall and crushroom at the Lichfield-street end. Numerous exits from the corridors are provided, so that the building could be cleared in a few minutes.

The boilers and other machinery would be placed in a water-tight concreted area, provided with pumps in case of emergency.

The Leicester-street site seemed the most appropriate for the art gallery; the plan, however, shows only a suggestive scheme, which is shown to indicate a possibility of linking it up with the whole scheme of the Town Hall and municipal buildings, and affording an additional exit to Leicester-street.

The principal fronts were to be executed in Hollington stone, and the roofs covered with sea-green slates; portions of the side fronts, and all elevations to internal courtyards to be of Leicester Heather brick and Whitfield's pressed Paddock bricks. Floors to be fireproof, and strong rooms to have direct foundations, and be constructed with expanded metal embedded in concrete.

The heating was to be by low-pressure steam; the general rooms heated by low-pressure radiators, the air being taken from the outside through air bricks. Corridors to be heated by non-ventilating radiators. In rooms with fireplaces the extraction to be through the fireplaces. The great hall was to be mechanically ventilated on the plenum system, with extraction at floor level to an upcast shaft.

The estimated cost is 54,800*l.*; adding 2,000*l.* more for the portion of the tower above the line of parapet.

SKETCH DESIGNS FOR TAPESTRY PATTERNS.

THE designs for textile patterns here illustrated in monochrome are reproduced from a sheet of small sketches in water-colour, shown at the last exhibition of the Royal Academy, and are to a scale of about one-tenth of actual size.

The original drawings represent quick sketches recording the designer's first impression for a projected pattern and its effect in colour, before proceeding with the enlarged design, in which, while the general scheme

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and arrangement of line is adhered to, the detail is more fully studied in accordance with the requirements of the material.

Some reference to the designs individually may be permitted.

No. 1 intended for silk tapestry is in tints of light blue and grey, with a little yellow in the flowers, on a dark blue ground.

No. 2 is produced as an Axminster carpet; the foliage green, larger flowers yellow, smaller bells pink, with ground blue patched in places with brown.

Nos. 3 and 8 are for wool tapestry: the former with leaves and stems in light and dark green and flower-heads in gold and grey; the latter being in brown with grey-blue flowers on olive ground.

No. 4 is made in silk tapestry woven in duplicate; that is, the web forming the pattern is attached to the ground at the edges only, thus giving a loose, puckered appearance to the cloth, which heightens the effect of the material. The design is in four colours; grey-green leaves, orange flowers, and olive ground. The principal flower is suggested by that of the tulip tree.

No. 5, with yellow iris and waved stems of persicaria, is reserved for cretonne.

No. 6 is made in tapestry of wool and silk combined, the pattern being in wool of two shades of brown, the ground in silk of a green colour.

No. 7, based on the artichoke, is to be produced as a wall decoration, in relief.

These designs were all made to the order of certain manufacturing firms, whose property they are; and are therefore copyright.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE first meeting of the Session 1900-1901 was held at 56, Great Marlborough-street, W., on the 12th inst., Mr. C. H. Strange, Chairman of the Section, in the chair. The paper of the evening was entitled "Logical Building and its Influences on Design," by Mr. Geoffry Lucas.

Mr. Lucas, at the opening of his address, said:—In spite of the production in this century of what some would call truly living work, could we say when we look at the bulk of modern building that it in any way expresses the deep underlying tendencies of present day humanity in the same way and degree that architecture has incorporated such ideas, sympathies and feelings into itself in the past? He did not think, on taking a general view of architecture in this country, that we can be satisfied when we apply such a test as this. A number of buildings, he said, have been erected for new purposes and new requirements, which are decidedly satisfactory and full of promise of better things, and, as copies and replicas of past manners, many examples can be pointed to, but the great mass of modern building must be written as feeble and unworthy to express the ideals of nineteenth century architecture.

A careful and scholarly reproduction of ancient manners not having sufficed to produce an architecture interpreting the needs and aspirations of our time, the necessity arises of finding out some other way to achieve this object. Some people would say that the best method of doing this is to break away from all restraint arising from what has been attained in the past, and for each architect to be as clever, ingenious, and curious as he can be, but Mr. Lucas condemned such a proposal as being likely to end in failure, and maintained the existence of "style" in architecture to be a true necessity, and that some surer ground on which to advance must be discovered.

Mr. Lucas considered that one great and vitalising force in architecture was logical building, and asked: "Is it not time to apply the ancient principles of logical construction and development of a design, and to study possibilities of material in a bolder and more characteristic way?" Mr. Lucas then proceeded at considerable lenth to show how this could be best attained, by saying that the foundations of logical building were, the use of material without undue waste, the amount being governed by the principles of good proportion, as well as by the nature and strength of the material; the seeking after Truth in architecture; and the consistent use of ornament; and he finally emphasised the necessity of binding together, indissolubly, the science of construction and the art of adornment.

In criticising the craze for the picturesque, he deprecated this when it resulted in illogical building, and as an illustration, stated that in one structure frequently could be found the employment of gables, hipped roofs, with a great number of materials, such as stone, rubble, brick, half-timbering, rough cast, tile hangings, plaster, slate hangings, barge boards to gables, and cornices and parapets to eaves, for no other reason than to obtain picturesqueness—a picturesqueness not the outcome of any requirement in the material or construction. Mr. Lucas proceeded in his paper to cite two examples of what he conceived to be types of logical building, ancient and modern, viz., Santa Sophia, Constantinople, and the new Romanist cathedral at Westminster.

The paper was fully illustrated by the exhibition upon the screens of various plates, showing ancient and modern architecture from a logical standpoint.

Mr. Weymouth opened the discussion, and proposed a vote of thanks to the author for his paper. Mr. Taylor seconded, and the discussion was continued by Messrs. Osborne Smith, H. P. G. Maule, W. A. Pite, C. H. Strange, and Mr. Seth-Smith.

Mr. Seth-Smith said that no architecture is satisfying to the intellect unless it is thoroughly logical and does really give us some idea of the use of the building. He instanced the Houses of Parliament at Westminster, as a monumental Gothic building which is both beautiful and logical.

Mr. H. H. Statham, speaking as special visitor, thought they must not push the severity of logic too far. St. Sophia, the first building mentioned in the paper, was no doubt logical in its great external counterforts, but they were totally devoid of expression. Those who had sketched old work much would find in their sketch books many things that were illogical, which had been drawn because they were interesting. The plan of the modern-mediæval church was no doubt entirely illogical in a practical sense; though, if churchmen considered the church to be the same now as in the Middle Ages, it was logical from their point of view that the building should be the same. Truro Cathedral was internally an elaborate imitation of Mediæval work, yet it had its own original features, such as the two great windowed bays flanking the altar; and externally it showed its architect's special *cachet*. The Houses of Parliament had been stigmatised in the paper as illogical as being a reproduction of Tudor detail; that was not the architect's fault—it was forced upon him; but the whole plan, design, and grouping were perfectly original, and logical. It was impossible to be always inventing new detail; it was not in the power of the human mind to do so. But each building could have its own plan, general design, and grouping. That seemed to him to be the escape from the position. An architect could always carry out an original conception of a building as a whole, even if he must depend largely on tradition for his detail. The necessary complication of plan in a modern building was in fact the architect's opportunity; it gave the basis for the treatment of the building.

Mr. Lucas having replied, the Chairman announced that the next meeting will be held on November 2, when Mr. H. Rose will read a paper entitled "Church Bells."

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this body was held at Spring-gardens on Tuesday, Mr. W. H. Dickinson (the Chairman) presiding.

Loans.—The following loans were granted to Vestries:—Paddington, £30,000 for paving works; Plumstead, £2,520 for street improvements; Westminster, £30,000 for paving and sewer works; St. Martin-in-the-Fields, £2,985; Shoreditch, £8,770 for public baths, &c.; Islington, £3,100 for electric light installation; Poplar, £3,450 for the erection of baths and washhouses.

Ancient Monuments.—The General Purposes Committee reported that among the measures that received the Royal assent in August was the Ancient Monuments Protection Act, 1900, by which County Councils are authorised to purchase any monument in its county, or in any adjacent county, and to become guardians of the same.

Acquisition of No. 17, Fleet-street.—The Public Control Committee reported that the contract for the purchase, at the price of 20,000*l.*, of the fee simple of No. 17, Fleet-street, subject to an existing lease and an arrangement for renewal thereof, had been exchanged, and that completion was to take place on or before December 24. The Committee had instructed the Solicitor to complete the purchase, and recommended the Council to approve of the course taken.—Mr. N. Robinson asked whether the matter had arrived at such a stage that it could not be set aside.—Mr. Torrance (Chairman of the Committee) replied that the matter had gone too far to allow the Council to draw back.—Mr. Crooks said they had heard a number of fairy tales with reference to the building, but they had absolutely nothing for the 27,000*l.* they had determined to spend. — Colonel Rotton thought it would be absolute nonsense to spend 27,000*l.* out of pure sentiment.—Mr. Westacott said the price they were paying was absurdly high, but they could not go back upon the contract they had entered into. —The Committee's recommendation was adopted.

Alexandra Park—Proposed Acquisition.—A long discussion took place upon a report of the Parks and Open Spaces Committee dealing with the proposal to contribute to the fund for purchasing the Alexandra Park and Palace for the "free use of the people for ever." It was stated that the cost of acquisition would be 150,000*l.*, that subscriptions to the amount of 139,500*l.*, supplemented by a contribution of 5,000*l.* from Tottenham, had been promised by the Middlesex County Council, the Islington Vestry, and various urban district councils It was proposed that the palace and grounds, having an area of 173 acres, should be vested in a body of trustees to be elected by the contributory authorities, and the palace should be maintained out of the income derived from the rent of refreshment rooms, the letting of the racecourse, the theatre, and the concert rooms, and from stalls and exhibitions, and licences for outdoor games. The Committee recommended the Council to contribute 7,000*l.* to the fund. An addendum was adopted imposing the condition that the contribution should be subject to the condition that the lease of the racecourse should not be renewed when it expires, and that no further licence be applied for in respect to a public-house on the estate. With this addition the report was agreed to.

Holborn to Strand—Architectural Features.—The Improvements Committee reported with regard to the designs received from architects for the elevation of the buildings proposed to be erected fronting on the Strand and on the crescent road to be formed between Wellington-street and Clement's Inn. They thought it necessary for arrangements to be made for a public exhibition of the designs, and suggested as a suitable place the gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East. The total cost of the exhibition would be 50*l.*, and they suggested that upon the first of the nine days—namely, on Thursday, October 25—the gallery should be open only to members of the Improvements Committee; and upon Friday and Saturday, October 26 and 27, to members of the Council and their friends, from 10 a.m. until 6 p.m.; and that the public should have admission, without payment, on Monday, October 29, to Saturday, November 3, inclusive, from 12 noon until 8 p.m. For the two remaining days the gallery would be open only to members of the Council and their friends. The name of the architect submitting a particular design was not yet known, because they had arranged that the design of each architect should not be signed, but should be accompanied by a sealed envelope containing the name of the architect submitting the design. As each design had been received a number had been placed thereon, and also upon the outside of the sealed envelope containing the name of the architect. The envelopes would not be opened until the exhibition of the designs had taken place.

The Council, when inviting the designs, agreed that they should be publicly exhibited, and this was necessary to enable the committee to advise the Council in regard to the elevations of the buildings to be erected in connexion with the Holborn to the Strand improvement. Moreover, the Council agreed that, before making use of any of the designs sent in, expert advice would be sought thereon. They considered that this undertaking could be best met by securing the services of an eminent architect to advise upon the designs in association with

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the Council's architect. Their report would be made before the exhibition closed and before the identity of the eight architects was disclosed. They were endeavouring to secure the services of a well-known architect, and having regard to the nature and extent of the work involved they were of opinion that a fee of 50 guineas would be a reasonable sum for the Council to pay. They recommended—

(*a*) That the estimate of 50*l.* be approved, and that the Improvements Committee be authorised to take all necessary steps for the exhibition at the gallery of the Royal Society of Painters in Water Colours of the suggested designs for the elevations of the buildings proposed to be erected.

(*b*) That the estimate of 52*l.* 10s. be approved, and that the Improvements Committee be authorised to incur an expenditure of 52*l.* 10s. in obtaining expert advice upon the designs in question.

These recommendations were agreed to.

Proposed New Lambeth Bridge.—The Bridges Committee submitted a special report on the unsatisfactory condition of Lambeth Bridge, and mentioned that the engineer had presented designs for a suspension bridge and of a more rigid type of construction, known as the "braced-arch type." The Committee remarked that by each of these types of construction a certain extent of camber along the central portion of the bridge is desirable, even at the slight sacrifice of a better gradient for traffic. Owing to the great width from outside to outside of the parapets required for each of the above-mentioned types of bridges (say 66 ft. 6 in. for a suspension bridge and 68 ft. for a trussed arch bridge) to enable them to accommodate two lines of tramway, and for the simultaneous passage of the widest-wheeled waggon with a tramcar at any point, it is necessary to reduced the road gradients and the depth and consequent weight of the structures by dividing their widths by means of central supporting chains or by girders as shown upon the designs. In either type of construction the general width of each road between the kerbs will be 19 ft. 9¼ in., and each of the footways 9 ft. 7¾ in., but these respective widths will be reduced at the tower entrances to 17 ft. 1¼ in. and 5 ft. 11 in. The clear widths between the piers of the central navigable waterways will in each case be about 353 ft., and the clear navigable heights beneath the bridge platform where it spans the central waterway will be 20 ft. above Trinity high-water mark at the centre of the bridge, reducing to about 16 ft. 2 in. near the piers. The clear navigable waterway between the piers of the two side spans will be about 176 ft. for each bridge, but the suspension type affords about 3 ft. more headway than the braced arch at the centre of the side span, being 13 ft. 9 in. above Trinity high-water mark as against 10 ft. 9 in., and it also provides a considerably increased headway at the sides of the span ; but in these positions great headway is less important than in the central opening of the bridge. In another respect the braced arch type of construction gives a great advantage over the suspension type, inasmuch as no land anchorages project above and encumber the space for land traffic at the approaches to the bridge, and no chains or girders obstruct or divide the roadway throughout the length of the side spans, and for a length of about 450 ft. the road between the parapets can be kept at its full width of 63 ft. 6 in. for the accommodation of the land traffic. The cost of constructing either of these types of bridge would probably not differ much. The architectural features shown upon the drawings (which were exhibited in the lobby) were, the Committee added, matters of taste, requiring some little further consideration, and were not to be taken by the Council as in any way final. As the bridge will be situated in the neighbourhood of the Houses of Parliament, which were of the Perpendicular Gothic style of architecture, and as it will lead to Lambeth Palace, which was of a more severe style, it must in some way be made to harmonise with both. They propose, therefore, that one of the best authorities on Gothic architecture of the day should be asked to advise in working out the details of the piers, towers, and abutments of the bridge.

The report was adopted.

Tenders accepted.—The Council accepted the tender of the St. Helens Cable Company in 4,300*l.*, for the supply of electric mains required in connexion with the electric light installation for Victoria Embankment and Westminster-bridge, and that of Messrs. Martin, Wells, & Co., in 11,293*l.*, for the erection of cottages at Trafalgar-road, Greenwich. For the supply of 22,800 tons of lime at the Barking and Crossness Outfall Works, the tender of Mr. Andris-Jochams at 16s. 9d. per ton was accepted.

MEMORIAL TABLETS ON LONDON HOUSES.

The Council of the Society of Arts have had a tablet placed on the front of the house No. 54, Hunter-street, with the inscription—"John Ruskin, artist and author, born here. Born 1819—Died 1900." It may be of interest to our readers to give here the complete list of all the houses in London which have been distinguished by similar tablets, affixed under the care of the Society of Arts. The list up to the present time stands as follows :—

Joanna Baillie, Bolton House, Windmill Hill, Hampstead.
James Barry, 36, Castle-street, Oxford-street.
Elizabeth Barrett Browning, 15, Wimpole-street.
Robert Browning, 19, Warwick-crescent, Paddington.
Edmund Burke, 37, Gerrard-street, Soho.
Lord Byron, 16, Holles-street.
[The house was pulled down in 1889. In May, 1900, Messrs. John Lewis & Son, silk mercers, erected on the front of the new house (now in their occupation) a fresh memorial, consisting of a bronze relief bust of Byron placed in an architectural frame of Portland stone.]
George Canning, 37, Conduit-street.
George Cruikshank, 263, Hampstead-road.
Madame D'Arblay (Fanny Burney), 11, Bolton-street, Piccadilly.
Charles Dickens, Furnival's Inn.
[The whole of Furnival's Inn was pulled down in 1898.]
John Dryden, 43, Gerrard-street.
Michael Faraday, 2, Blandford-street, Portman-square.
John Flaxman, 7, Buckingham-street, Fitzroy-square.
Benjamin Franklin, 7, Craven-street, Strand.
Thomas Gainsborough, Schomberg House (now part of the War Office, Pall-mall).
David Garrick, 5, Adelphi-terrace.
Edward Gibbon, 7, Bentinck-street.
George Frederick Handel, 25, Brook-street.
Sir Rowland Hill, Bertram House, Hampstead.
William Hogarth, 30, Leicester-square.
John Keats, Lawnbank, Hampstead.
Samuel Johnson, 17, Gough-square, Fleet-street.
Napoleon III., 3A, King-street, St. James's.
Lord Nelson, 147, New Bond-street.
Sir Isaac Newton, 35, St. Martin's-street.
Peter the Great, 15, Buckingham-street, Strand.
Sir Joshua Reynolds, 47, Leicester-square.
John Ruskin, 54, Hunter-street, Brunswick-square.
Richard Brinsley Sheridan, 14, Savile-row.
Mrs. Siddons, 17, Upper Baker-street.
Wm. Makepeace Thackeray, Kensington Palace-green.
John Thurloe, 24, Old-square, Lincoln's-inn.
Sir Harry Vane, Belmont, Rosslyn-hill, Hampstead.
Sir Robert Walpole, 5, Arlington-street.

The Council of the Society of Arts will be glad to receive suggestions from those who know of houses once the residences of celebrated persons, the owners of which would permit the erection of tablets.

Books.

Building Construction and Drawing. By Charles F. Mitchell, Headmaster of the Polytechnic Technical School, &c. Assisted by George A. Mitchell, Honours Medallist Building Construction, &c. First Stage or Elementary Course. Fifth Edition. London: B. T. Batsford, 94, High Holborn. 1900.

This is a "thoroughly revised and much enlarged" edition of a text-book which has already been of service to innumerable students. Although designed in the first instance as a guide to the Board of Education's examination in the First Stage or Elementary Course of Building Construction, it really contains much information for more advanced students. The new edition is said to contain 950 illustrations, but only 803 of these are in elucidation of the text, the remainder being copies of the diagrams given in the questions set at the Board of Education's examinations from 1890 to 1900. Over two hundred new illustrations have been added, and many of the old illustrations have been redrawn. Among the new features of the book are the illustrations of the tools used in the different trades and a chapter on "Builders' Quantities." We have noticed a few misprints, such as "being being" (page 14) for (?) "being badly," and "centered" (page 40) for "centred." The dictum that "drawing instruments with needle points should be avoided" will not commend itself to every draughtsman. These, however, are minor details which are scarcely worth mention. The book is a model of clearness and compression, well written and admirably illustrated, and ought to be in the hands of every student of building construction.

Sewage and the Bacterial Purification of Sewage. By Samuel Rideal, D.Sc. (Lond.), F.I.C., F.C.S., &c. London : Robert Ingram, Pleydell House, Fleet-street, E.C. 1900.

The title of this book appears on the title-page as quoted above, but on the cover of the book it is given as "Sewage and Sewage Purification." The longer title is the more appropriate, as the work is, according to the preface, designed to be a *résumé* of "modern ideas of sewer* (*sic*) purification by bacterial processes." We may say at once that no better *résumé* of the subject is possible at the present time. It is only when Dr. Rideal deals with matters outside his provinces of chemistry and bacteriology that there is room for criticism. Thus, the brick-built gully-pit, trapped simply by a flag dipping into the standing water, may be the best of the four illustrated, but it is far from being a perfect arrangement, and the statement on page 10 that the model by-law of the Local Government Board to the effect that "means of access [to privies] must be provided for the scavenger, so that the filth need not be carried through a dwelling," is to a great extent aimed at the evil of back-to-back houses, shows a little want of forethought, as back-to-back houses have necessarily a street on each side or front, and the privies are grouped at the ends of the blocks, with direct access, as a rule, to both streets. Again, the illustration on page 113 is given as an illustration of a ridge-and-furrow system of sewage-distribution adopted in broad irrigation, whereas it is really the common arrangement for intermittent filtration through land ; the ridges and furrows for broad irrigation are very different.

These, however, are trifling blemishes. The chapters on Chemical Analysis, Bacteria Occurring in Sewage, Chemical Changes Produced by Bacteria, Sterilisation, and Bacterial Purification—which occupy more than two-thirds of the book—show Dr. Rideal at his best. His conclusions are entirely in favour of "the treatment of sewage on bacterial lines for even the largest centres of population." Architects, who have to consider the disposal of sewage from large houses, schools, and other buildings in the country, will find in the book much valuable information ; and to engineers, who wish to be abreast of the latest knowledge and are desirous of avoiding the dangers which accompany "a *little* learning," the book will be indispensable

A Practical Guide for Sanitary Inspectors. By F. C. Stockman, Assoc. San. Inst., Sanitary Inspector for the Finchley District of Middlesex. With an Introduction by Henry Kenwood, M.B., L.R.C.P., D.P.H., &c. London : Butterworth & Co., 12, Bell-yard, W.C. 1900.

According to the preface, this work is intended "more particularly for those who have just obtained their first appointment as sanitary inspectors," but it will also be of use to older practitioners as well as to students. The matter is carefully arranged and there is no unnecessary verbiage. Much of it is, of course, a mere recapitulation of the Acts of Parliament now in force, but the book also contains much good advice on the details of the sanitary inspector's work. The Infectious Disease (Notification) Extension Act, 1899, is omitted from the list of Sanitary Acts on page 10, but mention of it is made in a footnote on page 112 ; it is, however, erroneous to say that this Act makes notification "universal," as its operation is confined to England and Wales. We have noticed two or three details on which there is room for difference of opinion, such as the kind of trough-closet recommended and the amount of flush. The method of fixing anti-siphonage pipes where "two or more water-closets" are connected with the same soil-pipe is wrongly described on page 73 ; it

* Clearly a misprint for "sewage."

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would be bad plumbing to make a separate anti-siphonage pipe for each closet "by connecting a short piece of lead pipe with the top of the trap to the soil-pipe." The book is well printed, and the descriptions are on the whole so well expressed that the lack of illustrations is scarcely noticed. We can heartily recommend the book as a practical guide for sanitary inspectors both in town and country.

Defects in Plumbing and Drainage Work. Described by FRANCIS VACHER, Medical Officer of Health for Cheshire. New and Enlarged Edition. Manchester: John Heywood. 1900. Price 1s.

THIS is an illustrated account of about 120 defects in plumbing and drainage work which have come under Dr. Vacher's own observation or have been described to him by correspondents. Some of them are such curious examples of misplaced ingenuity as might appear incredible, but that similar or even worse defects have come under our own observation. The book is on the same lines as Dr. Teale's "Dangers to Health," but is published at the small price of one shilling in order that it may circulate widely among artisans. Much can undoubtedly be learnt from a careful study of the defects which Dr. Vacher has described, and it would be a good thing if every plumber and drainer would read the book so as to know how *not* to do their work. It is a pity that the illustration on page 41 has been allowed to remain; a wash-down closet with a fan-spreader (instead of a flushing rim) ought not to have been recommended in 1900, whatever may have been thought about it eleven years ago, when the book was first published.

Gas, Oil, and Air Engines. By BRYAN DONKIN, M.Inst.C.E., &c. Third edition; revised and largely rewritten. Charles Griffin & Company, Limited, 1900.

THIS book is already well known to the engineering world as a standard work, superior to any other dealing with gas, oil, and air engines. As an author, Mr. Donkin possesses the advantage of a long practical experience in addition to theoretical knowledge of a high order. He is therefore well able to appreciate the importance of points upon which engineers and others are most likely to require information. His work bears unmistakable signs of painstaking research, and the voluminous details it contains are set forth in a manner which leaves little to be desired. Mr. Donkin is descriptive rather than argumentative, and moreover he is merciful to the general reader who may require information, for his pages are not overrun with abstruse calculations of the kind which take away so much of the interest and usefulness, except, of course, to professional engineers, of many technical works.

Gas-engines are now being adopted for so many different purposes in connexion with private and public buildings of all kinds that the architect is frequently called upon to advise as to the relative suitability or efficieny of certain gas-engines, or he may have to decide whether a gas or a steam-engine should be employed in some particular case. It is one of the privileges of the architect that he is frequently expected to be an expert upon anything which finds its place within the walls of a building. Consequently, he may occasionally discover that the acquisition of supplemental knowledge is very desirable. If information of the kind be required as to gas and similar motors, the inquirer may be sure of finding what is wanted in Mr. Donkin's admirable treatise.

The Timber Merchant's and Builder and Contractor's Calculator. By JOHN ROBERT BARKER. Published by the Author (no date or address).

MR. BARKER'S little book of sixty-six pages contains a considerable amount of information which may prove useful to builders who are in a small way of business. It is not, however, sufficiently complete to be of much service to more important firms or to the timber merchant. Nothing is said about any other standards than the St. Petersburg; this, of course, is the most important; but at the very least multipliers ought to have been given for converting this into other standards, such as the Quebec, London, Christiania, &c., and *vice versâ*. Then, again, only the quarter-girth system of measurement is given for round timber, and nothing is said as to allowances which are made in the dimensions of logs, although this is a matter of great importance in the case of many of the more valuable timbers, such as mahogany.

We have not checked all the tables, but in the one we have checked—that on p. 48—the errors are numerous. To begin with, there is an unfortunate omission in the title of the table, which reads "Table showing the proportion in value between timber per load, or per foot cube, and 12-ft. 2½-in. and 3 in. battens, deals, and planks;" "120 pieces" ought to have been inserted before "12 ft." The values are also incorrectly stated. Out of fifty-four values of deals, battens and planks, no fewer than thirteen are inaccurate, the errors ranging from 6d. to 2*l*. If there is one essential in a work of this sort, it is accuracy, and we fear, therefore, that Mr. Barker's book cannot be recommended till the calculations have been carefully revised.

Practical Book-keeping for Builders and Contractors. By E. H. MASON. Newport: Geo. Bell. 1900. Price 1s.

THE author of this pamphlet is a corporate accountant and auditor at Newport (Mon.) and may therefore be assumed to be fully competent to treat the subject of account-keeping. His object is to show how the accounts of the average builder may be easily and accurately kept without unnecessary expenditure in large salaries to trained book-keepers. As he observes, "it must surely be better to spend an hour or two daily keeping the accounts in order than to see the credit balance at his bankers growing smaller while large trade is being done, and not know the leakage." The information is succinctly and clearly given, with specimens of columned sheets for the various classes of accounts in connexion with building work.

An Epitome of the Law and Practice connected with Patents for Inventions. By JAMES JOHNSON, Barrister, and J. HENRY JOHNSON, Solicitor and Patent Agent. Third Edition. London: Longmans, Green, & Co.; Stevens & Sons, Limited. 1900.

THERE is little to be said of this convenient handbook. It is in effect a sketch of the law and practice clearly and concisely stated. It is useful for those who wish to obtain a general idea of the law of patents, and how one is to be obtained. It is too slight if some particular point in regard to patents has to be elaborately made up. But it is obvious that it is a book which supplies a want.

COMPETITIONS.

TECHNICAL SCHOOL, BURNLEY.—The assessor who has had the plans before him of the new technical and higher grade school at Burnley has given his award in favour of the design marked "C." The author of the design is Mr. T. Bell, of Burnley.

BOOKS RECEIVED.

THE CHEMISTRY OF ENGINEERING. By A. H. Sexton. (Technical Publishing Company, Manchester).

THE GEORGIAN PERIOD: Being measured drawings of Colonial work. By C. F. Bragdon, F. J. Kidd, J. F. Scrobel, jun., C. L. Hillman, F. S. Swales, and S. R. De Long (Office of the *American Architect and Building News*, Boston, U.S.A.)

PRACTICAL BOOK-KEEPING FOR BUILDERS AND CONTRACTORS. By E. H. Mason. (Newport: G. Bell)

ARCHITECTURE AND HISTORY, AND WESTMINSTER ABBEY. By William Morris. (Longman & Co.)

CHARING CROSS AND HAMPSTEAD RAILWAY.—Sir Douglas Fox and Mr. W. R. Galbraith have been appointed engineers for the construction of the electrical railway, in respect of which a company was incorporated in August, 1893. Under the modified plans the line, a branch from Park-street, Camden Town, to Kentish Town included, will be about six and a half miles long, and the estimated cost is nearly 4,000,000*l*. The railway and plant will be after the latest American patterns, the third rail serving as a feeder for the motors. The project, we understand, has been taken over by a syndicate of New York capitalists, whose chairman is Mr. C. T. Yerkes, a well-known street-railway builder in America, and donor of the great telescope to the Yerkes Observatory at Geneva, Illinois.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTURAL EDUCATION.

SIR,—I notice in last week's *Builder* that Mr. Seth-Smith advocates a two years preliminary training for architectural students in London. It is now six years since I started such a scheme at University College, Liverpool, and my experience, therefore, may be of some interest to those who, like myself, believe that this is the right course to pursue. In 1894 I started with one student. During the past three years I have had, on an average, sixteen students each year taking the two years course, and this year I have nineteen passing through it; seven in their second year and twelve in their first. Some of the advantages of such a scheme you referred to in your "Note" on Mr. Seth-Smith's address. The principle advantage, however, is that the student commences work at the beginning and is taught systematically. None of his time is wasted on work which he cannot understand, as is too often the case when he enters an office straight from school or college. So much is omitted in office work, being understood, that it is sometimes difficult for a pupil to get behind the scenes and understand why things are done, and the reasons for the different methods of construction adopted. There is no danger of this in a systematic course of preliminary training. Opinions may differ somewhat as to the details of any scheme, but that is immaterial. The great thing is to agree on the need for a change in our present methods of training architects. I have no doubt whatsoever that if such a scheme, as is suggested, were started in London, it would be a success. If I can get nineteen students in Liverpool it ought to be possible to get five times that number in London. The fees here are low, 25*l*. a year; in London they could be at least 40*l*. Supposing that only fifty students joined, that means an income of 2,000*l*. a year. Mr. Seth-Smith's estimated expenditure of 1,000*l*. a year is altogether too low. It would probably eventually be nearly treble that amount, but even if it were I believe that the scheme would still be a financial success.

The only point I am doubtful about is whether the Architectural Association is the proper body to start such a scheme. Nobody knows better or recognises more fully than I do the excellence of the work which it has done in the past, but Mr. Seth-Smith's italicised proposal of a "purely architectural college" is surely a mistake. The architectural student ought not to be isolated. From the first he should be in touch with the workers in other branches of art, and with the craftsmen and artificers who will in after years be called upon to assist him in his work. He should also, I consider, be encouraged to pursue his studies in general subjects, arts and sciences, before commencing his more technical training. The student with a good preliminary grounding, as I know from experience here, learns ever so much more quickly than one who is deficient in this respect. For these reasons I think the new University of London should be pressed to undertake the work, and I hope that all who are interested in improving architectural education in this country will support the efforts of the President and Council of the Royal Institute of British Architects in their desire to see architecture included in the curriculum of the University. But, in my opinion, it is necessary not only to include architecture but also the other arts and crafts allied to it. This would be a large order no doubt, but it is worth trying for. From letters I have received lately I gather that somewhat similar schemes to the one suggested are about to be started in other large towns, and the new developments at the College of Art, South Kensington, may also tend in the same direction.

F. M. SIMPSON.

University College, Liverpool.

ANCIENT CARTHUSIAN MONASTERIES IN ENGLAND AND SCOTLAND.

SIR,—I am desirous of finding a plan, picture, or engraving of the following monasteries as they existed when occupied by the Carthusian monks:—Witham, Hinton, Sheen, Totnes, London, Coventry, Hull, Beauvale, Mount Grace, Epworth (Axholme), Oakham, and Perth.

Will you permit me to ask the kind assistance of your readers? CHARLES C. THORNTON.

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The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

14. Methods of Charging for the Electric Light — The Hopkinson and Wright Systems — The Wright Demand Indicator—Free Glow Lamps —Meters—Best Known Types—Tests —The Eversheд Meter.

MANY consumers of the electric light are puzzled by the extraordinary systems of charging for it adopted by supply companies and corporations. If every company adopted a similar system, the public would try and understand the reason for it, but as there are some twenty or thirty different systems in use the labour involved is too great. Yet there are one or two main principles underlying them all, and a study of these will be instructive. The late Dr. Hopkinson was the first to propose that every consumer ought to pay his fair share of the "standing charges" to which he put the company, as well as his share of the "running charges." The "standing charges" include such items as salaries, rent, depreciation, &c., and the "running charges" include the price of the coal, water, and lubricating oil used. If all the consumers had mansions wired for a great number of lamps, and only kept these lamps burning for a few hours on special occasions every year, it will be obvious that the machinery at the central station must be large enough to cope with these special demands, and yet the greater part of this expensive machinery will be nearly always lying idle, and it will be depreciating in value all the year round.

The same problem occurs in supplying many other wants. Railway and omnibus companies have to keep a much larger running stock than if their clients arranged their journeys so as to distribute the load evenly throughout the day. Even in gas and water supply notwithstanding the ease with which they can be stored, this difficulty comes in. What the supply companies want for economical working is an evenly distributed load throughout the day so that they can supply the demand with the smallest plant and the most effective staff.

In electricity supply these considerations have special force because the plant must be sufficiently powerful to take the maximum load which, from the nature of the case, only occurs for a few hours every winter. If the meter bills of consumers are not sufficiently high to pay the "standing charges," then these consumers are a loss to the company and prevent the small consumer, who takes no long holiday every year and uses his lamps regularly, from getting the rebate to which he is in equity entitled. Yet in several towns in which the Hopkinson method of charging has been introduced, the consumers who get no rebates have protested against the system on the ground that they are paying for the current consumed by the consumer who gets a rebate. As a matter of fact, the opposite is the truth. The most profitable class, who get the largest rebates, still pay more than their fair share of the expenses of generating and distributing the electricity.

There are three principal methods adopted of charging for electric light and power. In the first method a fixed charge per unit is made, the energy supplied being measured by a meter. The second method is to make a fixed charge per annum for the number of lamps installed, and in addition to make a charge per unit as measured by the meter. The third method, which is due to Mr. Arthur Wright, of Brighton, is to charge for electricity consumed at a fixed rate, and give rebates depending on the maximum demand made during the quarter under consideration.

In Manchester both the first and the second methods are employed, and consumers must choose the method they elect to be charged by and must abide by their choice for, at least, twelve months. The scale is as follows :—

1. A fixed price of 5d. per unit, or

2. A fixed charge of 7*l.* per annum per kilowatt installed, *i.e.*, for every sixteen 16 c.p. lamps installed, and in addition a charge of 1½d. per unit for electrical energy taken.

Which system to adopt is a matter of considerable importance to a consumer. If he calculates that he will use his lamps on an average for one hour every day in the year. Then on the first system his meter bill would be for 365 units for every 16 lamps and would amount to 7*l.* 12s. 1d. per kilowatt demanded. In the second system it would be 7*l.* + 365 units at 1½d., *i.e.*, 8*l.* 18s. for every 16 lamps. If he used his lamps on an average for three hours every day, then on the first system his bill would be 22*l.* 10s. 3d., and on the second 12*l.* 14s. 1d. It will be seen that an error in guessing what his probable demand may be, may lead the consumer into considerable expense.

In order to apply the "Wright" system of charging, we need in addition to the meter to have some instrument to indicate the maximum current that has been taken during the quarter. In this country the instrument employed for this purpose is the Wright demand indicator. It consists simply of a differential air thermometer made of a glass U tube with two glass bulbs blown at each end and partly filled with coloured sulphuric acid. A small platinoid resistance coil is wound round one of the bulbs, and is in series with the mains. When a current passes the air in one bulb being hotter than the other, the liquid is forced up one side of the U-shaped tube, and part of it falling into the other bulb is stored there, and is used to measure the maximum current. It is sluggish in its action, and hence an accidental short circuit or turning on a great many lamps for a minute or so will not make it register. It can be set at once by tilting the tube, and there is nothing in it liable to get out of order.

The Islington scale is :—7d. per unit for the first hour per day of the maximum supply demanded, and 4d. per unit for all in excess of this. For example, supposing that the meter showed that 150 units had been consumed during the quarter, and the indicator that the maximum demand had been at the rate of 1½ units per hour, then the bill would be for 91 × 1½ units at 7d. (counting ninety-one days in the quarter) *i.e.*, 104 units at 7d., and 46 units at 4d., or altogether 3*l.* 10s.

At Brighton the scale is :—7d. per unit for the first hour per day of the maximum supply demanded, and 1d. per unit for all over this consumption. At Brighton the maximum demand is not taken every quarter, but is taken as the mean of three readings taken every half-year.

It will be seen that the system of charging, based on the maximum demand as at Brighton, is fairer than that based on the maximum number of lamps installed as at Manchester. It very rarely happens that all the lamps in a house are turned on at one time, and when a demand indicator is fixed the consumer can easily arrange so that the dining-room and drawing-room "loads," &c., do not overlap too much. If he wishes to give an entertainment and have a great blaze of light, then he can arrange with the supply company to cut out his demand indicator for that evening.

It is useful also to consider the methods that have been adopted to encourage a day load on the supply station. The St. Pancras Electricity Supply fixes two meters when desired in a consumer's house—one for a cheap daylight service at 3d. per unit, mainly for power purposes; the other, at 6d. per unit, for lighting purposes. By means of a switch, devised by Mr. J. T. Baron, the consumer can use which meter he likes, but the cheap meter is not on the lighting circuit. Mr. R. P. Wilson has invented a meter which records at different rates at different times. During the day-time, by means of clockwork, a resistance is inserted in the shunt of the meter, which accordingly goes slower, and at night the clockwork cuts out this resistance. There are many other systems of charging adopted, but we have said enough to indicate the principles on which they are based.

Some electric supply companies, in addition to giving rebates on the meter bills, supply their consumers with glow lamps. In America this practice is largely adopted. The Edison companies, for example, when a customer is connected, give him a glow lamp for every socket he has in his house absolutely free, and he can have them of any candle-power he desires. He is also given a few lamps to keep in reserve. Whenever a filament burns out or the candle-power of a lamp falls off he can exchange it for a new one. There is much to be said in favour of this system. From the company's point of view, the satisfaction of the consumer and the certainty he has that he is getting the light for which he pays more than compensate for the cost of lamp renewals.

The ordinary consumer is very loth to replace lamps that burn dimly when he has to pay for them himself. As a rule, he measures the worth of a glow lamp by the length of its life. From the point of view of economy, this is a very mistaken idea. Every seventeen hours an ordinary 10-c.-p. lamp will consume a unit, the price of which we may take at sixpence. In its life, which is often between one and two thousand hours, or even longer, it will consume two or three pounds' worth of energy. As the original cost of the lamp is at the most two shillings, it will be seen that the cost of lamp renewals is only about 5 per cent. of the meter bill; and as lamps often vary in efficiency by as much as 100 per cent., it will be seen that the life of the lamp is not nearly so important as its efficiency.

Before November, 1893, when the patent for glow lamps owned by the Edison & Swan Company expired, the price of them was high (3s. 9d.), but the workmanship was excellent, and every lamp was tested for candle-power, &c., before leaving the factory. Now, when many factories are turning out 20,000 lamps a week labelled 8, 16, and 32 c.-p., and selling them for a shilling each, it is not to be wondered at that many of them do not correspond to their labels, and that some of them are defective. When Bradford changed over from supplying at 115 volts pressure to supplying at 230 volts Mr. Gibbings, the Corporation electrician, tested many of the 115 volt lamps taken from consumers' premises in exchange for 230 volt lamps. He found that in the majority of cases they had been taking from 4 to 6 watts per candle, and as a good lamp will give a candle for every 3 or 3½ watts consumed, many of the consumers had been paying very expensively for their light through the medium of so-called "cheap" lamps.

Now, in order to test a lamp, an expert is required; hence one of the main reasons given why companies should supply their consumers with free lamps is that they are in a position to test the lamps and guarantee their quality, whilst the consumer, if left to himself, will probably buy cheap and long-life lamps, and so pay 50 per cent. more for the light he gets. At Bradford Mr. Gibbings has introduced a modified system of "free lamps." Every consumer there is entitled to an 8 or a 10 c.-p. lamp for every 60 units of electricity he consumes by the use of glow lamps only.

Electricity meters may be divided into three principal classes :—

1. Electrolytic meters.
2. Clock meters.
3. Motor meters.

The first class of meters measures ampere-hours only. As the pressure, however, of an electric supply is practically constant, this is proportional to the watt-hours or energy consumed. If the average pressure for the quarter were 1 per cent. low, then the consumers would be charged 1 per cent. too much for the power they actually consumed; and if the pressure were 1 per cent. high, they would be charged 1 per cent. too little. The best-known type of electrolytic meter is the Bastian meter. The main current passes, by means of platinum electrodes, in and out of the base of a glass tube of uniform bore filled with water, with a small proportion of sulphuric acid added. The more current that passes the more water is electrolysed into oxygen and hydrogen, which escapes into the air; hence the level of the water falls and the calibration along the side of the tube shows the number of units consumed. To reset the meter it is filled with water up to the zero mark. The meter is cheap (2*l.* 10s.), and is suitable for small consumers on 200-volt circuits. A drawback is that there is a drop of two or three volts across the meter, which would represent a serious loss of energy on 100-volt circuits. Its main advantages are accuracy, the registration of very small currents, and freedom from harm by temporary excess currents.

By the London County Council regulations "a meter shall be considered to be correct when the registration shown by the dials is within 2½ per cent. of absolute accuracy at all points above one-twentieth load, or 1½ amperes." This is very much the same degree of accuracy as is insisted on for gas meters. No gas meter is stamped which has an error of more than 2 per cent. in favour of the seller or 3 per cent. in favour of the consumer. The pressure of the gas supply is of secondary importance to the consumer, who is mainly concerned with its illuminating power. Hence there is often a drop of 20 per cent. in the pressure of the gas supply across the gas meter, a drop which, of

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course, would be quite inadmissible in the case of electric pressure. This is one of the reasons that make it so difficult to construct an electric meter, the power at our disposal is so small. For this reason the earliest meters invented were either electrolytic or clock meters.

The earliest successful clock meter was the Aron meter. It had two pendulums; the bob of one was magnetic and oscillated in a magnetic field when the lamps in the house were turned on, and so was accelerated at a rate proportional to the current taken. The difference between the rates at which the two pendulums oscillated measured the ampere-hours taken, and this was registered by a differential gear. The meter in its original form was thus an ampere-hour meter, or, as it is sometimes called, a coulomb meter or a quantity meter. It had the great drawback of requiring to be wound every month or so, and required a good deal of inspection. The modern Aron meters are a great improvement on the older form. They are all energy meters, and being motor meters, they require no winding.

The motor meters form by far the largest class. The best known types in this country are the Thomson, Ferranti, Hookham, and Aron meters. In the Thomson meter we have a drum-wound armature placed in series with a high non-inductive resistance across the mains. It is placed in the field of a coil which is in series with the house circuit. The current through the armature is proportional to the pressure at the house terminals, and the magnetic field in which it rotates is proportional to the current flowing into the house. Hence the driving torque is proportional to the product of these two, *i.e.*, to the watts expended. A large copper disc fixed on the spindle rotates in a magnetic field formed by permanent magnets, and thus the eddy currents induced in it produce a retarding torque proportional to the speed. Hence if there was no friction the number of revolutions of the spindle would measure the watt hours, *i.e.*, the energy consumed. In order that this meter may start with a sufficiently small current, a starting coil is used which consists of a few turns of the shunt resistance wound similarly to the series coil. Even when no current is being taken by the house circuit there is therefore a torque on the armature which is a little more than counterbalanced by the frictional resistance. This meter will record either alternating or direct currents.

The Ferranti meter is an ampere-hour meter, and utilises the principle that mercury placed in a magnetic field will rotate when current enters at its centre and leaves at its circumference. This meter successfully reduces the frictional resistance, but has the drawback, in common with several other meters, that an overload, such as an accidental short circuit, will upset the calibration and render it untrustworthy.

The losses that take place in the shunt coils of energy meters—losses that are continually going on—are very important. As a rule, they may be anything between one and four watts in a Kilowatt meter. This loss is paid for, of course, by the company. If we remember that a watt is about 44¼ foot pounds of work per minute, it will be seen that this is serious. At full load in a good meter about 1 per cent. of the total power is being wasted in the series coil, and about ¼ per cent. in the shunt coil.

In testing a meter the following points have to be considered:—

1. Its accuracy at a twentieth, a half, and at full load;
2. Whether it will run on the shunt alone if vibrated slightly;
3. Watts lost in the shunt;
4. The drop of volts in the series coil at full load;
5. The insulation of the meter.

One of the great drawbacks to making a good meter is the difficulty of overcoming the frictional resistance of the bearings, &c. Using a starting coil is not a satisfactory way of getting over this difficulty, because if the meter be afterwards placed in a situation where it is subject to vibration from the street traction the traffic in the streets or machinery, then we may have the meter continually registering. This difficulty is got over in the Evershed meter and in the Stanley meter by means of a magnetic suspension. In the Evershed meter nearly all the weight of the spindle and armature is supported magnetically, and in the Stanley meter all the weight of the spindle and the aluminum disc is supported magnetically. How successful Mr. Evershed has been in eliminating friction will be seen by the fact that the moment of the frictional resistance in his meter is only about two dyne-centimetres which is less than the 100th part of the moment of the frictional resistance of the best-known types of meter. A turning force equal to the 30,000th part of an ounce acting at a leverage of 1 in. would be sufficient to turn round the spindle of an Evershed meter, and it has a very wide range and is extremely accurate. One recently tested showed no error greater than one-tenth per cent. from one-twentieth to full load. This shows that the principle of the Evershed meter is sound, and if it can be made cheaply enough it ought to have a great future before it.

OBITUARY.

MR. JOSEPH GODDARD.—We regret to have to record the death of a well-known provincial architect, Mr. Joseph Goddard, of Leicester, who died suddenly from hæmorrhage on the brain at his residence, the Manor House, Newton-Harcourt, near Leicester, on the 10th inst., in his sixty-first year. Mr. Goddard was articled to his father, Mr. Henry Goddard, in 1856, and commenced practise in partnership with him in 1862. His first works were the Westcote School, Alderman Newton School, and St. Mary School; all carried out between 1862 and 1865; and in 1875 he carried out one of the first Board Schools, in Syston-street, all in Leicester. In 1868 he won in competition the Memorial Clock Tower, erected the following year in the centre of Leicester. He was equally fortunate in his competition for the Leicestershire Bank, built between 1870 and 1872, and in consequence of its success was appointed architect to the company, building in the following years the branch banks of Hinckley, Swadlincote, Uppingham, Ashby-de-la-Zouch, Loughborough, Coalville, Nuneaton, Bedworth, and Wellingborough. In 1866 he was entrusted with the important restoration of the Parish Church at Church Langton. The restoration of many Leicestershire churches followed, including those of Evington, Ibstock, Thornton, Oadby, Whetstone, Kirby Bellars, Whitwick, Newbold, Glenfield, and others of less importance. He also designed the churches of St. John the Baptist, St. Barnabas, S. Hilda, and St. James (now in progress), all in Leicester. Of these the church of St. John is the most remarkable, with a wide nave and narrow aisles serving as the ambulatory, and a gallery over, thus being able to bring the whole width of nave and aisles into the upper part of the church. In 1876 he built the Leicestershire Club, and at later periods the Alliance Offices, Walker Memorial Hall, General News Room, and Messrs. Cook & Son's Memorial Buildings, all in Leicester. In the course of his career Mr. Goddard built and inhabited three houses of his own design; the last one, at Knighton Spinneys, near Leicester, not only being admirably planned, but in design and construction one of the best half-timbered houses in the revival of this type. A drawing of this was placed on the line in the Royal Academy Exhibition of 1888, and in 1889 gained a silver medal at the Paris International Exhibition. The erection of these houses for himself brought numerous commissions, in many cases from complete strangers, who were anxious to obtain similar residences, the most important being Broomleys, at Coalville, and others in and about Leicester, at Manchester, Barnes Green, and Stanmore. All Mr. Goddard's earlier works were in the type of the Gothic revival of thirty to forty years ago, influenced by the works of the late William Burges and A. W. Godwin, and with respect to the former he followed in his wake by designing all his own furniture, finding it impossible otherwise to obtain examples which would be in accordance with the style of the houses he was building. Mr. Goddard became a Fellow of the Institute of Architects in 1871, and about three years ago was appointed Justice of the Peace. Mr. Goddard acquired from his father a taste for works of fine art, and on his death in 1868 he succeeded to a small but interesting collection, to which he has largely added. It was probably this taste which led him to assist in the formation of an art gallery in Leicester, which was one of the first started in the Provinces, and now forms one of the best collections.

MR. WALTER HANSTOCK.—We have also to announce the death, on the 6th instant, at Harrogate, in his 58th year, of Mr. Walter Hanstock, who, we understand, was the sole surviving partner of the firm of Messrs. W. Hanstock & Son, of Oxford-place, Leeds, and Branch-road, Batley. Mr. Hanstock gained the second premium, upon the award of Mr. Emerson as assessor, for his designs (of which the estimated cost amounted to 55,000*l.*) in the Leeds Market Hall competition of September last year. For the Corporation of Leeds he planned and designed the new Municipal Meat Market and Slaughter-houses, New York-street, opened on July 24, 1899, at a cost (to include the abattoirs) of about 30,000*l.*; additions to the Public Baths in Cookridge-street; the Public Baths in Joseph-street, Hunslet, 12,000*l.* (1898); Union-street Baths (1894-5); Kirkstall-road Baths; Holbeck-lane Baths (1897, cost about 8,500*l.*); and the Meanwood-road Baths, at a cost of 13,000*l.*, including 3,000*l.* for the site (1898). Amongst other architectural works recently carried out by him we may mention the Public Baths for the Selby Urban District Council; the laboratory at the Grammar School, Catlinghow, near Batley; the Public Baths, Batley (1893); and the Methodist Free Church at Armley, Yorkshire. A few months ago Mr. Hanstock was appointed architect to the Batley Corporation to prepare designs for the proposed Town Hall and municipal buildings (26,850*l.*), police-station and police-court (4,650*l.*), and an improvement of the public market (4,500*l.*), the estimated costs amounting to a total of 36,000*l.*

GENERAL BUILDING NEWS.

METHODIST CHURCH, RANMOOR, SHEFFIELD.—The foundation-stone of a Methodist church at the corner of Fulwood-road and Nethergreen-road, Ranmoor, was laid on the 10th inst. Mr. C. J. Innocent is the architect, and the contractors are Messrs. D. O'Neill & Son.

MISSION CHURCH, CHURCHILL, BRISTOL.—A mission church has been built near Stock-lane, in the parish of Churchill, near Bristol. The church consists of nave, chancel, vestry and porch, and is built of Ham Hill stone with a roof of red Broseley tiles. Messrs. Samson & Cottam, of Taunton and Bridgwater, were the architects, and Mr. T. Stockham, of Bridgwater, was the contractor.

ST. MATTHEW'S MISSION CHURCH, STRATFORD, LONDON.—The dedication service of this building was held on Friday, the 12th inst. A simple treatment of the early period of Gothic architecture has been adopted. The main gable of the church is flanked on either side by bold pilasters, one terminated with gabled canopy, the other being carried up as an open bell turret, terminating in a spirelet carried on four dwarf stone columns with carved caps. The spirelet is covered with oak shingles, and finished with a wrought-iron weather vane. A five-light centre-traceried window forms a feature in the front gable. A narthex containing two main entrances relieves the front elevation. The chancel arch is of Bath stone, carried on columns of the same material. The roof is of open timber hammer-beam construction with boarded ceiling, and the timber is stained dark walnut. The vestry is arranged on one side of the chancel, and class-rooms, kitchen, and other accommodation are placed in the basement. The building has been erected from designs selected in competition submitted by Messrs. George Baines & Reginald Palmer Baines, architects, of Clement's Inn, Strand. The builders were Messrs. Battley, Sons, & Holness, of London.

RESTORATION OF PARISH CHURCH, WATLINGTON.—This building, erected about the year 1300, and which was in a very dilapidated condition, has now been thoroughly restored, under the direction of the diocesan surveyor, Mr. A. J. Lacey, architect, of Norwich. During the execution of the work a piscina and two aumbries in the north wall of the chancel were discovered. They are believed to have belonged to a small chapel which existed there. Messrs. Bardell Bros., of Lynn, were the contractors, and the re-glazing was done by Mr. Thos. Horth, of Norwich.

ST. NICHOLAS MISSION CHURCH, BLACKWALL.—This church was consecrated a few days since. It stands in a district which has been formed on areas cleared for the formation of the Blackwall Tunnel, near one of the staircase entrances to the tunnel. Attached to the church are a recreation-room, kitchen, and committee-room. The building is of red bricks inside and out, the arches of openings almost entirely semi-circles, the covering of grey-green Westmoreland slates. There are six bays, and at the east end is an apse, covered with a semi-dome. The church is floored with Duffy's wood blocks, the windows are glazed with mutfled glass, there are ventilators, with shields to prevent draughts, the heating is by hot water, and there is electric lighting. The attached buildings are distinguished from the church by differences of colour and treatment. Messrs. J. W. Falkener & Sons, of Ossory-road, Old Kent-road, have carried out the building work. It has been necessary to carry down large piers of brickwork in cement as far as the bottom of the lowest sewer, and to carry the walls over the sewers on steel girders. Messrs. J. & S. Flint Clarkson were the architects, and Mr. Hutcheson has acted as clerk of works.

THE LONDON SCHOOL OF MEDICINE FOR WOMEN.—The alterations and additions that have been carried out comprise the block having a frontage to Hunter-street, and containing residential rooms for seventeen students, and the science laboratories on the return frontage in Handel (formerly Henrietta) street, planned and designed by Mr. J. M. Brydon. To make room for the new buildings the retired cottage, or lodge, known as the "Pavilion," has been removed.

ENTRANCE, NO. 120, GREAT PORTLAND-STREET.—This house has recently been rebuilt for the school managers of All Souls, Langham-place. The ground floor is used as the entry to the infant schools in the rear, the upper story being used as a teachers'

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and clergy residence. The ground floor has been treated by the architect, Mr. Beresford Pite, in an effective and characteristic manner, with two piers and carved brackets in Monk's Park stone, and a solidly designed iron railing in front of the central window, the entrances to school and residence being on each side. The iron girders carrying the upper front are exposed, and treated as a part of the architectural design.

Wesleyan Sunday School Buildings, North Ormesby, Yorkshire.—New Wesleyan Sunday school buildings were opened at North Ormesby on the 10th inst. The site has frontages to Derwent and Jubilee streets. The buildings comprise a central hall, 57 ft. by 30 ft. 6 in., an infants' schoolroom, 33 ft. by 16 ft. 4 in., six classrooms, a church parlour, vestry, kitchen, &c. The floor throughout is of wood blocks. Mr. Robert Moore, of Middlesbrough, was the architect and Messrs. Allison Bros., of the same place, were the contractors.

Laundry and Carpet-beating Works, Sheffield.—New premises for the Pitsmoor Laundry and Carpet-beating Company, Limited, have been erected in the Woodfold, off Woodside-lane, Pitsmoor, Sheffield. The architect was Mr. E. Winder, of Sheffield, and Messrs. Eshelby & Sons were the contractors.

Almshouses, Dewsbury, Yorkshire.—The Fletcher Homes, six almshouses which have been built on the north side of Dewsbury Public Park, were opened on the 10th inst. The buildings are of stone from the Woodhead quarries. Mr. F. W. Ridgway was the architect.

New Hotel, South Shore, Blackpool.—The building of the Savoy Hotel, South Shore, on the site of the Old Britannia, is estimated to cost about 30,000*l*. The edifice will be in the Italian Renaissance style, and will have a commanding elevation to the sea, with frontages to Shaw-road, Britannia-place, and Bolton-street. On the ground floor there will be an entrance-hall, with central lounge, smoking and billiard room, coffee-room, and a dining-room 82 ft. long. Hydraulic lift, lavatories, &c., are to be placed on each floor. The basement is to be entirely occupied by large kitchen and servants' offices, bottling stores, wine and beer stores, &c. First, second, third, and fourth floors are to be fitted up with drawing, sitting, and bedrooms, in all ninety-eight bed and sitting-rooms. The hotel has been designed by Messrs. Garlick & Sykes, architects; and Mr. William Eaves, of North Shore, Blackpool, is the building contractor.

Public Hall and Winter Garden, Springburn, Glasgow.—The memorial stone of a public hall about to be erected in Springburn was recently laid, and the formal opening of the Reid Winter Garden took place at the same time. The public Hall is situated in Keppochhill-road, at the corner of Millerbank-street, and almost directly opposite another range of public buildings occupied by the Fire Brigade and Tramway Departments. The estimated cost is about 12,000*l*., and the edifice is being erected in accordance with plans by Mr. W. B. Whittie, formerly assistant in the office of Mr. A. B. M'Donald, the City Engineer. The main hall is 77 ft. in length by 50 ft. in width, and is seated for the accommodation of fully 1,200 persons. The Winter Garden occupies an appropriate site on the southern portion of Springburn Park, a short distance to the north of Broomfield-road. It has been erected at a cost of 10,000*l*., through the generosity of the family of the late Lord Dean of Guild Reid, whose gifts to the city, it will be recalled, include a numerous and valuable collection of paintings. The structure, which has an internal area of 150 ft. by 60 ft., is about 40 ft. in height, and was designed by Messrs. Simpson & Farmer, hot-house builders, with Mr. William Baird, of the Temple Ironworks. On each side of the main building is a range of plant houses.

Chapel School, Whiterigg, Lanarkshire.—This school was opened recently; it is situated on high ground on the road between Airdrie and Plains. It is constructed of rough freestone, taken from Fallahill Quarries, and is partly of Gothic and partly of Old English design. The length of the building is 106 ft., the breadth 45 ft., with an interior height of 20 ft. The entrances, two in number, are both situated on the side of the church farthest from the road. The interior of the building is divided off by folding doors. Three of the divisions only are used for school purposes, but for the Sunday services the full length of the building is utilised. For the children a cloak-room and lavatory are provided within the building. A wainscot of polished pine runs round the whole interior of the building for a height of about 6 ft. from the floor. The altar is the work of Mr. Hugh Murphy, of Glasgow. There is accommodation for 500 at Mass, and for 300 school children. Acetylene gas is to be the illuminant. The heating apparatus consists of hot steamin pipes which run round the interior of the whole building. The building was designed by the late Mr. Cowan, the diocesan architect.

Proposed Baths, Morley-street, Bradford.—The Baths Committee of the Bradford corporation are applying for the sanction of the Local Government Board for a loan of 40,000*l*. for the erection of baths in Morley-street. The plans provide a swimming bath nearly 120 ft. long by 40 ft. wide. The dressing-rooms would be in a separate apartment. In winter the swimming bath would be covered with a pine flooring, and the surrounding space would be converted into raised tiers. The apartment containing removable dressing-rooms would become a supper-room. The decorations uniformly would be such as to suit the purposes of a bath in summer and of a concert-hall or dancing-room in the winter. As a concert-hall, the building would yield sitting accommodation for nearly 1,300 persons. Mr. A. H. Tiltman, architect, of London, has prepared the sketch plans.

Primitive Methodist Institute and Sunday School Building, Burslem.—A Primitive Methodist Institute and Sunday-school building, in Church-street, Burslem, was opened on the 12th inst. The building is two storied. It contains two assembly rooms, fourteen class-rooms and kitchen. The rooms are separated by folding partitions, whereby seven class-rooms may be added to each central hall: giving two assembly rooms, one on each floor of about 60 ft. and 50 ft. In the centre of the front façade is the principal entrance and the main staircase leading to the boys' school above, whilst from the vestibule below access is gained right and left to the girls' and infants' school. The principal elevation, which has terra cotta dressings, faces Church-street. The building is warmed by open fireplaces supplemented by hot-water pipes. Mr. J. H. Broadhurst, of Burslem, was the contractor; Messrs. Ford and Slater were the architects.

Mission Church, Roundhay, Leeds.—The foundation stone of a mission church and parochial hall, at Roundhay, Leeds, has recently been laid. The building is designed to accommodate 250 people, and will be of stone. Its cost is estimated at 1,500*l*. Mr. Carby Hall is the architect.

SANITARY AND ENGINEERING NEWS.

Electric Fittings, Bridgewater House.—A number of leading manufacturers in England and France were recently invited to submit designs for electric fittings for Bridgewater House, London, the town residence of the Earl of Ellesmere. Considerably over a hundred designs were sent in, and those submitted by Messrs. Dynnison, Berlon Sillem & Co., of London and Liverpool, were selected. Massive circular dishes of cut glass, 24 in. in diameter, surmounted by metal coronas, form the principal part of each electrolier, and the supporters and crest of the Ellesmere family have been introduced throughout. The coronas, with their six crystal pendants surrounding the larger central cut glass dish, and carrying forty-five lights in all, are supported by chains and rings from metal crowns at the ceiling above. The state rooms will take sixteen of these electroliers.

Victoria Bridge, Perth, N.B.—The new bridge over the river Tay at Perth, was opened by Sir Robert Pullar, on Saturday, the 13th inst. The bridge has six piers formed with steel caissons sunk into the bed of the river to a depth of about 30 feet below the summer level of the river. The *Dundee Advertiser* states that at each side of the bridge the last six feet of excavation work was in hard clay, which proved very troublesome to the contractors owing to the water being inside of the cyclinders. Each cylinder was filled with cement concrete to the summer level of the river, and here the masonry of the piers commenced. After the girders were set the mason work in connexion with the pilasters was commenced, and carried up in two octagonal turrets in the Scotch Baronial style. There are four spans of girders, each 88 ft. long, and three cross girders bracing between the piers. On the top of the cross girders longitudinal piers parallel with the main girders are run from end to end, and are jack-arched. The pavement is of granolithic, while the road is laid with tar macadam. On each side of the road runs a parapet wall, and at the east abutment there is a flood arch 17 ft. wide; while between this and the Dundee-road is an access for the proprietor of the Rodney Lodge grounds. The cost of the whole is between 30,000*l*. and 40,000*l*. The contractors were:—Mason work, Messrs. Fraser & Morton, Perth; iron work, Arrol's Bridge and Roof Company. The engineer was Mr. F. Young (Messrs. Blyth and Westland); and the clerk of works, Mr. Webster.

Sewage Disposal, Glendale.—The Glendale Rural District Council at their last meeting approved and accepted the scheme of sewage disposal prepared by Mr. Harry W. Taylor, of Newcastle-on-Tyne and Birmingham. The sewage will be disposed of bacterially, the cost being about 1,750*l*.

FOREIGN.

France.—The new building for the Ecole des Arts et Métiers at Lille, commenced as long as twenty years ago, has just been opened. M Batigny is the architect. It is in French Renaissance style, and the principal façade is decorated with pediment sculpture by M. Cordonnier, representing "France encouraging Art and Industry," and with separate statues symbolising Art, Science, Commerce, and Industry, by MM. Fagel, Mabille, Gascq and Laoust. A spacious courtyard separates the school proper from the shops for metal work, carpentry, and weaving.——M. Gervex has been commissioned to paint the commemorative picture of the Mayors' banquet, in place of the Roll, who has declined.——M. Alfred Lenoir, the sculptor, has just completed the model for a monument to M. César Franck, the composer, which is of rather unusual type. It consists of a representation of a portion of a church in the mediæval style, in which the composer is represented seated at an organ, and inspired by a female figure representing "Musique Sacrée," who leans forward towards him from the opening of a pointed arch. The architectural portion is by M. Hannotin.——A monument to Lenepveu, the painter, has been completed at Angers. It consists of a bust by M. Injalbert, on a pedestal bearing a bas-relief by M. Louis Noel representing Painting, with the Villa Medici and the Institute of France as a background.——The new church at Lourdes is in active progress. It is in a pure Romanesque style, and is more than 200 ft. long and about 90 ft. in extreme width. It is expected that the building will be completed in a year.——M. Chandéze has been appointed curator of the Conservatoire des Arts et Metiers in place of Col. Laussedat, who has resigned.——The Paris Committee of "Habitations a bon marche" has instituted a competition, to take place on November 30, in which prizes will be awarded to the best plans of dwellings of the above-named class built since 1895.——The jury of the competition for a hospital at Honfleur has awarded premiums to M. Rueil and M. Brieu, as of equal merit.——The decease is announced of M. Guinet, architect, of Nancy, at the age of thirty-nine.

Queensland.—In the recent competition for a new General Post Office to be erected in Brisbane, the first premium was awarded to the design by Mr. John Barr. In an article in the Brisbane *Telegraph* it is stated that the aim in this design has been to keep each department distinct, with good lighting, cross ventilation, and proper aspects. Building operations will be commenced by the removal of all premises on that portion of the site between the two lanes and Elizabeth-street. This part of the building will be completed first, and a new lane formed, giving uninterrupted communication between Queen and Elizabeth streets. The public hall of telegraph and money-order offices, and sale of stamps, would be placed temporarily in the clerks' office, with entrance from the arcade. The remaining portion of the building would then be built, completing the contract. The style is free classic. The exterior walls are to be built of local sandstone returning round two pavilions, the remainder of brick with stone dressing. All partition walls are to be of terra-cotta lumber built in cement, and Monier fireproof flooring throughout. The public hall floor is to be covered with large marble mosaic; the mail branch floor covered with wood-blocks; basement and balcony floors with asphalt. The ceilings to the administrative branch to be plaster, the remaining ceilings small corrugated iron. The heating is by electrical radiators in the rooms, and lighting by electrical power supplied from dynamos in the basement. Ventilating trunks are to be carried over the corridor ceilings with inlets to the rooms, the trunks being taken to the basement floor level and into the chimney-shaft, which will act as an extract ventilator. The estimated cost is 150,653*l*.

India.—A licence has been granted to the Calcutta Electric Supply Company to supply electricity to the added area of Calcutta, including the suburbs of Alipore and Ballygunge.——The Bombay-Baroda and Central India Railway Company have decided to practically reconstruct their metre gauge lines at Delhi to suit the convenience of the standard gauge lines.——The Ootacamund Municipal Council have decided to ask the Madras Sanitary Board to furnish them with type designs for model native houses to be erected by the Council.——Analyses of Bombay water during the month of September show that the heavy rains have purified the water in the lakes, and all the waters may at the present season be classed as fairly good waters.——The condition of the fine mosaic pavement in the Lahore Museum is said to be very unsatisfactory. The original materials with which it was laid do not appear to have been good.——The Government of India have approved of the site selected for the new European Hospital to be constructed at Simla, and have authorised the local government to make a free grant of the land to the hospital committee.——Subject to defensive requirements being complied with, the Government of India has approved the construction by the Provincial Irrigation Department of the canal connecting the Madras harbour with the Cooum.

MISCELLANEOUS.

Memorial Window, Botus Fleming Church, near Plymouth.—A stained glass window has been placed in Botus Fleming church, in memory of General Sir W. Penn Symons. The subject of the window is "Christ and the Centurion." Underneath the window is a brass plate bearing an inscription. The work was designed and executed by Mr. W. G. Taylor, of London.

Glasgow Architectural Craftsmen's Society.—The opening meeting for the session was held on

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the 13th inst., when Mr. Alex. Davie delivered his Presidential address. In his opening remarks he stated that he proposed speaking on a subject interesting to all members of the Society, namely, "The Carrying-out of Building Contracts." Speaking of the architect's share of this, he mentioned his great responsibilities and the necessity of his being able to prepare plans to suit his client's requirements, to design with taste, and to use good construction. Valuable hints were then given in regard to the preparing of probable costs and schedules. Suggestions as to conducting their work were made to contractors, and the paper concluded by asking the members to remember that the object of the Society was the mutual improvement of its members in all matters relating to architecture and building, and to help to attain this end by giving their individual experiences as craftsmen in the various discussions during the session.

Memorial Tablet to Members of the C.I.V.—It has been decided to erect a Bronze Memorial Tablet in the Parish Church of each member of the above regiment who has fallen in the South African campaign, subject to the approval of the incumbents. The Lord Mayor (Sir Alfred Newton) has commissioned Mr. Frederick Wheeler, architect, to prepare the design. We learn this has been approved, and that the work is now being carried out by the Coalbrookdale Company, of Queen Victoria-street, E.C. Mr. Wheeler, we may mention, is an old member of the 20th Middlesex (Artists).

The Holland Fine Art Gallery.—This gallery has been removed from 235A, Regent-street to 14, Grafton-street, Bond-street, W. An exhibition of works by modern Dutch masters will be opened there on October 24.

A Brickworks in the Market.—At the Mart Tokenhouse-yard, on Wednesday, the 9th inst., Messrs. Willis & Crouch offered for sale by auction the freehold property known as the Lower Morden Brickworks (formerly the Wimbledon District Brick, Tile, and Pottery Works), near Raynes Park and Worcester Park stations. It was explained that the area comprised 27 a. 3 r. 39 p. of excellent mild earth up to 30 ft. thick, suitable for manufacture into all kinds of brickyard goods. The present trade, it was added, was principally in London stocks, of which the sales for cash with order had averaged 3,500,000 yearly for some years past. Messrs. Trendell Bros., the proprietors, were dissolving partnership, and were disposing of their works as a going concern. Wimbledon, Kingston, Surbiton, Croydon, Mitcham, Sutton, Ewell, and other towns and neighbourhoods were all within easy reach by good roads; plenty of water was available, and there was no difficulty in procuring both chalk and breeze. The buildings comprised two five-roomed brick-built cottages, an office, a large drying-shed, shaft, tool-shed, and numerous timber-built sheds. The plant, comprising five pug mills (driven by steam), and all necessary utensils and accessories would have to be taken by the purchaser at a valuation in the usual way. There was only a small attendance in the auction-room. Bidding commenced at 1,500*l.* and went up to 1,600*l.*, beyond which the occupant of the rostrum (Mr. Crouch) could elicit no advance, and he declared it not sold, but bought in by the vendor at 3,000*l.*

Obsolete Drainage, Sheffield.—The *Sheffield Independent* states that at the Sheffield Town Hall on the 9th inst. a Local Government Board inquiry was held to hear an appeal entered by Mr. Robert Styring, solicitor, of Sheffield, against charges made upon him by the Sheffield Corporation in respect of two houses, Nos. 193 and 195, Rockingham-street. The drainage of these houses was effected until recently by an open channel across the pavement. The Corporation have substituted a proper closed drain, connected with their sewer, and charged the owner of the property with the cost, under the provisions of Section 23 of the Public Health Act of 1870. The contention of the appellant was that the improvement was chargeable to the public funds, and not to the owner of the property. The Town Clerk remarked that to a great extent this was a test case. In the course of the evidence Dr. Robertson, Medical Officer of Health for the city, said that in November, 1898, his attention was called to the condition of Rockingham-street. In consequence of that he made an inspection, and took notes of a number of defective channels crossing the pavement. He presented a Report to the Health Committee, in which he said that the unhealthiness was due to slop water stagnating upon the footpaths, and were this remedied the repairs necessary to the footpaths need not be very extensive in order to make the street reasonably healthy. The houses, Nos. 193 and 195 were made a note of as amongst those which had defective channels which ought to be dealt with. Dr. Robertson went on to say: "I think the question of surface drainage in a town like Sheffield is one of the things which give rise to the enormous typhoid and diarrhœa mortality we have here. The discharge of sewage into more or less imperfect channels, and its percolation into the ground-soil, constitute the danger."

Institution of Junior Engineers. — Sir Lowthian Bell, Bart., F.R.S., has been elected President of this Institution, in succession to the Hon. G. A. Parsons, the retiring President.

CAPITAL AND LABOUR.

Employment in the Building Trades During September. — The *Labour Gazette* reports that employment in the building trades has remained good in most branches. The percentage of unemployed union members among carpenters and plumbers at the end of the month was 2·1, compared with 1·8 in July and August. The percentage for September, 1899, was 1·3. In London the trades continue well employed in most branches. Returns from 184 branches of eight unions paying unemployed benefit, with a membership of 13,604, show that 217 (or 1·6 per cent.) were unemployed, compared with 1·3 in August, and 0·5 per cent. in September, 1899. The carpenters and joiners, stonemasons and stonecarvers, describe employment as fair; the bricklayers, painters and decorators, and plumbers, as moderate; the plasterers as bad. Five disputes commenced during September, and affected 290 workpeople, directly or indirectly. All the disputes were in England. Only one was in reference to wages. It affected thirty-three plumbers at Stockton-on-Tees, who required an advance from 8½d. to 9½d. per hour. No settlement has been reported. Of the four other disputes, one had reference to an importation of worked stone from alleged lower paid localities; another was a demarcation dispute between bricklayers and stonemasons, followed by a general lock-out; the third was a strike against an introduction of piecework; and the last had reference to cement floors being laid by a concrete worker. With regard to the dispute as to importation of worked stone, it is stated that "men found work elsewhere; shop closed to union men." The dispute affected only twelve workmen. The result of the demarcation dispute was that the work was awarded by the arbitrator to the bricklayers. The dispute was at Barrow-in-Furness. Of the two remaining disputes no settlements are reported.

LEGAL.

A QUESTION OF LIABILITY.

Sitting at the Lambeth Police-court recently Mr. Horace Smith heard a summons taken out by the London County Council against Mr. Frederick Beckwith, of St. Luke's-road, Clapham, as the owner of a house in Hemberton-road, for the recovery of the sum of 2*l.* 5s. 3d., being expenses incurred by the Council in respect of the survey of the premises in question as a "dangerous structure." Mr. Beckwith disputed his liability. Mr. Norman Bevan, from the solicitor's department of the Council, said the house in Hemberton-road belonging to the defendant was certified to be dangerous by the District Surveyor, who ordered the owner to take down a defective ceiling and reinstate a wooden cross-runner carrying the wall above should it have been rotted through the percolation of water from above. The defendant did not carry out the requirements of the notice and the Council issued a summons at this court. Then it appeared that the defendant had repaired the defective plaster, and had barred the bressummer, with the result that it was found that it was not dangerous. Whether the bressummer was dangerous or not was beside the point, because the plaster was dangerous, although the building was not dangerous to the extent expected by the Surveyor. The summons was withdrawn, and now the defendant thought that he ought not to pay the expenses of the Surveyor. The Act, however, was clear on the point, and the fact that the original summons was withdrawn did not preclude the Council from recovering their expenses. In many cases the owner did the necessary work without a summons being issued at all. Mr. Horace Smith said he did not think there was any doubt about the case. Defendant: It was not a dangerous structure to start with. Mr. Horace Smith remarked that it was dangerous to the extent of the plaster, and said he thought the Council were entitled to recover. Defendant: I do not see why they shonld be if it was not dangerous. Mr. Henry Parsons, District Surveyor for the Southern Division of Lambeth and part of Camberwell, said he surveyed the house in question and gave a certificate to the effect that the building was dangerous so far as regards the ceiling, part of which had fallen, and he also suggested, he having seen that there was a great leakage in the ceiling, that the wood oressummer should be reinstated should it be found to be rotten through the percolation of water above. As a matter of fact the bressummer upon examination was found to be perfectly sound.—Defendant: How much plaster do you say was cracked?—Witness: Really I cannot say. The defendant said there were only two yards of plaster.—Mr. Horace Smith made an order requiring the defendant to pay the Council the amount claimed, together with 13s. 6d. costs.

BUILDING PROSECUTION, BURSLEM.

At Tunstall Stipendiary Court, on the 11th inst., the Stipendiary gave judgment in the case of Charles Henry Holmes, builder, of Surrey-road, Crewe, who was summoned for breaches of the by-laws in respect to certain houses defendant was erecting in Newcastle-street, Burslem. There were three offences alleged, namely (1) that walls were not properly bonded, (2) that flues were not properly plastered or pargetted, and (3) that the joists were not placed 4½ in. from the centre of the wall. With regard to the first two, the Stipendiary, who had inspected the houses, said the by-laws had been absolutely broken. There was nothing true in the suggestion for the defence that the angle walls had been bonded; even with the aid of a stick it seemed to him they could be pushed one from the other. Then if the plastering, or pargetting, carried out was proper plastering they might just as well strike out the by-law altogether. With regard to the third offence, the by-law said the joists must be placed 4½ in. from the centre of the wall, but the Corporation allowed defendant to build a 9-in. wall, and if the by-law was insisted upon the joists did not rest on anything. Referring again to the established breaches of the by-laws, the Stipendiary described the work as of the jerriest character he had seen, and disgraceful in any kind of construction. He inflicted a fine of 40s. and costs in each of the two cases, and adjourned the question of a continuing offence to see if the work would be carried out. The Stipendiary asked why the Corporation did not have their by-law with respect to the joists altered, and Mr. Ellis said the Local Government Board would not allow them to alter it. They would not have prosecuted, however, if defendant had not placed the joists end to end, but had placed them alternately.—*Staffordshire Sentinel.*

THE FENCING OF CIRCULAR SAWS.

At the Rochdale Police-court, on the 10th inst., Schofield and Jones, joiners and builders, Duke-street, Rochdale, were charged with neglecting to fence a circular-saw. Mr. Dodgson, Factory Inspector, conducted the prosecution, and stated that on August 30 James Pilling was injured by the defendants' circular-saw, and that his right hand had to be amputated. On July 5 he visited the manufactory in consequence of an accident through an unfenced flywheel, and then he noticed that the saw was still unfenced, and he notified the firm of the defect. On July 13 he saw Mr. Jones and noticed that the saw was still unfenced, and told Mr. Jones that if an accident occurred he should proceed against him for a penalty of 100*l.* On August 30, the accident occurred to James Pilling. On September 14 he saw again that no guard had been provided. Pilling was a married man, with a family, and had only been employed by the firm thirty minutes when the accident occurred. After Pilling had given evidence, Mr. Thompson, who conducted the defence, called John Schofield, a member of the firm, who said, as a practical man, that he never saw a guard used when sawing window-sills. Christopher Jones corroborated this evidence. Herbert Crabb, the foreman, stated that he had worked this machine without a guard for the last four years, and had not had an accident. George Cockrill, manager of Messrs. Grandidge's timber works, stated that they had eight machines, and they were provided with guards, but the workmen would not use them. The magistrates imposed a fine of 5*l.* and costs.—*Manchester Courier.*

CLAIM FOR BUILDING MATERIALS:

DISPUTED LIABILITY.

In the Westminster County-court on Monday, his Honour Judge Lumley Smith, Q.C., and a jury, had before them the case of Bolding & Sons *v.* the Finchley School Board, in which the plaintiffs, a firm of metal and hot water apparatus dealers, carrying on business at Davies-street, Oxford-street, sued the defendant board to recover the sum of 48*l.* in respect of sheet-lead, brass, and hot water fittings supplied to the order of a man named Holloway, in his capacity of director of works.

The defence was that Holloway had no authority to give the orders, and that the plaintiffs knew perfectly well that he had been removed from his position.

Mr. Christopher C. Hart was called and said he was the managing director of the plaintiff company, and was introduced to Holloway by a Mr. Sayers who was the chairman of the Finance Committee of the board, and who told him that he could supply goods to Holloway's order. That took place in 1898, and from that time forward Holloway was looked upon as the accredited agent of the board, but when the present account was sent in they repudiated their liability and refused to pay.

The defence was that prior to the supply of the goods in question the plaintiffs had been instructed not to supply goods to anybody without the authority of the architect. It was further contended that the plaintiffs had made personal application to Holloway for payment, and that he had promised to settle the matter with them, but he committed suicide on the very day upon which he promised payment.

After hearing the whole of the evidence his Honour withdrew the case from the jury, and gave judgment for the defendants, with costs, on the ground that plaintiffs ought to have demanded an officially sealed order from the Board before supplying the goods.

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RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

12,332.—Floors and Pavements: *C. Spighi.*—A grooved or perforated wooden backing-block is secured with hot asphalt or mastic to a wearing-face of fine wood, whose edges project beyond the asphalt; the composite blocks are laid in cement, asphalt, &c., upon boards that are fastened to the joists of the floor, passage, and so on.

12,334.—Extinction of Fire: *W. H. Douglas.*—In order that acid and alkali may be readily mixed the extincteur is inverted, whereupon the acid escapes through the opened valve or cover of its container, and through perforations to the alkali that is admitted through openings between the acid bottle and its supporting flange; in another form vent-holes are cut in the sides of the acid bottle.

12,353.—Electrical Conductor Conduits: *E. Jones and F. A. Pocklington.*—The lengths having a partial pipe-section are closed with lids of tile, and they have either spigot-and-socket joints or butt joints with separate sleeves, an insulating material is filled in, the cables resting upon studs or bridge-pieces; the service boxes are divided with vertical partitions, which serve to keep the wires apart from one another, and chambers are provided around the service and other fittings by means of junction boxes that are set over the conduits.

12,305.—Ball-and-float Valves: *J. H. Harrison.*—A ball valve and a disc valve are arranged within the casing of a ball-and-float valve. One end of the spindle that carries the disc valve engages with the float's arm, whilst its other end raises the ball valve from its seating. A cup that contains a washer forms the disc valve which operates against a removable seat. Nuts that work upon an adjustable spindle hold the bent and free end of the float arm to the ball. The principle of the invention may be rendered applicable to a water tap by screwing the disc valve's spindle and fitting it with a handle.

12,413.—Appliance for Flushing and other Taps: *S. A. Bhise.*—For the automatical closing of a flushing tap, a plug valve, which is joined with hanging rods to the cistern containing a float, is fitted to the passage that joins the service and discharge pipes, the valve remains shut whilst under normal conditions the cistern and float remain at the bottom of the containing chamber, but the flush is started at the rising of the cistern, together with the plug valve, when the working-lever is pressed downwards; a catch upon the pivotted arm that carries the float engages with a projection so that it may sustain the cistern when the latter is lifted, whereupon water will flow into the cistern through a by-pass (which can be regulated) until the rising float frees the catch in order that the cistern's fall may again close the valve. When the cistern sinks to the bottom of the container it discharges its contents through a pipe into the flushing-pipe as a valve is pressed upwards by the contact. The main plug valve may be either after the hinged disc kind or conical in shape, to be turned about its axis with a toothed quadrant-rack. Various modifications of the mechanism are specified.

12,453.—Tile-moulding: *E. Hodgkinson.*—For making ridge, hip, coping, valley, or other angle-tiles the pugged clay is forced through rollers, which consist of segments V-shaped in cross-section that are bolted on to plain rollers, the stream of clay as it is pressed out being cut into lengths with a knife or blade which is set in operation by the mechanism specified in No. 28,168 of 1897. The plain tiles can be shaped in the ordinary manner, or caps, ridges, or rolls can be affixed to the plain angle-tiles. For making ridge tiles that have central ribs a grooved roller is to be employed.

12,458.—Automatical and Intermittent Water-discharge: *J. Murray.*—Though the apparatus more particularly relates to the discharge of sewage filters, it is stated to be applicable for flushing trough closets, drains, &c. Joined to each filter bed are two chambers, one of which communicates through a pipe with the filter, and the other communicates with the former by means of a valve. When the filter has been filled, the liquid passes into the second chamber until a siphon is started so as to start another siphon which discharges the filter, whilst the valve controls the time during which the filter will be full.

12,407.—Cranes: *J. Ruhling.*—Builders' materials are raised by means of a crane, whose base is made fast to the structure with clamps; the crane is made so that its head can be turned around an axis upon the vertical support, and ball bearings may be adopted for the winch's axle.

12,581.—An Odometer: *H. A. L. Chaix.*—A wheel nave or axle turns a chain wheel which operates upon level wheels and a friction disc; a friction wheel imparts motion to the gearing for an index hand, and that wheel is adjustable upon the friction disc's face accordingly with the diameter of the vehicle's wheel. In the register, which may be placed some distance apart, are bellows into which air is forced with an india-rubber ball, which is compressed by the action of a cam rocking a spring cradle; a pawl upon the top of the bellows moves the first wheel of a gear after the "Geneva" kind. In order to set the register at zero, squared spindles, to be turned with a key, are joined rigidly to the dials, and the gear wheels work together through their contact alone.

12,638.—Pipes and Joints for Drains, Sewers, &c.: *H. J. Weaver.*—For joining two main pipes after they have been fixed or laid is contrived an insertion-pipe, which is composed of a pipe, an extended socket pipe fashioned with a slot, and a ring, or making-up piece, which will fit within the slot in the socket pipe, and there are projections upon the insertion and socket parts. The three parts together may be as long as a common pipe, and be made of iron, terra-cotta, &c.

12,640.—Fencing-posts or Standards: *R. S. Moncaster.*—For making hollow standards or posts, the inventor bends sheet-metal strips so that their edges, being left apart, shall form slits; in line with the slits he makes holes in the standards, into which are fitted screw-hooks for the wires, or strands, or wire nettings, the latter being secured with nuts; the slits will also take T-headed bolts, with which earth-plates can be fastened on to the standards.

12,052.—Self-closing and Lift Valves: *J. Hurrell and G. Sturgeon.*—The two parts which constitute the casing of a self-closing water-tap are fastened together and are provided with a washer, which answers the purpose of a seat for a spring-pressed valve; in the screwed plug which serves for the opening of the valve is a hole into which the valve spindle is fitted, or a short upper spindle can be attached to the plug.

12,062.—Butt and Flange Joints: *C. Taylor.*—A jointing for soil and waste pipes is formed between the soil pipe and the leaden pipe that passes from the closet by slipping a flange over the end of the leaden pipe and splaying out its end so as to make a packing washer between the flanges. For the smaller connecting pipes the leaden washer should be soldered on; by these means a jointing may be effected at any angle.

12,663-4.—Kilns for Burning Lime, Cement, &c.: *F. C. Timm.*—In the case of shaft kilns or furnaces the walls are made thin and around them is built up a casing that comprises an entire cylindrical surface consisting of several sections, laid the one above the other, or of separated rings, so that the furnace's walls are sustained by either corrugated plates, half-tubes, whole tubes, or radial wings to be inserted at different places within the casing and outside the built-up sections. For rotary furnaces heated with gaseous fuel, the "baking-on" of goods to the interior is obviated by forming the inner tube of metal without any lining, or with but a thin lining only, and providing for the circulation of air within the annular space between the tube and the outer casing which turns with it. Freedom of expansion is ensured by loosely joining the casing to the tube by means of radial wings that are fastened on to driving and supporting rings, and, after passing through spaces in the casing, engage freely with projections upon the tube; at the ends of the tube and casing are flanges that press against cylindrical projections on the fixed end chambers.

12,690.—A Circular-saw Guard: *R. W. Tayler and J. Tayler.*—An adjustable guard for differently-sized saws consists of a pillar which carries a radial bar. The bar supports two front and back guard-plates which are attached to toothed segments, the back plate being adjusted lengthwise, and the segments are pivotted on to a sliding plate. A sliding-rack provides for the setting of the guard-plates at any angle; another guard-plate, mounted at the end of a lever and held up by a counter weight, is placed beneath the back guard-plate and is pressed down by the wood which drives the lever's end forward, the wood being then returned to its normal position by the action of the balance weight.

12,712.—A Water-waste Preventer: *C. H. Woodhouse, T. W. Woodhouse, and T. W. Cook.*—A bell is kept in its place within a well by means of two projecting lugs that engage with two recesses that are fashioned in the bell's flange. The bell is prevented from touching the bottom of the well with india-rubber buffers set in keyhole-shaped slots. Upon opposite sides of the tank are recesses which take the axle of the rocking lever.

12,792.—An Apparatus for Windows: *H. Beyer.*—Upon the sides of the sliding sash or frame is a rack that will gear with pinions that turn upon rubber tubes mounted upon grooved bosses. The bosses are affixed to squared pins, which pass through the sides of metal boxes in recesses cut in the frame. The sash or frame will be held in any required position by means of the friction set up between the pinions and the tubes. For the tubes may be substituted solid cushions, and within the tubes may be put solid cores or helical springs. Any shaking by the sash in the frame will be obviated by adding pads or shoes of india-rubber to the ends of the sash stiles.

12,836.—Process of Moulding Building Blocks, &c.: *C. Schneider.*—For moulding blocks of fire-proof materials, artificial stone, Dinard or magnesia stone, and for the walls of smelting-furnaces, the mould is formed of a bed which has spring-controlled sides; over the mass is passed a roller with a pressure that increases gradually until all air has been forced out and a high degree of density has been obtained. A moveable mould and a fixed roller can be employed, or the blocks can be drawn between rollers in pairs. The apparatus is also intended for use in the manufacture of electrical-light carbons, carbon anodes for electrolytical processes, and kindred goods.

12,871.—Cements for Building Purposes: *W. Borgolte.*—The cements which are especially intended for taking oil-colours and similar coatings are made by mixing ground limestone and ground clay with small quantities of tar, naphtha, paraffin, coal, fat, sawdust, &c., separately burned without the access of air; the admixture is pulverised, and after the addition of oil, coal, &c., is again similarly burned, when it is broken and ground. For a glazed cement clay-marl and alumina should be incorporated with the compound, together with minerals, either unburned or burned with hydrocarbons.

MEETINGS.

Friday, October 19.

Architectural Association.—Annual Conversazione, King's Hall, Holborn Restaurant. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. H. R. Kenwood on "Elementary Statistics." 8 p.m.

Institution of Mechanical Engineers.—Mr. Bryan Donkin on "An Improved Glass Revealer for Studying Condensation in Steam Engine Cylinders and Rendering the Effects Visible." 8 p.m.

Saturday, October 20.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Leyton Sewage and Destructor Works. 3 p.m.

Architectural Association of Ireland.—Visit to Royal Hospital, Kilmainham.

Tuesday, October 23.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Wright Clarke on "Details of Plumbers' Work." 8 p.m.

Wednesday, October 24.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Wright Clarke on "Sanitary Appliances." 8 p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection and Demonstration in the Parish of St. George's, Hanover-square (number limited). 2 p.m.

Thursday, October 25.

Carpenters' Hall, London Wall (Lectures on Sanitary Building Construction).—Professor R. Elsey Smith, A.R.I.B.A., on "The Drainage of a Dwelling House." 7.30 p.m.

Friday, October 26.

Architectural Association.—Mr. Francis Bond, M.A., on "French and English Cathedrals." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. H. D. Searles Wood on "Building Materials." 8 p.m.

Institution of Junior Engineers.—Annual General Meeting at Westminster Palace Hotel. 8 p.m.

Saturday, October 27.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection and Demonstration at Aylesbury Dairy Company's premises, St. Petersburgh-place, Bayswater. 3 p.m.

Institution of Junior Engineers.—Visit to Millbank Station of London Hydraulic Power Company. 3 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 3.—By Cheatle & Hall (at Longdon).

Longdon, Staffs.—A copyhold farm, 122a. 0r. 29p.	£760
Five cottages, blacksmith's shop, and plot of garden land, c.	556
The Meeting House Field, 4a. 1r. 27p., f.	405

October 4.—By Newbon, Edwards, & Shephard.

Islington.—23, Gibson-sq., u.t. 26 yrs., g.r. 9l., r. 48l.	365
Barnsbury.—47, Crossley-st., u.t. 50 yrs., g.r. 6l. 10s., r. 38l.	370
Holloway.—14, Freegrove-rd., u.t. 56 yrs., g.r. 6l. r. 42l.	550
38, Grove-rd., u.t. 48 yrs., g.r. 8l., r. 40l.	335
29, Beversbrook-rd., u.t. 67 yrs., g.r. 7l., e.r. 48l.	535
15, Alexander-rd., u.t. 57 yrs., g.r. 6l., r. 36l.	370
8, Landseer-rd., u.t. 57 yrs., g.r. 6l., r. 38l.	400

By Wm. Stevens.

St. Pancras.—11, Woburn-bldgs., u.t. 18 yrs., g.r. 10s., r. 50l.	405
Clapton.—74, Nightingale-rd., f.	970
2, Atherden-rd., u.t. 87½ yrs., g.r. 5l. 5s.	210

By C. C. & T. Moore.

Whitechapel.—Valiance-rd., the Royal George b.-h., a freehold rental of 45l., reversion in 49½ yrs.	1,150
Spitalfields.—115, Buxton-st., and the Crown and Anchor p.-h., area 1,750 ft., f., r. 60l.	1,620
Mile End.—46 and 48, Rutland-st., u.t. 6½ yrs., g.r. 5l.	140
15, 17, and 19, Ewing-st., u.t. 75 yrs., g.r. 15l. 15s.	750
Bromley-by-Bow.—85 and 87, Marner-st., u.t. 26 yrs., g.r. 5l. 7s.	130
Limehouse. 15 to 21 (odd), Eastfield-st., f.	800
139, Eastfield-st., f.	200
66 and 68, Carr-st., f.	300
Bethnal Green.—164 to 170 (even), Globe-rd., u.t. 19½ yrs., g.r. 8l. 8s.	500
Bethnal Green.—224 and 226, Green-st.; 1, 2, and 3, Violet-row; and 75 and 77, Moss-st.; u.t. 26 yrs., g.r. 17l. 10s.	800
Highbury.—Ellwood-st., &c., f.g.r. 22l., reversion in 8½ yrs.	2,150
Hoxton.—28, St. John's-rd., f., r. 55l.	870
1 and 3, Myrtle-st., f., r. 66l.	970
18 and 20, Myrtle-st., f. r. 60l.	900
Kingsland.—18 and 20, Philip-st., f.	790
Hackney.—11, Grove-passage, c., r. 35l.	620
Mile End.—15 and 17, Essex-st., f.	570
70, Skidmore-st., f.	350
Bow.—29 and 37, British-st., f.	840
59, British-st., f.	450
Mile End.—Moody-st., a plot of land, area 1,170 ft., f.	180
Old Ford.—74, 76, and 78, Usher-rd., f.	750
Bromley-by-Bow.—27 to 39 (odd), Box-st., f.	1,080

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[October 5.—By HARDS & BRADLY.
Greenwich.—Blackwall-lane (near), a plot of riverside land, 1 a. 1 r. 31 p., f. £4,500
43 and 44, Claremont-st., f. 445
59, Dutton-st., u.t. 40½ yrs., g.r. 3l. 260
By JONES, LANG, & CO.
Wimbledon.—Tabor-grove, f.g.r. 21l., reversion in 67 yrs. 555
By VINCENT S. LEIGH.
Hackney.—285, Victoria Park-rd., u.t. 44 yrs., g.r. 5l., r. 36l. 360
72, Cassland-rd., u.t. 54½ yrs., g.r. 6l. 6s., r. 46l. 380
West Ham.—88, Caistor Park-rd., u.t. 79 yrs., g.r. 6l. 375
22, 24, 25, and 27, Caistor Park-rd., u.t. 79 yrs., g.r. 20l. 870
By VICTOR VAUGHAN.
Beckenham.—Rectory-rd., Mayfield, u.t. 63½ yrs., g.r. 20l., e.r. 120l. 1,200
Kilburn.—Dunster-gardens, f.g.r. 7l., reversion in 86 yrs. 195
By C. C. & T. MOORE.
Bethnal Green.—227, 231, and 233, Globe-rd., and 94, 96, and 98, James-st., f., also f.g.r. 5l., reversion in 44 yrs. 260
224, 226, and 232, Globe-rd., f. 1,613
15, Digby-st. and 2, Digby-walk, f. 330
7, 9, 11, and 13, Digby-st. and 1, Digby-walk, f. 950
252, Globe-rd., f., e.r. 50l. 725
1, North-passage and 1, North-pl., f. 395
4, Bullard's-pl., f. 370
3, Sydney-st., f. 670
3 and 5, Norton-st., f. 500
1 and 3, Moss-st., with yard and stabling, f. 750
46, Green-st., f., r. 42l. 855
111 and 146, Green-st., r. 100l. 1,715
203 and 205, Green-st., f., r. 110l. 2,270
15, Winchester-st., f. 275
34 and 36, Camden-st., f. 475
12, Patriot-sq., f. 520
257, Cambridge-rd., f., r. 36l. 650
Mile End.—4 and 5, Allas-rd., f. 825
25, 31, and 33, Portman-pl., f. 1,030
By CHEATLE & HALL (at Lichfield).
Burntwood, Staffs.—Marling's Farm, 65 a. 2 r. 20 p., f. and c. 930
Fulfin or Bank Farm, 106 a. 3 r. 34 p., f. 2,750
Enclosures of land, 32 a. 1 r. 24 p., f. 970
Lichfield, Staffs.—20, Greenhill, f. 170
October 8.—By BROWETT & TAYLOR.
Islington.—225, Essex-rd., u.t. 18 yrs., g.r. 6l., e.r. 48l. 250
By DAVID J. CHATTELL.
Chislehurst Common, Kent.—Green-lane, Mead House, and 2 a. 1 r. 30 p., f. 2,160
By ELLIOTT, SON, & BOYTON.
Marylebone.—3, Devonshire-ter., u.t. 9¾ yrs., g.r. 40l., e.r. 180l. 480
By PYKE & PYKE.
Bloomsbury.—109, Great Russell-st., beneficial lease for 15¼ yrs., r. 90l. 250
October 9.—By H. J. BROMLEY.
Forest Hill.—Dartmouth-rd., Belvidere House, and 2¼ acres, u.t. 51 yrs., g.r. 20l. 2,500
Penge.—5, 6, 7, 8, and 9, Railway View, u.t. 68 yrs., g.r. 17l. 10s. 400
By E. H. HENRY.
Fulham.—1, Hildyard-rd., u.t. 75 yrs., g.r. 9l., e.r. 45l. 310
By WESTON & SONS.
Brixton.—27, Canterbury-rd., u.t. 61 yrs., g.r. 5l. 10s., e.r. 30l. 500
By T. G. WHARTON.
Fulham.—Rowallan-rd., f.g.r. 67l., reversion in 97 yrs. 1,705
Mablethorpe-rd., f.g.r. 133l. 10s., reversion in 97 yrs. 3,440
Lambrook-ter., f.g.r. 336l. u.t. 94 yrs, g.r. 56l. 10s. 6,000

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 16 0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 12 0	,,	,, ,,
Smooth Bright Facing Stocks..	2 18 0	,,	,, ,,
Shippers	2 8 0	,,	,, ,,
Flettons.....	1 10 0	,,	,, ,,
Red Wire Cuts ..	1 15 0	,,	at railway depôt.
Best Fareham Red	3 12 6	,,	,, ,,
Best Red pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,, ,,
Do., Bullnose	4 12 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 6	,,	,, ,,
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,

PRICES CURRENT (*Continued*).

	£ s. d.		
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	per 1,000,	at railway depôt.
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.		
Thames and Pit Sand	8 0	per yard,	delivered.
Thames Ballast	6 9	,,	,,
Best Portland Cement	37 6	per ton	,,
Best Ground Blue Lias Lime..	24 0	,,	,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d.	per yard,	delivered.
Stourbridge Fire-clay in sacks,	32s. 6d.	per ton at rly. dpt.	

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube,	deld. rly. depôt
Bath ,, ...	1 7	,,	,,
Farleigh Down Bath ..	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,, ...	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale ,,	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York ,,	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super. at rly. depôt.	
,, ,, 6 in. Rubbed Ditto..	2 10½	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 3 in. self-faced Ditto	0 9	,,	,,

SLATES.

in. in.	£ s. d.		
20 × 10 best blue Bangor..	11 5 0	per 1000 of 1200 at ry. dep.	
,, best seconds ,,	10 15 0	,,	,,
16 × 8 best ,,	6 8 6	,,	,,
20 × 10 best blue Portmadoc ..	10 18 0	,,	,,
16 × 8 best blue Portmadoc	6 0 0	,,	,,
20 × 10 best Eureka unfading green.....	11 2 6	,,	,,
16 × 8 ,, ,,	6 15 0	,,	,,
20 × 10 Permanent green	10 0 0	,,	,,
16 × 8 ,, ,,	5 12 6	,,	,,

TILES.

	s. d.		
Best plain red roofing tiles..	41 6	per 1,000 at rly. depôt.	
Hip and valley tiles....	3 7	per doz.	
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles....	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles.....	4 0	per doz.	,, ,,
Valley tiles.....	3 9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes).	50 9	per 1,000	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles.....	3 8	,,	,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.	
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0	
Deals: best 3 by 9	14 10 0	15 10 0	
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0	
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.	
Deals: seconds	1 0 0	less than best	
Battens: seconds.....	0 10 0	,, ,,	,,

	At per load of 50 ft.		
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0	
Seconds	4 5 0	4 10 0	
Small timber (8 in. to 10 in.)	3 12 6	3 15 0	
Swedish balks.....	2 15 0	3 0 0	
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0	

JOINERS' WOOD.

White Sea:	At per standard.		
First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0	
3 in. by 9 in.	24 0 0	25 0 0	
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0	
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0	
,, ,, 3 in. by 9 in.	20 0 0	21 0 0	
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0	
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0	
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0	
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0	
Do. 3 in. by 9 in.	22 0 0	23 0 0	
Battens.....	16 10 0	17 10 0	
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0	
Do. 3 in. by 9 in.	17 0 0	18 0 0	
Battens.....	14 0 0	14 10 0	
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0	
Do. 3 in. by 9 in.	14 0 0	14 10 0	
Battens.....	12 10 0	13 10 0	
White Sea and Petersburg:—			
First white deals, 3 in. by 11 in..	15 10 0	16 10 0	
,, ,, ,, 3 in. by 9 in. ..	14 0 0	15 0 0	
Battens.....	12 10 0	13 10 0	
Second white deals 3 in. by 11 in.	14 0 0	15 0 0	
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0	
,, ,, battens	11 0 0	12 0 0	
Pitch pine: deals	16 0 0	18 0 0	
Under 2 in. thick extra	0 10 0	1 0 0	

PRICES CURRENT (*Continued*).

	At per standard. £ s. d.	£ s. d.	
Yellow Pine—			
First, regular sizes	30 0 0	33 0 0	
Broads (12 in. and up)	2 0 0	more.	
Oddments	22 0 0	24 0 0	
Seconds, regular sizes	24 10 0	26 10 0	
Yellow Pine Oddments	20 0 0	22 0 0	
Kauri Pine—			
Planks, per ft. cube	0 3 6	0 4 6	
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 2 6	0 2 8	
Small ,, ,, ...	0 2 4	0 2 -	
Wainscot Oak Logs, per ft. cube ..	0 5 0	- - -	
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 -	
¾ in. do. do.	0 0 7	- - -	
Dry Mahogany—			
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11	
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0	
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0	
Teak, per load	16 0 0	20 0 0	
American Whitewood Planks—			
Per ft. cube.....	0 2 3	0 3 0	

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6
Compound Girders ,, ,,	12 5 0	13 10 0
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	11 7 6	12 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.	
IRON.—			
Common Bars.....	10 0 0	10 10 0	
Staffordshire Crown Bars, good merchant quality	10 15 0	11 5 0	
Staffordshire "Marked Bars" ..	13 5 0	- - -	
Hoop Iron, basis price.....	11 0 0	11 10 0	
,, ,, galvanised	17 0 0	- - -	
(* And upwards, according to size and gauge.)			
Sheet Iron, Black.—			
Ordinary sizes to 20 g.....	11 5 0	- - -	
,, ,, to 24 g.....	12 10 0	- - -	
,, ,, to 26 g.....	13 10 0	- - -	
Sheet Iron, Galvanised, flat, ordinary quality.—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14 15 0	- - -	
,, ,, 22 g. and 24 g.	15 5 0	- - -	
,, ,, 26 g.....	16 15 0	- - -	
Sheet Iron, galvanised, flat, best quality.—			
Ordinary sizes to 20 g.....	18 0 0	- - -	
,, ,, 22 g. and 24 g.	18 10 0	- - -	
,, ,, 26 g.....	20 0 0	- - -	
Galvanised Corrugated Sheets.—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 15 0	14 10 0	
,, ,, 22 g. and 24 g.	14 10 0	15 10 0	
Cut nails, 3 in. to 6 in.....	11 10 0	- - -	
(Under 3 in. usual trade extras.)			
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -	
Pipe in coils	20 17 6	- - -	
Soil Pipe..	23 17 6	- - -	
ZINC—Sheet—			
Vieille Montagne ..... ton	28 0 0	- - 6	
Silesian.....	27 10 0	- - -	
COPPER—			
Strong Sheet..... per lb.	0 1 1	- - -	
Thin ..... ,,	0 1 1	- - -	
Copper nails ..... ,,	0 1 3	- - -	
BRASS—			
Strong Sheet..... ,,	0 1 3	- - -	
Thin ,, ... ,,	0 0 11	- - -	
TIN—English Ingots ..... ,,	0 1 1	- - -	
SOLDER—Plumbers' ..... ,,	0 1 6	- - -	
Tinmen's ..... ,,	0 0 8	- - -	
Blowpipe ..... ,,	0 0 10	- - -	
	0 1 0	- - -	

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft. delivered.
,, fourths	2¾d.	,, ,,
21 oz. thirds	3¼d.	,, ,,
,, ,, fourths.....	3½d.	,, ,,
26 oz. thirds	4d.	,, ,,
,, ,, fourths	4¼d.	,, ,,
32 oz. thirds	4¾d.	,, ,,
,, ,, fourths	5d.	,, ,,
Fluted sheet, 15 oz.	3½d.	,, ,,
,, ,, 21 ,, ...	4¼d.	,, ,,
½ Hartley's Rolled Plate.....	3d.	,, ,,
⅓ ,, ,, ,, ...	3½d.	,, ,,
¼ ,, ,, ,, ...	4d.	,, ,,

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes	per gallon	0 3 1
,, ,, ,, in barrels	,,	0 3 2
,, ,, ,, in drums	,,	0 3 4
Boiled ,, ,, in pipes.....	,,	0 3 4
,, ,, ,, in barrels	,,	0 3 5
,, ,, ,, in drums	,,	0 3 7
Turpentine, in barrels	,,	0 2 7
,, in drums.....	,,	0 2 9
Genuine Ground English White Lead ...	per ton	27 10 0
Red Lead, Dry.....	,,	25 0 0
Best Linseed Oil Putty.....	per cwt.	0 9 6
Stockholm Tar	per barrel	1 8 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish or outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work.....	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0

[*See also next page.*

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COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Bridge	Newcastle-on-Tyne Corporation	Not stated	Nov. 15
Parade Extension	Bridlington Corporation	35 guineas and 15 guineas	Dec. 1

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Road Making, &c.	Willesden District Council	Engineer, Public Offices, Dyne-road, Kilburn, N.W.	Oct. 22
Offices, &c., Old Oak Common, near Acton	Great Western Railway Company	G. K. Mills, Paddington Station, W.	do.
Villa, Cwmla-road, Neath		J. C. Rees, Architect, Neath	do.
Building Work, Chapel-street	Stratford-on-Avon Corporation	R. Dixon, Civil Engineer, Municipal Offices	do.
Engine House Works, Dockfield	Shipley (Yorks.) U.D.C.	S. Jackson & Son, Architects, Tanfield Chambers, Bradford	do.
Road Works	Uttoxeter (Staffs.) R.D.C.	J. Preston, Surveyor, Woodlands, Uttoxeter	do.
Works at Workhouse	Leeds Guardians	J. C. Ford, Poor Law Offices, East Parade, Leeds	do.
*Alterations to Drains	Woolwich Guardians	Union House, Woolwich	Oct. 24
Road Works, Hemdean-rise	Caversham U.D.C.	S. P. Andrews, Surveyor, 22, Prospect-street, Caversham	do.
Rebuilding Black Swan Inn, Stockingford	Messrs. Atkinson's Brewery, Ltd.	H. W. Chattaway, Architect, Trinity Churchyard, Coventry	do.
Nurses' Home	Stoke-on-Trent Guardians	C. Lynam, Architect, Stoke-on-Trent	do.
Road Widening, Bailey Hall	Halifax Corporation	J. Lord, Borough Engineer, Town Hall	do.
Boundary Walls, &c., West Didsbury	Withington U.D.C.	J. Cartwright, Civil Engineer, Market-place, Bury	do.
Road Works, &c.	Renfrew Parish Council	P. Kerr, Civil Engineer, Johnstone, N.B.	do.
Library, Cathays, Cardiff		Jones & Co., Architects, 18, St. Mary-street, Cardiff	do.
Engine House, &c., Catshill, near Bromsgrove	East Worcestershire Water Co.	E. B. Marten, Engineer, Church-street Chambers, Stourbridge	do.
Rebuilding Fishburn Bridge	Durham County Council	W. Crozier, Civil Engineer, Shire Hall, Durham	do.
Cottage, Leslie Wynd, Elgin, N.B.		Reid & Wittet, Architects, Elgin	do.
Electricity Station, Bloom-street	Manchester Corporation	F. E. Hughes, Town Hall	do.
Inn, York-road, Fisherton, Salisbury	Messrs. J. Folliott & Sons	J. Harding & Son, Architects, Salisbury	do.
Alterations to Business Premises, Leeds	Mr. F. Davis	H. Walker, Architect, 8, Upper Fountaine-street, Leeds	do.
Alterations to Police Station, Merthyr	Glamorgan County Council	T. M. Franklen, Westgate-street, Cardiff	do.
*Old Materials	Camberwell Guardians	Clerk, Guardians' Offices, 29, Peckham-road, S.E.	do.
*Pipes	Bombay Corporation	J. Taylor, Sons & Santo Crimp, 27, Great George-street, S.W.	Oct. 25
Brick Culvert	Walker, Northumberland, U.D.C.	T. M. Sturgess, 5, St. Nicholas-buildings, Newcastle	do.
Building Eight Houses, Ardsley, Yorks.		Jones Brothers, Builders, Stairfoot, York	do.
Alterations to No. 1 Wood-street, Stratford-on-Avon		A. Lacey, 1, Wood-street, Stratford-on-Avon	do.
Additions to Schools, Loxton-street	Birmingham School Board	Martin & Martin, Architects, 106, Colmore-row, Birmingham	Oct. 26
Additions to Schools, Gem-street	do.	do.	do.
*Granite, &c.	Bexhill U.D.C.		do.
*Hospital	Fylde, Preston, &c. Jt. Hos. Com.	See Advertisement	do.
School	Avington (Hants.) School Board	Colson, Farrow, & Nisbett, Archts., 45, Jewry-street, Winchester	Oct. 27
Street Works	Swindon U.D.C.	H. J. Hamp, Surveyor, Regent Circus, Swindon	do.
Engine House, &c., at Gasworks	Kendal Corporation	T. N. Ritson, Civil Engineer, Parkside, Kendal	Oct. 29
Road Works, Ovenden-road	Halifax Corporation	J. Lord, Borough Engineer, Town Hall	do.
Refuse Destructor	Partick (N.B.) Commissioners	Burgh Surveyor, 17, Peel-street, Partick	do.
*Alterations to School Buildings	Waltham Holy Cross Sch. Bd.	Clerk, School Board Offices, Waltham Abbey	do.
Road Works, Bake-lane, Clifton	Barton-upon-Irwell R.D.C.	C. C. Hooley, Civil Engineer, Union Offices, Patricroft	Oct. 30
Nurses' Home, Wednesbury-road, Walsall	Committee	Bailey & McConnal, Architects, Bridge-street, Walsall	do.
Laying, &c., C.I. Main	Clevedon (Somerset) Water Co.	J. Mansergh, Engineer, 5, Victoria-street, Westminster	do.
Business Premises, Swadford-street, Skipton	Mr. A. R. Stockdale	J. Hartley, Architect, Exchange Buildings, Skipton	do.
*Fencing	Hackney Vestry	Surveyor, Town Hall, Hackney, N.E.	do.
Offices, Dock-street, Middlesbrough	N. E. Railway Company	W. Bell, Architect, York	Oct. 31
Passage Works, Towcester-street, &c.	Litherland (Lancs) U.D.C.	W. B. Garton, Surveyor, 25, Sefton-road, Litherland	do.
*Fencing	Wanstead U.D.C.	Surveyor's Department, Council Offices, Wanstead	Nov. 1
Institute and Hall, Nantymoel		Jacob Rees, Architect, Pentre	Nov. 2
Sewers, &c.	Northwich R.D.C.	H. Bancroft & Son, Civil Engineers, 88, Mosley-st., Manchester	Nov. 8
*Filter Bed	Petersfield U.D.C.	Surveyor, Council Offices, High-street, Petersfield	Nov. 14
Kerbing, &c., St. George's-road and others	Barnsley Town Council	J. H. Taylor, Civil Engineer, Town Hall, Barnsley	do.
House, Crosshaven, N.B.	Mr. E. Baxter	A. Hill, Architect, 21, George's-street, Cork	No date
Houses, East Burnside, Cupar, Fife		H. Bruce, County Buildings, Cupar, Fife	do.
Four Houses, Stanley-road, Wakefield		W. Wrigley, Architect, 6, Westgate, Wakefield	do.
Road Works, &c., Byfleet, Surrey		F. S. S. Taylor, Architect, 5, John-street, Bedford-row, W.C.	do.
Granite (2,000 tons)		C. & A. Musker, Limited, Tuebrook, Liverpool	do.
Rebuilding Moot Hall, Wheelergate, Nottingham		A. R. Calvert, Architect, Low Pavement, Nottingham	do.
Repairs, &c., to Church, Elberton, near Bristol		A. C. Jones, The Court, Elberton	do.
Mission Room, East Common, Selby		Garside & Pennington, Architects, Pontefract	do.
Additions to Business Premises, Carlton-st. Castleford	Mr. C. Farber	do.	do.
Chimney at Brewery, Woodlesford, near Leeds	Messrs. Bentley's, Limited	E. W. Higgins, Architect, Messrs. Bentley's Brewery, Woodlesford	do.
Two Cottages, Claverham, Yalton		C. A. Rowley, Architect, 38, College Green, Bristol	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Liverpool Vestry	3 guineas per week	Oct. 25
*Junior General Assistant and Tracing Assistant	Wallasey U.D.C.	85*l.* and 78*l.* per annum	do.
*Assistant Draughtsman	Metropolitan Asylums Board	2*l.* 2*s.* per week	Oct. 26
*Clerk of Works	Croydon County Council	3*l.* 10*s.* per week	Oct. 29
*City Architect	Bradford Corporation	400*l.* per annum	Oct. 31
*Clerk of Works	East Ham U.D.C.	4*l.* 4*s.* per week	Nov. 3

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv. vi. viii. x. & xxi. *Public Appointments, pp.* xviii. xix. & xxi.

PRICES CURRENT (*Continued*).

VARNISHES, &c.

	per gallon. £ s. d
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

J. J. B. & Son.—A. H. (Amounts should have been stated.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

ALCESTER.—For rebuilding business premises, Evesham-street, for the Alcester Co-operative Industrial Society, Limited. Mr. J. W. Adams, architect, Hay Mills, Birmingham:—

Huxley Bros., Astwood Bank, Redditch* £2,097

BRIDLINGTON QUAY (Yorks.).—For the erection of a house, St. John's-avenue, for Mr. A. Jennison. Mr. J. Earnshaw, architect, Wellington-road, Bridlington Quay:—

J. Rennard	£456 0 0	Barr & Booth	£349 3 0
G. Walkington	439 14 0	Smallwood & Shaw	337 3 6
E. Corner	439 0 0	A. Gardam	333 0 0
C. Simon	398 0 0	T. Spink, Bridlington*	301 11 0
T. Atkin	379 9 0		
W. Barnes	378 0 0		

DERBY.—For the reconstruction of Crossley and Beighton-streets, for the Ripley Urban District Council. Mr. R. Argile, surveyor, Oxford-street, Ripley. Quantities by the surveyor:—

Beighton-street.

John Coupe, Ripley, Derby	£136 11 4½
S. Richmond & Co., New Lenton, near Nottingham*	123 3 8

Crossley-street.

S. Richmond & Co., New Lenton, near Nottingham	154 3 6
John Coupe, Ripley, Derby*	149 17 8

HERTFORD.—For the erection of a fire station house, stables, &c., Mill road, for the Corporation. Mr. J. H. Jevons, C.E., Town Hall, Hertford:—

Stims & Co.	£2,000 0 0	Norris & Son	£1,855 0 0
Laurance & Son	1,994 0 0	E. R. Kemp	
E. West	1,935 0 0	Hertford*	1,839 12 8

[Engineer's estimate, £1,850.]

HINDLEY (Lancs.).—For reconstructing a stone culvert, Swan-lane, for the Urban District Council. Mr. A. Holden, C.E., Council Offices, Hindley:—

W. Winnard	£249 16 6	H. & F. Lomax, Hindley*	£170 0 0
Jno. Dickinson	230 0 0		
W. McKenzie	200 0 0		

KIRKCALDY.—For new class rooms and cookery room at Dysart North Public School, for the Dysart Burgh School Board. D. Forbes Smith, architect, Kirkcaldy. Quantities by the architect:—

Masonry.—Balfour Bros., Rosabelle-street, Sinclairtown*	£896 0 0
Joinery.—Geo. Hay & Son, Relief-street, Dysart*	472 10 0
Plastering.—A. Hutchison, Aitken-street, Sinclairtown*	142 19 6
Slating.—D. Stark, Whytehouse Mansions, Kirkcaldy*	79 10 0
Plumbing.—James Crombie, Windmill-road, Gallatown*	241 18 11½
	£1,832 18 5½

LIMERICK.—For the erection of an electric generating station, Frederick-street, for the Town Council. Mr. J. J. Peacocke, surveyor, Town Hall, Limerick:—

Gough, Colooney-street, Limerick	£3,925
Bourke, Carr-street, Limerick	2,650

LONDON.—For additions, &c., to public library, Duke's-avenue, for the Chiswick Urban District Council. Mr. Arthur Ramsden, surveyor, Sutton Court-road, Chiswick. Quantities by Messrs. Morris Evans & Son, John-street, Adelphi, W.C.:—

Vigor	£1,450 0 0	Heath	£961 13 9
Gibson	1,250 0 0	Somerford & Sons	959 0 0
Foster Bros.	1,233 0 0	E. Wall, Wandsworth	906 0 0
Whitman	1,129 0 0		
Wisdom	1,060 0 0		
Heeps	1,013 0 0		

LONDON.—For the erection of licensed premises, stores, stables, &c., on site of old Crown Brewery, Loampit Vale, Lewisham, for Messrs. Thorne Bros. Messrs. Douglas Young & Co., architects, 51, Coleman-street. Quantities by Mr. Frederick G. Fletcher, 61, Chancery-lane:—

		Extra for Jarrah Wood in lieu of Staffordshire Paving.	Two Extra Shops.
H. Groves	£3,979	£56 16	£1,304
W. Rowe	3,935	40 0	1,292
F. & H. F. Higgs	3,830	30 0	1,240
Turtle & Appleton	3,760	30 0	1,235
G. Parker	3,745	50 0	1,249
Marsland & Sons	3,675	48 0	1,195
Matthews Bros.	3,563	49 0	1,147
Holliday & Greenwood	3,497	51 0	1,115
Foster Bros.	3,478	9 0	1,294
Jerrard & Sons	3,373	47 0	1,063
H. Line‡	3,126	64 0	1,050

‡ Accepted omitting two extra shops.

LONDONDERRY.—For additions, &c., to nurses' rooms, workhouse infirmary, for the Guardians. Mr. M. A. Robinson, C.E., Richmond-street, Londonderry:—Robert Colhoun, Strand-road, Londonderry £350

ERITH (Kent).—For the erection of forty-eight cottages, Brook-street, Belvedere, and a lodge at the recreation ground, for the Urban District Council. Mr. Harold Hind, Surveyor, Erith Urban District Council:—

—	Twenty-four Cottages, Class A, Containing Six Rooms. With Stock Bricks.	Twenty-four Cottages, Class B, Containing Five Rooms. With Stock Bricks.	Twenty-four Cottages, Class A, Containing Six Rooms. With Place Bricks in Internal Walls.	Twenty-four Cottages, Class B, Containing Five Rooms. With Place Bricks in Internal Walls.	Superintendent's Lodge.
Martin, Wells, & Co.	£10,250	£9,250	£10,200	£9,225	£750 0
Frank Parsons	9,390	8,790	9,150	8,550	575 0
Gunning & Son	7,200	6,600	7,080	6,480	420 0
O. H. Evans	6,984	6,600	6,840	6,456	—
Enness Bros.	6,576	6,024	6,420	5,868	485 0
H. J. Evans	6,390	5,790	6,200	5,622	—
W. Richardson & E. Woodley, S. Wimbledon*	6,000	5,040	5,760†	4,830†	300 0†
J. T. Jarvis	—	—	—	—	408 0
G. Wyman	—	—	—	—	398 15
Spencer & Son	—	—	—	—	394 10

REDRUTH.—For alterations, &c., to East-end schools for the School Board. Mr. Sampson Hill, architect, Green-lane, Redruth:—

John Odgers, Redruth £1,210

RIPLEY, DERBY.—For laying, &c., 1,120 yards sewers, &c., for the Urban District Council. Mr. Robert Argile, C.E., Public Offices, Ripley. Quantities by the surveyor:—

Jno. Coupe, Ripley, Derby	£613 13 7
S. Richmond & Co., New Lenton, near Nottingham*	589 0 0

SHREWSBURY.—For the erection of residence for Mr. Frank Plimley. Messrs. Dalgleish & Dickens-Lewis, architects, Shrewsbury. Quantities by the architects:—

Building.

Price & Sons	£865	Wm. Pace	£720
Walter Richards	797	Thos. Pace*	690
Farmer & Sons	731		

Plumbing.

Scull Bros.	£113 6 10	Morris & Co.*	£107 0 0
Marston & Co.	109 17 0		

[All of Shrewsbury.]

SOUTHAMPTON.—For new schools at Shirley, for the Southampton School Board to accommodate 1,500 children. Mr. John H. Blizard (Messrs. Lemon & Blizard), Southampton, Surveyor to the Board. Quantities by the Surveyor:—

Rashleigh & Sons	£19,810	Jenkins & Sons*	£19,467
Stevens & Co.	19,720	Architect's Estimate	19,776
Goulding & Ansell	19,500		

[All of Southampton.]

SURBITON.—For the erection of store-rooms, entrance gates, &c., Alpha-road, for the Urban District Council. Mr. Samuel Mather, surveyor, Ewell-road, Surbiton:—

J. Hill	£1,130 16	Sease & Son	£810 0
J. H. Jarvis	1,095 0	J. Allwork	765 0
B. Cropley	875 0	McDonald & Sons, Surbiton*	688 0
J. B. Tomkinson	855 0	G. King‡	579 0
Highy & Ralson	815 0		

‡ Withdrawn.

[Surveyor's Estimate £684.]

TUNBRIDGE WELLS.—For the erection of chimney shaft, &c., 180 ft. in height, for the Corporation. Mr. W. H. Maxwell, A.M.Inst.C.E., Town Hall, Tunbridge Wells:—

Foster Bros.	£6,495 0 0	R. B. H. Neal	£4,713 0 0
Tinkers, Ltd.	5,126 3 8	Myles & Warner	4,385 5 10
Anderson & Co.	4,928 9 4	J. Jenkins, Swansea*	3,835 2 4
Wilson Bros.	4,789 0 0		

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect:—

* *Denotes accepted.*
‡ *Recommended for acceptance.*

BRUNSWICK-ROAD.—Adapting building for a day industrial school for 150 children:—

T. L. Green	£5,467	Stevens Bros.	£4,628
Glover & Son	4,764	Lawrance & Sons	4,562
Wall & Co.	4,725	F. & F. J. Wood‡	4,489

HANBURY-STREET.—New school—boys, 274; girls, 274; infants, 274; total, 822. Graded school on three stories with boys' and infants' covered playgrounds, &c., under school, and girls' playground on top of building. Halls—boys', 50 ft. 9 in. by 30 ft. 4½ in.; girls', 50 ft. 9 in. by 30 ft. 4½ in.; infants', 50 ft. 9 in. by 30 ft. Classrooms—boys', 50, 56, 56, 56, 56; girls', 50, 56, 56, 56, 56; infants', 50, 56, 56, 56, 56. Drawing classroom, 1,009 sq. ft.; heating and ventilation by propulsion system; area of site, about 21,295 sq. ft. Playgrounds, area per child—boys', 23 sq. ft.; girls', 14 sq. ft. (on top of building); infants', 28 sq. ft. Schoolkeeper's house:—

		A.
Leslie & Co., Limited	£27,275	+ £347
T. L. Green	26,415	—
J. Longley & Co.	26,390	+ 350
Clarke & Bracey	25,990	+ 380
Treasure & Son	25,865	+ 244
Kirk & Randall	25,761	+ 365
Perry & Co.	25,697	+ 430
F. & F. J. Wood	25,656	+ 400
J. Grover & Son	25,421	+ 363
C. Cox	25,401	+ 360
E. Lawrance & Sons*	25,267	+ 310
Miskin & Sons	24,264	+ 300

A. If walls of classrooms and halls are plastered *add*.

HITHER GREEN—Industrial and Truant Schools, Catford.—Industrial School—Accommodation, 150 boys. Ground floor—Three classrooms, two workshops, reading-room, playroom, needlework-room, dining-room, lavatory, bath and dressing-rooms, general administrative offices, including residence for Governor and staff. First floor—Four dormitories, water-closets, and lavatories and storerooms, and cubicles for older boys. Second floor—accommodation for female staff. Buildings common to both institutions—manual training-room, 70 ft. by 22 ft.; swimming-bath, 70 ft. by 32 ft.; gymnasium, 48 ft. 6 in. by 24 ft., with dressing-rooms, bandroom 24 ft. by 18 ft., bakery, large and small washhouse and ditto laundry, boiler-house, and coal store. Infirmary building—Receiving ward (one bed), two sick wards (six beds each), day and nightrooms for nurse, dispensary, and clothes store, &c. Out-buildings—Two drill sheds, 80 ft. by 20 ft. each, and band stand:—

Martin, Wells, & Co.	£96,752	E. Lawrance & Sons	£86,534
Leslie & Co., Ltd.	95,691	Treasure & Son	85,626
W. J. Mitchell & Son	95,270	Holliday & Greenwood	84,777
Spencer, Santo, & Co., Ltd.	89,980	W. H. Lorden & Son	84,444
McCormick & Sons	89,853	C. Miskin & Sons	83,448
Killby & Gayford	89,096	F. & H. F. Higgs	83,322
S. Hart	88,186	G. E. Wallis & Sons	83,273
J. Grover & Son	87,989	J. & M. Patrick	81,990
Kirk & Randall	87,902	J. Garrett & Son	81,472
Stimpson & Co.	87,472	J. Smith & Sons, Norwood, Ltd.‡	81,472
W. Johnson & Co., Ltd.	86,536		

MARLBOROUGH-ROAD.—Improvements and enlargement—ground floor, infants' department. Providing 3 new classrooms, 56, 50, 50; reducing classroom G from 100 to 50; providing new hall, 67 ft. by 30 ft., cloakrooms, lavatory, teachers' room and stockroom; altering door openings to classrooms C, D, and F, and providing new doors and building up existing openings in classroom G; converting existing area in Marlborough-road into furnace-room and coalcellar; extending existing coalcellar under cloakroom; providing 4 new staircases to boys' and girls' departments; removing roof over present hall and forming open court; refixing covered playground and providing new water-closets. Gain, 106 places. First floor, girls' department.—Providing 3 new classrooms, 56, 50, 50; reducing classroom G from 90 to 50; new hall, 67 ft. 4½ in. by 30 ft.; cloakrooms, lavatories, teachers' room, and stock-room, and extending corridor; removing existing mezzanine floors; forming new windows to open court from hall and corridor; altering door openings to classrooms C, D, and F, providing new doors, &c., and building up existing openings in classroom G; providing new glazed partition between corridor and existing lavatory, where, mezzanine removed; 4 new staircases for boys and girls; new water-closets on ground and roof playgrounds. Gain, 116 places. Second floor boys' department.—Providing 3 new classrooms, 56, 50, 50; reducing classroom G from 93 to 50; new hall, 67 ft. 4½ in. by 30 ft. 4½ in.; cloakrooms, lavatory, teachers' room and stockroom; four new staircases for boys and girls: removing existing mezzanine floor, forming additional new corridor; also new windows to open court from hall and corridor; providing new glazed partition between corridor and existing lavatory where mezzanine is removed; altering openings and providing new doors to classrooms C, D, and F, and building up existing opening in classroom G; providing two new water-closets in playground. Gain, 113 places. Third floor.—Providing drawing classroom, 900 square ft. area; girls' open and covered playground and water-closets: two girls' staircases and boys' staircase; enclosing, draining, and tar-paving the additional land; heating by low-pressure hot-water apparatus. Revised accommodation—Boys, 512; girls, 540; infants, 588; total, 1,610. Net gain, 335.

Wallis & Sons	£19,796	Lathey Bros.	£18,760
Lorden & Son	19,352	Lawrance & Sons	18,285
Treasure & Son	18,968	Stimpson & Co.	18,200
Leslie & Co., Ltd.	18,884	Miskin & Sons	18,023
Patman & Fotheringham, Ltd.	18,771	C. Cox‡	17,950
		Garrett & Son	17,242

NORTHWOLD-ROAD.—New School. Accommodation, boys, 306; girls, 306; infants, 306; total, 918. Graded school on three stories. Halls, boys, 1,998 square feet about; girls, 1,998 square feet about; infants, 1,998 square feet about. Classrooms, boys, 40, 40, 56, 50, 60, 60; girls, 40, 40, 56, 50, 60, 60; infants, 40, 40, 56, 50, 60, 60. Special Rooms—Drawing classroom, 1,050 ft. Heating by low-pressure hot-water apparatus. Area of site about 57,800 square feet. Playgrounds area per child, boys, 65 ft.; girls and infants, 34 ft. New house for schoolkeeper:—

T. L. Green	£26,987	Treasure & Son	£24,621
Patman & Fotheringham, Ltd.	26,163	W. Shurmur	24,498
Leslie & Co., Ltd.	26,103	Miskin & Sons	24,429
J. Grover & Son	25,917	Johnson & Co., Ltd.	24,344
E. Lawrance & Sons	25,465	W. M. Dabbs	24,317
		C. Cox‡	23,948

[See also next page.

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WESTVILLE-ROAD.—Rebuilding and fitting with separate pans and traps girls' offices, including the removal of the old offices, also removing and refixing covered playground, altering and refitting with separate pans and traps boys' offices, including reconstructing urinal; altering and refitting with separate pans and traps the male and female infants' offices, including new urinal for male infants, constructing new chambers, altering old chambers, laying new soil drains from offices; relaying the drain from disconnecting chamber now receiving the drainage from the laundry down to the intercepting chamber, reconnecting the old surface water drainage to new system, taking out old disused soil drains, refitting the schoolkeeper's closet and providing new sink in scullery, and ventilating pipes for new drains :—

Martin, Wells & Co.	£2,500 0 0	R. P. Beattie	£2,087 12 7½
Unsigned	2,483 0 0	G. Neal‡	1,977 0 0
Johnson & Co., Ltd.	2,108 0 0		

WILLIAM-STREET. — Providing and fixing iron staircase :—

McDowall, Steven, & Co., Ltd.	£90 10	Hayward Bros. & Eckstein, Ltd.‡	£44 10
St. Pancras Ironwork Co., Ltd.	49 10		

WOODLAND-ROAD.—Refitting the boys', girls', and female infants' offices with separate pans and traps, removing and rebuilding the male infants' offices, including coal store for schoolkeeper, adapting the present offices for urinal, refitting water-closet for infants' teachers adjoining cloakroom, new fixed lavatories for teachers, channels to lavatories, &c., and new drainage scheme :—

Burn Bros.	£2,980 0	Johnson & Co., Ltd.	£2,540 0
Martin, Wells, & Co.	2,973 0	J. & C. Bowyer	2,492 0
Falkner & Sons	2,637 0	R. P. Beattie	2,457 19
		Johnson & Co.‡	2,416 0

The exteriors of the following schools will be painted between October 22 and November 17, 1900 :—

FLEET-ROAD :—

Hodgson & Co.	£360 5 0	Marchant & Hirst	£229 0 0
Wall & Co.	253 0 0	Densham & Sons	215 0 0
F. Chidley	252 5 0	S. Polden	205 0 0
W. Chappell	250 0 0	T. Cruwys*	178 12 0
F. T. Chinchen	240 0 0		

HASELTINE-ROAD :—

J. & C. Bowyer	£221 0	G. Kemp	£184 0
E. Proctor	205 0	C. G. Jones	178 0
Somerford & Son	198 0	W. J. Howie	172 0
H. Groves	189 0	Hayter & Son*	158 17

HAVERSTOCK HILL :—

Hodgson & Co.	£352 1 0	W. Chappell	£198 10 0
Densham & Sons	275 0 0	J. W. Dixon	190 0 0
R. S. Buckeridge	271 0 0	Marchant & Hirst*	147 10 0
Wall & Co.	250 0 0		

LOWER CHAPMAN-STREET :—

J. Kybett	£265	Heard & Co.	£220 0
J. T. Robey	257	G. Barker	212 0
Gibb & Co.	253	S. H. Corfield	181 0
J. Haydon	239	G. Wales*	162 3
J. F. Holliday	236		

MARNER-STREET :—

J. F. Holliday	£221 0 0	Elkington & Sons	£180 0 0
Gibb & Co.	198 0 0	G. Wales	177 16 0
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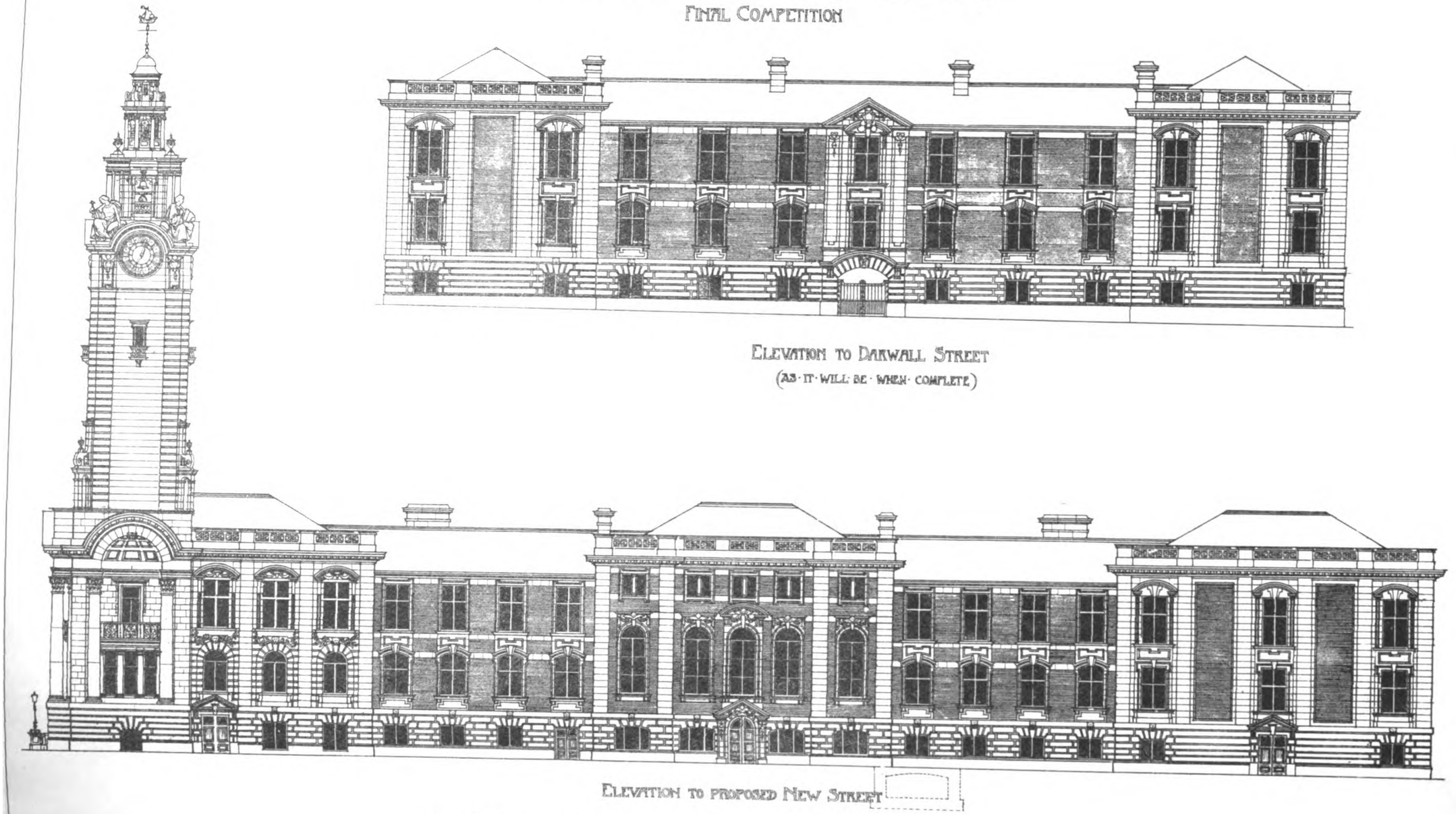

ELEVATION TO PROPOSED NEW STREET

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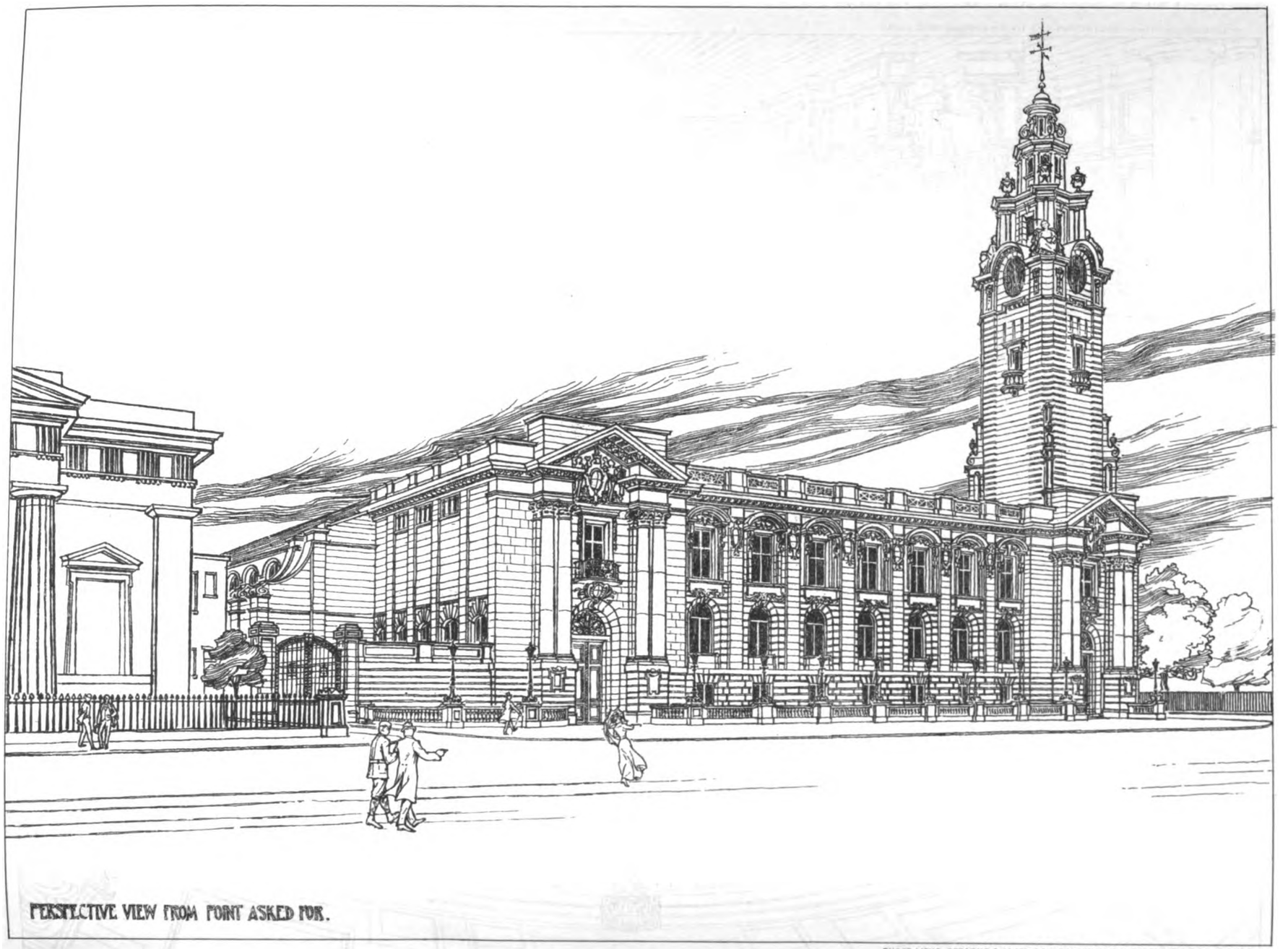

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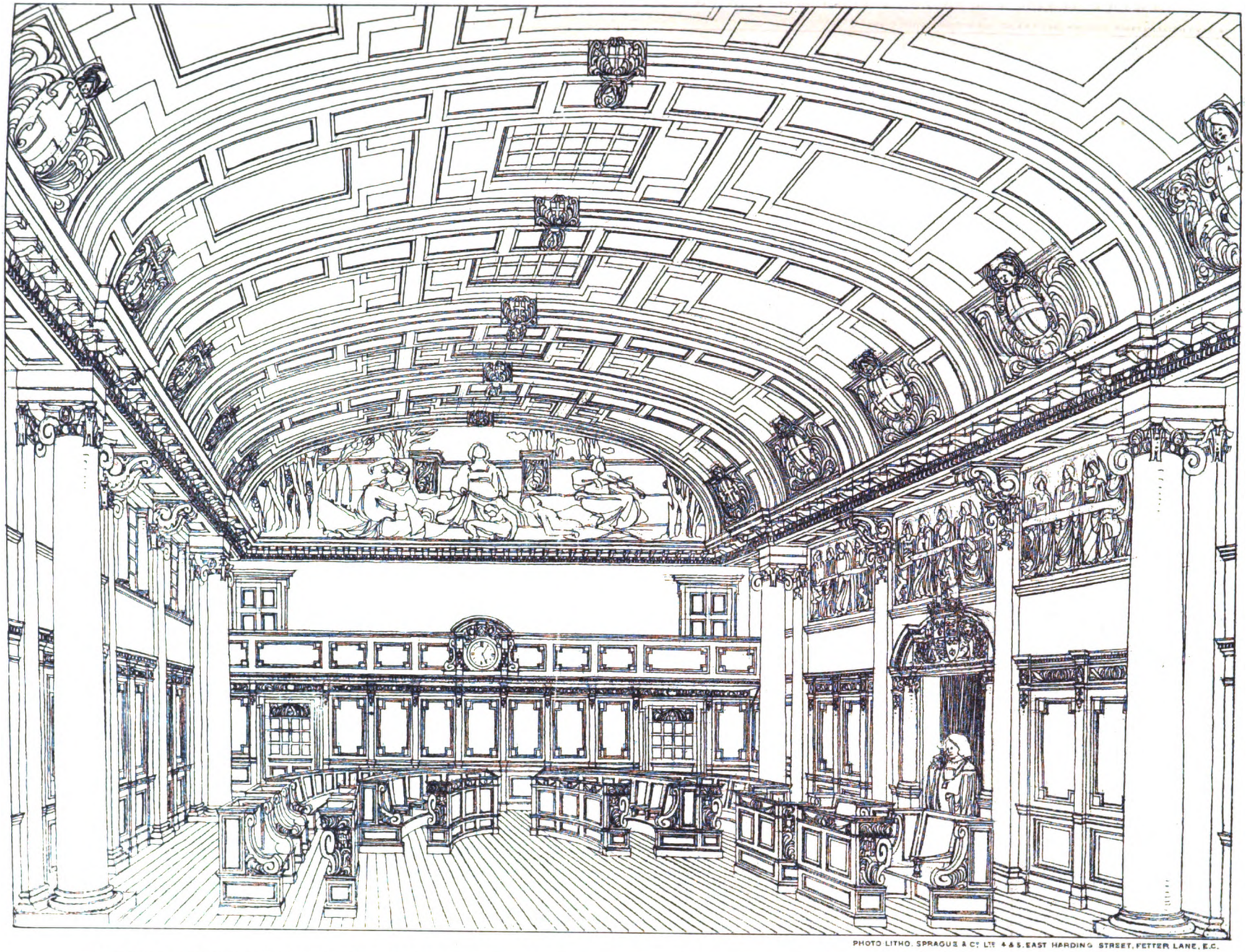

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INTERIOR OF HALL.

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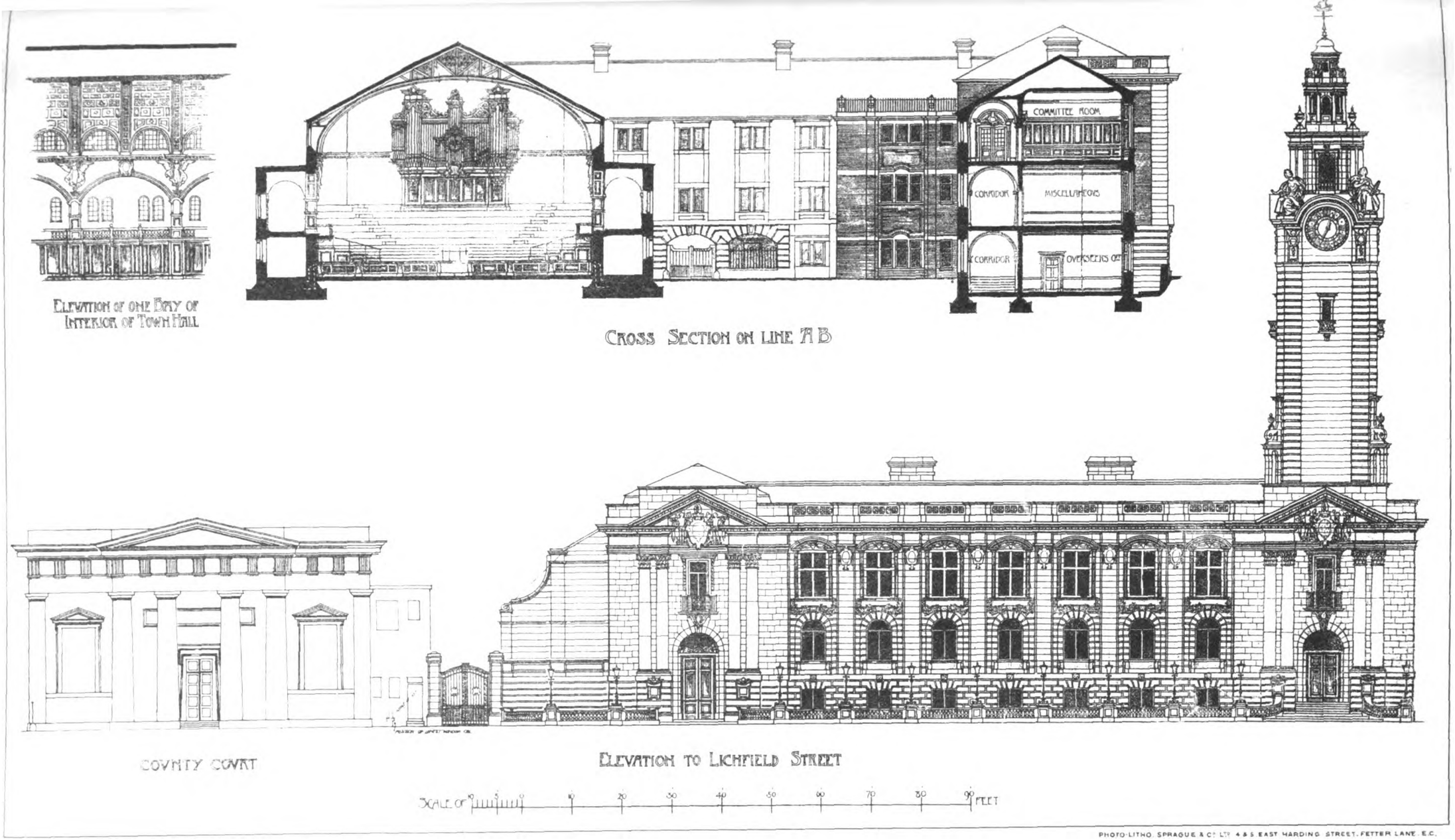

ELEVATION OF ONE BAY OF INTERIOR OF TOWN HALL

CROSS SECTION ON LINE A B

ELEVATION TO LICHFIELD STREET

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ELEVATIONS AND SECTION.

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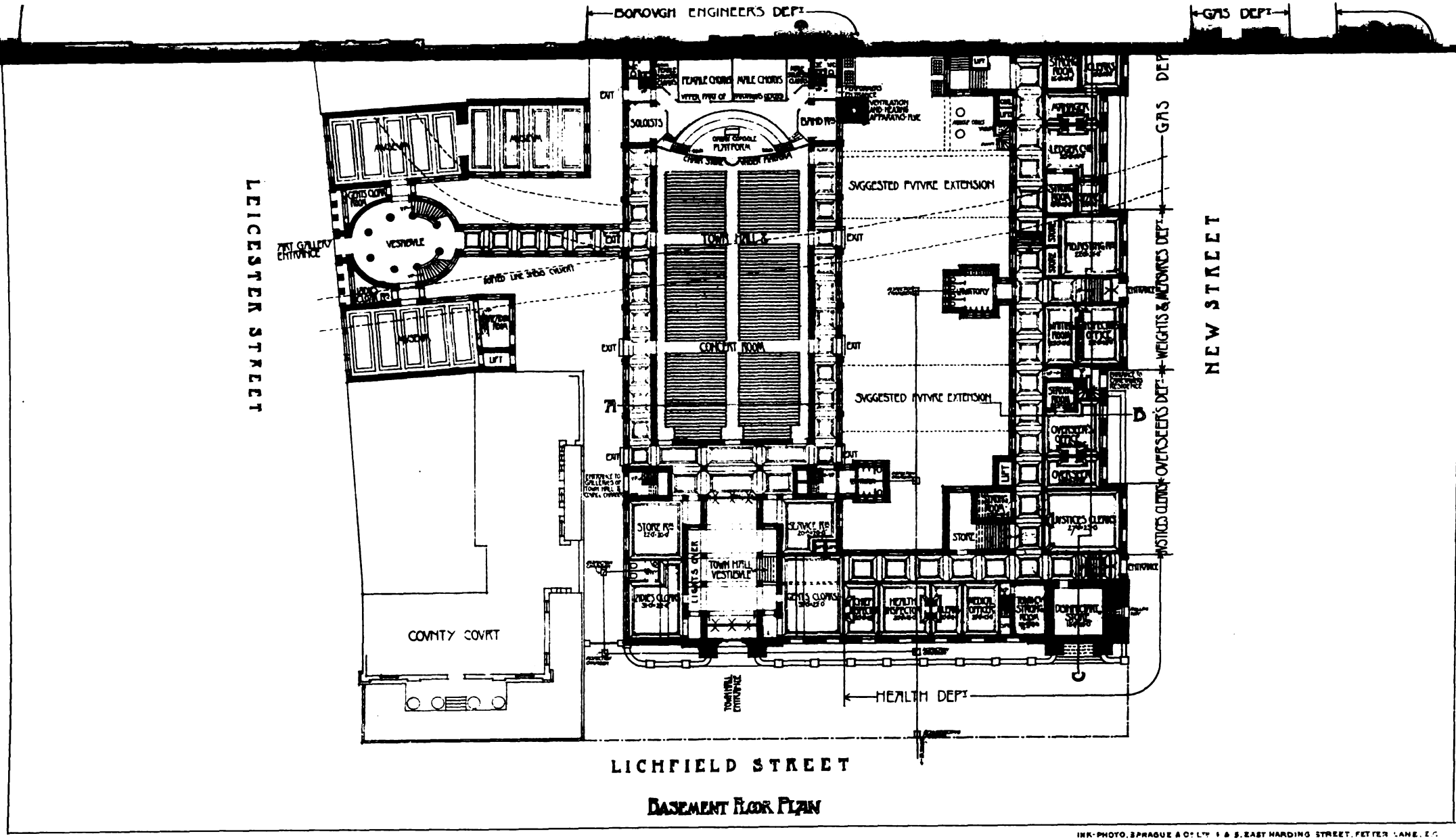

BASEMENT FLOOR PLAN

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PLANS.

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VOL. LXXIX., No. 3012. OCTOBER 27, 1900.

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Bridges and Blunders.

LONDON BRIDGE is again in danger. A good many years ago a hard fight had to be made to prevent the entire disfigurement of this noble monument—this "sublime bridge," as Street called it—by the jutting out of foot-walks on cantilevers from its sides, on the pretence that the bridge was not wide enough for the traffic; a procedure which would have totally ruined its appearance. It is extraordinary to see, when there is a great building to be spoiled, how eager some classes of persons, especially those of the official persuasion, are to find out that practical considerations necessitate the proposed vandalism. The traffic over the bridge has no doubt increased since the period of the last assault upon it, yet we fail to see that even now any case is made out for a necessity to widen it. We have often crossed and seen a considerable proportion of unoccupied space on the roadway. But from ominous paragraphs in the papers it appears that Rennie's work is again threatened, and that the Committee dealing with the matter have called in a very eminent engineer to advise them on the various schemes submitted for widening the bridge. What these schemes are seems for the present to be kept dark; but we can hardly doubt that the cantilever or balcony scheme will be brought up again, because, when it comes to a question of widening the roadway of a bridge, this is the cheapest and readiest way. It may be argued that the eminent engineer who is said to be consulted will certainly take due care of the work of a celebrated member of his own profession in past days; but we fear that is a *non sequitur*. Rennie himself had far more of æsthetic perception than most engineers of the present day—London Bridge itself is a proof of that; and we fear that a modern engineer will take no thought for anything, in such a case, but economy combined with safe construction, and that if that programme involves spoiling the bridge, spoiled it will be, without compunction.

We hope the public will realise that London Bridge is an erection to be proud of; that it is one of the finest things London can boast of; that any operation which will impair its monumental grandeur will be a serious blunder; and that an increased facility for traffic from widening the roadway will not compensate for this.

Our own opinion of what should be done may be very briefly expressed. In the first place, let us be quite sure that greater accommodation for traffic across the bridge is really a necessity—a point on which we have considerable doubt. If, however, it is impossible to come to any other conclusion, then let the bridge be widened in the only way in which its dignity and monumental character can be preserved, viz., by widening the arches in granite on one side of the bridge, taking out the facing of Rennie's work on that side and replacing it outside the added masonry; leaving the rest of the existing work, and the other face of the masonry, untouched. That would cost more than cantilever balconies, no doubt, but it would preserve a grand structure unimpaired for future ages. Moreover, the new portion would have its own foundation; whereas the building out of anything from the existing bridge would add a weight to the existing foundation which it may not be adequate to.

From the threatened treatment of London Bridge we turn to the scheme for the new Lambeth Bridge, which came before the London County Council last week. The engineer has prepared two types of bridge, a suspension bridge and a bridge of the braced-arch type; *i.e.*, we presume, a steel arch with cross bracing in the spandrels. Either of these would, of course, be essentially an engineer's bridge, one of steel and not of masonry. To this we have no objection provided they are honestly treated; only we may observe that a suspension bridge is seldom practically satisfactory where there is to be a large wheeled traffic; and there is no doubt that in the process of improvements and alteration of street line which are almost certain to take place before long on the north side of the river at this point, and which will render the Lambeth Bridge a more direct thoroughfare than it is at present, there is likely to be a considerable and increasing wheeled traffic over Lambeth Bridge; the pressure of such a development of traffic is indeed one reason for the requirement of a new bridge; and a suspension bridge will not remain rigid under a large wheeled traffic. In such cases it always degenerates into a "drive slowly" bridge, and thus to some extent defeats its own end. If there is not to be a masonry bridge, therefore, let us have the braced-arch bridge. The conclusions of the London County Council on the subject are amusing. They recommend that "one of the best authorities on Gothic architecture of the day should be asked to advise in working out the details of the piers, towers, and abutments of the bridge." It would seem, then, at the first glance, that the demonstrations which have been made in reference to Vauxhall Bridge, in regard to the necessity of employing an architect to design the architectural details have not been entirely without their effect; though one does not understand at first sight the reason for this change of policy. In regard to Vauxhall Bridge we were told that to employ an architect in conjunction with the engineer would be a direct slight to the engineer; but it appears that in connexion with the new Lambeth Bridge this objection disappears, and the engineer is to be "slighted" here, though it is pronounced impossible at Vauxhall. But alas! what does the reader suppose is the reason for this unexpected arrangement? Why, that the bridge will be situated in the neighbourhood of the Houses of Parliament, "which are in the Perpendicular Gothic style of architecture," and must therefore be "Gothick-ed" to harmonise with them.

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Here is the old blunder of the Tower Bridge over again. The Tower Bridge was to be sham-Mediæval because it was near the Tower, and so a quantity of sham-Mediæval details have been plastered over the real construction, rendering it a piece of pretentious gimcrack. One would have thought this had been ridiculed enough to have opened people's eyes to some extent. Is it impossible that the public and their official representatives can ever learn anything about the real meaning of architecture? Are they aware that the one defect of the Houses of Parliament is exactly that it is in the "Perpendicular Gothic style," *i.e.*, in an imitation of a past style of architecture, forced on its architect against his will, and which is just the æsthetic mistake in an otherwise great building. And now it is proposed, because this is so, to repeat the same mistake in the new bridge, and clothe it in a sham mediæval garb to harmonise with the sham-mediæval garb of the adjacent building. That is not the way to go to work in the matter. All that is necessary is that the bridge should be an honestly treated piece of engineering construction, with no bad or sham ornament about it. In that case there will be nothing vulgar about it, and nothing that will or ought to offend any one's taste. The sure way to spoil it is to bedizen it with ornament which is foreign to its purpose and which is imitative of a past style, pretending to be what it is not; and in the present state of feeling of architects on this subject it is probable that if the County Council do engage "one of the best authorities on Gothic architecture of the day" for any such purpose, he will frankly tell them that they are making a mistake, and that that is not what is wanted.

We give the London County Council credit for wishing to do the right thing, though we cannot understand why they should have so obstinately refused to associate an architect with the engineer in the case of Vauxhall Bridge, and yet be willing to do so in this case. The fact seems to show that they are learning a lesson, but have only got half-way. There are two things that may be done with a bridge of the kind proposed. One is to leave it frankly as a piece of structure, with no decorative treatment at all. It will then have the interest of structure, and it will at all events be honest. The other is to treat it as a work of art, and in that case no doubt an architect should be associated with the engineer. But to put sham Gothic ornament upon it is to do neither, but simply to create an absurdity; and it is futile to engage an architect for such a purpose. That is not what architectural design is for.

Concurrently with the question of widening London Bridge, we observe that the much smaller question of depriving St. Martin-in-the-Fields church of part of its base, under the pretence of widening the street at that point, has again been pushed forward by the Improvements Committee of the County Council. We had hoped that the sensible opinion delivered by the rector of the church, the last time the matter was discussed, had settled it. But this is another illustration of the passion that seems to exist among London officials for spoiling architecture whenever there is any chance of an excuse for it. That the proposed alteration of the steps which form the basement to the portico of St. Martin's will spoil the effect of a fine building there can be no doubt whatever. As to the pretext raised for it there is every doubt. We may say that we have constant occasion to pass St. Martin's-place, and we have never at any time seen anything like an inconvenient crowding of traffic there. What temporary check there occasionally is, is caused only by the cross line of traffic from the Strand to Pall Mall East, and would be totally unaffected by any widening of St. Martin's-place. The proposal of the "Improvements Committee" (surely ironically named in this case!) really amounts to doing a wanton injury to a fine building under the pretext of removing an imaginary and non-existent inconvenience. We are glad to see that the amendment moved by a prominent member of the County Council, to refer the matter back to the Committee "with instructions to take expert opinion as to the architectural effect of the proposed alteration," was carried without a division, so that the mischief is staved off for the present. Mr. Shaw-Lefevre is not, unfortunately, a *persona grata* to architects; but in this instance at least he has earned their thanks.

MANCHESTER DOCK EXTENSION.

SLOWLY, but surely, the Manchester Ship Canal is beginning to justify the anticipations of its founders. Having had to combat the usual antipathy of the public to all new things, to compete with the rival port of Liverpool, and to live down an attempted boycott on the part of the railway companies, Manchester has already become one of the great distributing centres of the United Kingdom. Since 1898 the congested state of the dock quays has constituted a serious problem. For the accommodation of merchandise and for dealing with inward and outward cargoes, extensive storage warehouses and transit sheds have been built, encroaching upon the spaces intended for "open-air" cargoes, which, in turn, have encroached upon the roads and railways. Moreover, the conditions attending the timber trade in Manchester are somewhat different from those prevailing in other ports. Manchester is the centre of a district where large quantities of timber are used both by builders and by packing-case makers, whose facilities for storage are limited. Consequently, the docks are practically used as a general store-yard for the surrounding district. Concurrently with the development of traffic an increase has taken place in the size of cargo steamers, thus rendering inadequate the established proportion of quay area to water frontage.

All these circumstances combine to render necessary the considerable extensions of the dock system now contemplated by the Canal Company. The additions in question are indicated by the plan on p. 357, for which we are indebted to the courtesy of Mr. W. Henry Hunter, M.Inst.C.E., Chief Engineer to the company. In the original plan the works not yet carried out are shown in red lines. The distinction cannot be carried out in our cut, but the lettering of the plan will be sufficient to explain.

Development of the docks in a north-westerly direction is at present barred by the Manchester Racecourse, which, with other lands, was scheduled to be purchased as long ago as the year 1883, but the proposal was withdrawn in consequence of opposition to the Canal Bill. The approximate areas of land now proposed to be acquired include 3 acres from the Salford Corporation, 41 acres from Captain Clowes, and 100 acres from the Racecourse Company. When the new territory has been incorporated, the area of the dock system from Mode Wheel sluices to Trafford-road will be 312 acres instead of 168 acres, as at present, and it is considered that the accommodation will be approximately commensurate with the capacity of the waterway forming the approach thereto, and upon which a capital sum of nearly 10,000,000*l.* has already been expended. At the same time it is quite within the bounds of probability that further expansion will ultimately be demanded by the exigencies of a growing trade and by the necessities of a rapidly increasing industrial population.

The new works whose details are now engaging the attention of the engineer will include the construction of one new basin, of additional roads, railway tracks, warehouses, and transit sheds, and the laying out of open-air storage grounds. It is not probable that the company will obtain possession of the racecourse before December 31, 1901, and by that time all the plans will have been completed and contracts let for the construction of the first basin. On reference to the plan it will be seen that only about three-quarters of this dock is to be excavated at first, but at the easterly end a temporary timber coffer-dam will be formed, so as to permit the extension to be carried out afterwards without causing interruption to the traffic of the new dock. The area of the first instalment will be 9·2 acres, and the length of quay frontage afforded will nearly approach three-quarters of a mile. When complete, the new basin will cover an area of more than 13 acres with a water frontage of one mile, and will increase the berthage for large modern steamers in the port of Manchester by nearly 50 per cent. No novel engineering problems are likely to occur in the formation of the basin, and the walls will be constructed in a manner equal and similar to the dock walls already existing in other parts of the port. In setting out the railway and other works, due provision will be made for the construction of a second basin, separated from the first, as shown on the plan, by an intervening pier.

With regard to railway facilities, it may be remarked generally that the functions of the Ship Canal Company are analogous to those of a railway company. Traffic is exchanged and rates are shared with all the principal lines in the kingdom, and the docks include a complete railway system, on which a regular service of trains is in operation from one part to another, as well as to certain junctions, so that connexion may be made with the goods trains of other companies.

For the safe and economical working of the goods traffic, it is essential that the through line of railway should be at the back of the dock system, so that no interference may be occasioned by or to the cross traffic on the quays, roads, and railways. It is proposed to construct this through line at the earliest possible moment so that it may be available for traffic. Large storage

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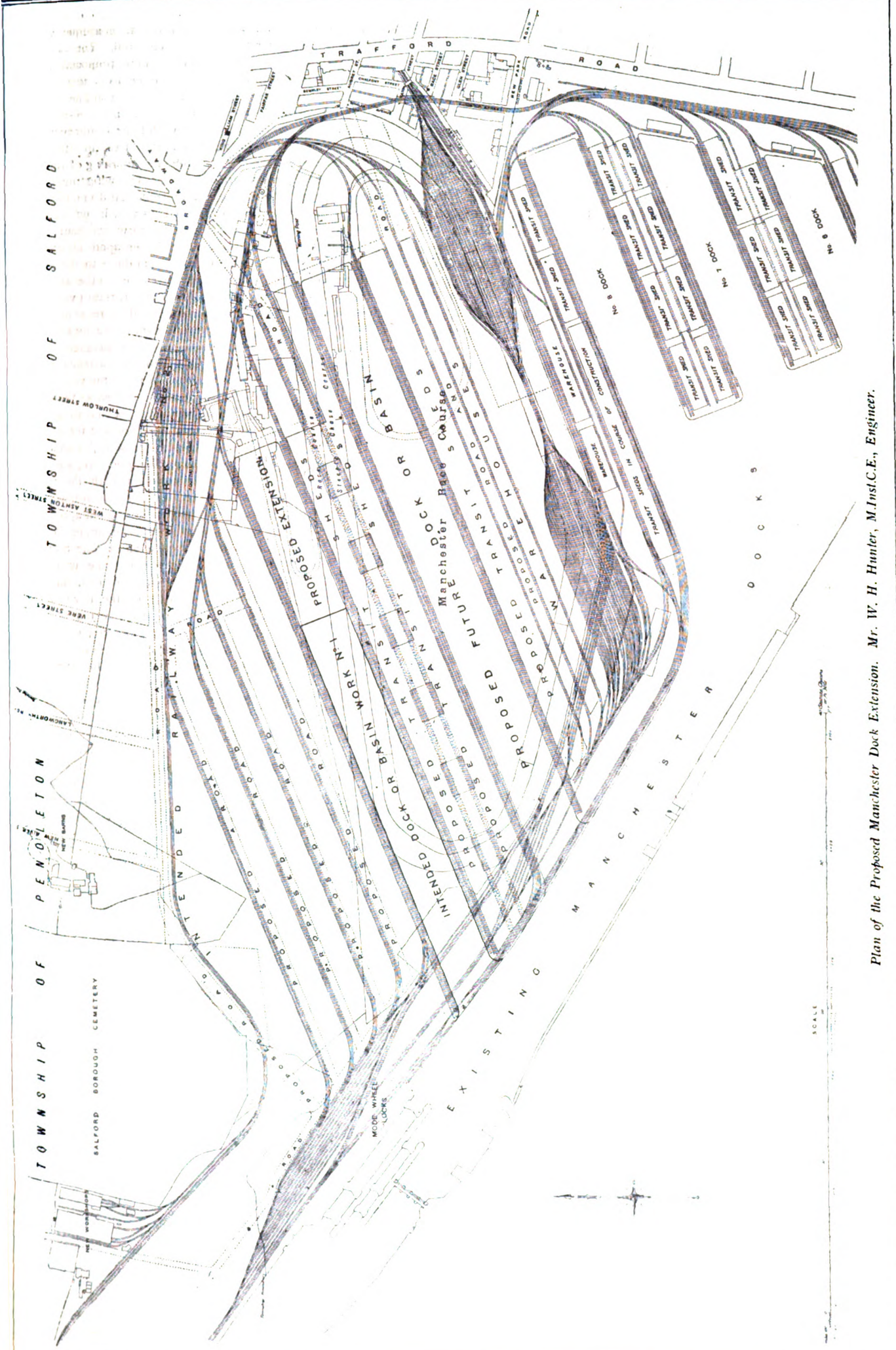

Plan of the Proposed Manchester Dock Extension. Mr. W. H. Hunter, M.Inst.C.E., Engineer.

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sidings will be formed in connexion, as shown on the northern boundary of the site.

Between Dock No. 8 and the second new dock a strip of land 250 ft. wide will be set apart for the construction of "balloon" sidings for the interchange of traffic with the Lancashire and Yorkshire Railway Company, and to provide for future developments a further strip 60 ft. wide is to be reserved for the increase of siding accommodation. As usual between railway companies exchanging traffic, each company will construct and work its own portion of the sidings. Work on the first set of sidings will be commenced directly possession of the race-course can be obtained. Extensions of the dock railways will be constructed from time to time as the increase of traffic may demand.

The whole of the land to the north-west of the first new dock will be laid out at once for the storage of timber, all necessary roads and railways being formed at the same time. As the area of this portion will be nearly thirty acres, exclusive of roads and railways, considerable relief will be afforded to other parts of the docks, now overstocked with timber and general merchandise. On the south-east of the same dock another yard will become available for the reception of timber, dye-woods, pig-iron, ores, &c., and upon this area all necessary roads and railways are to be established.

After the construction of the new dock continuous five-floor transit sheds will be built, served by roads and railway lines, in order that general cargo trade may be more adequately dealt with. The scheme also provides for the erection of additional storage warehouses, similar in character and design to those already in existence on the north quay of No. 8 Dock, and to be connected with the transit sheds by conveyors, in order to facilitate the transfer of goods.

According to the estimates, deposited in compliance with the Standing Orders of Parliament, the cost of the first new dock and railway works, exclusive of land, will be 150,503*l.* Adding the cost of subsidiary works, which it is proposed should be undertaken immediately, the total expenditure will amount to nearly 243,000*l.* It is estimated that the works will be completed within three years after the date on which the land becomes available.

NOTES.

Conference on London Gas.

A conference of representatives of the various metropolitan Local Authorities convened by the London County Council to consider certain matters relating to the London gas supply, was held on the 17th instant at the County Hall, Spring Gardens. Mr. Cornwall, the Chairman of the Parliamentary Committee of the Council, presided. After lengthy discussion, and the proposal and withdrawal of various motions and amendments, it was agreed that (1) the time has come for a revision of the sliding scale, in the interests of the gas consumers; (2) the practice of the Gas Light and Coke Company in treating differentially the consumers north and south of the Thames forms a grievance that requires redress; (3) the conference approved the action of the London County Council in requesting the Board of Trade to institute an inquiry as to the cause of the persistent differences between the illuminating power of the gas at the official testing stations and that found elsewhere with the aid of a portable photometer; (4) that capital powers should not be granted to any gas company for a longer period than five years; and (5) that the companies should be required to institute a sinking fund for the purpose of redeeming obsolete capital. The Lord Mayor has convened a meeting to be held in the Guildhall on Wednesday next to discuss the same subject, and we may take this opportunity to draw attention to two matters which are worthy of attention: first, it should be remembered that on and after July 1 next the South Metropolitan Company have power to supply 15-candle instead of 16-candle gas, and that therefore the difference in the prices of gas north and south of the Thames will probably be still further increased; and secondly, it should be noted that large sums of money are being expended by the gas companies and by the London County Council in connexion with these disputes, which money is eventually drawn almost entirely from the pocket of the gas consumer.

Electric Lighting Regulations.

It will be remembered that last summer the London County Council gave permission to the City of London Electric Lighting Company to change their pressure of supply from 100 volts to 200 volts in the Southwark district, subject to twelve conditions. The company appealed to the Board of Trade against these restrictions, and last week it was announced at the London County Council meeting that only the first of the proposed conditions—the one which makes the Company bear the cost of the necessary alterations in the wiring—was allowed by the Board of Trade. Apparently, then, the consumer must buy new lamps for the higher pressure, pay any increased premium the Fire Offices may charge, &c., and be left entirely to the tender mercies of the Company as to the rate at which he is to be charged for the energy he consumes. If the Board of Trade had rejected the whole of the twelve conditions, we could see some reason for their action. The company, no doubt, desire to treat their customers equitably, in view of the approaching competition; but why are they bound to bear the cost of the alterations in the wiring, and not bound to bear other costs to which they are in equity liable? The Highways Committee of the London County Council have done a public service by publishing the conditions they sought to impose on a lighting company wanting to change to a higher pressure. If the company does not voluntarily observe most of these conditions, we expect that the Board of Trade will be kept busy appointing arbitrators to settle disputes between the company and its consumers.

A Low-pressure Boiler Explosion.

The Board of Trade inquiry into the boiler explosion at the Municipal Technical Schools, Gloucester, in June last, has brought to light another case of ignorance on the part of a boiler attendant, and of careless design on the part of the engineers. The heating apparatus is a modern installation on the low-pressure system, carried out about eighteen months before the explosion by a well-known firm of heating and ventilating engineers. The heat is generated in two Cornish "Trentham" boilers, placed side by side. From the crown of each boiler a 5-in. flow-pipe, fitted with a Peet valve, is carried up and connected with a short horizontal connecting pipe, from which five flows, all fitted with valves, are taken to different parts of the building. The return-pipes are connected in a corresponding manner, and fitted with five subsidiary valves and two main valves. The fires in both boilers were lit on the morning of June 4, banked up during the following night, and restoked the next morning. At 8 a.m. the back end of one of the boilers was blown out, the boiler being projected forward about 13 ft. The attendant happily escaped injury, but considerable damage was done to the building. The immediate cause of the accident was that the main flow and return valves of the boiler which exploded were shut tight, and the pressure of steam gradually accumulated until it overcame the resistance of the boiler-plates. Of course the attendant was to blame for not having tried the valves, but in extenuation it must be said that the engineers' men, who had been fitting new pipes to the system, told him that the boilers were "full and ready for work," and as he had only been recently appointed, and was not thoroughly conversant with the apparatus, he accepted their statement without question. In a properly-designed apparatus such an explosion would be impossible, at any rate within such a short time after its installation. The great mistake was that only one safety-valve was provided, and that this was fitted on one of the flows taken from the connecting pipe above the boilers. The main flow-valves, therefore, came between the safety-valve and the boilers. The right course would have been to have provided two safety-valves—one for each boiler—and to have fitted them either directly to the boilers, or to the main flows between the boilers and the main flow-valves. To save the expense of an extra safety-valve the designers of the apparatus risked the life of the attendant and the possibility of great damage to the boilers and the building—another example of penny-wisdom and pound-foolishness.

Boiling Test for Cement.

Dr. Michaelis, of Berlin, was the first to investigate and advocate the boiling of cakes of Portland cement, and notwithstanding the fact that many modifications have been suggested, the original Michaelis method still appears to be the most reliable. The mode of procedure is that a pat of Portland cement, made up on filter paper placed upon a glass plate, should be allowed to harden for twenty-four hours in air and in water. At the expiration of that time the pat is placed in a vessel containing water at normal temperature. Heat is then applied, so that the water may gradually be brought to the boiling point, at which it is maintained for the space of three hours. If at the end of this time the pat be firm, hard, and free from cracks the cement may be considered good. The cement ought to be mixed with about 3 per cent. more water than is used for making briquettes; it should be well worked for several minutes with a knife, and moulded on the glass into a compact form, so that it may be free from air bubbles, which might afterwards induce cracks. The paste is then spread out into the form of a pat about 3 in. in diameter, very thin at the edge, and ½ in. thick at the centre. It is placed at once

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under a damp cloth or in a moist atmosphere until properly set, being next immersed in water for twenty-four hours, and the boiling test may then be carried out. The method in question appears to be correct in principle, and as a rapid test for cement it is worthy of consideration.

Electric Lighting Boards.

We had an opportunity last Friday of inspecting the electric lighting boards and strips which are being manufactured by the Electric Lighting Board Company at their works in Dean-street, Soho. In the E. L. B. system there is no necessity for lamp-holders, sockets, &c. If the strip is carried round the wall of a room, then, in order to fix a lamp, all that we have to do is to take one of their specially made glow lamps, each of which has two spikes attached to its base, and press it on the strip. When the switch is turned on the lamp will light, no matter on what part of the strip we have stuck it, provided the line joining the two spikes is perpendicular to the length of the strip. The two flexible conductors inside the strip have a hard insulating substance between them, but the spikes readily penetrate into the flexible wire through the softer insulating material near the edges of the strip. This strip can easily be let into dado mouldings, so that connection with a standard lamp can be made at any point of a room. In this case the surface of the strip is sometimes made of non-inflammable cork with asbestos underneath, so that there is no danger of fire from arc-ing when removing the spiked plug. This system of lighting is specially adapted for shop windows, showrooms, producing scenic effects in theatrical work, temporary installations (as at banquets, balls, &c.). Large boards are also made into which lamps can be stuck in any desired pattern for street decorations or other purposes. We were favourably impressed with the care with which all details have been worked out; and as this system will in many cases greatly cheapen the cost of electric wiring, it deserves encouragement from the electric lighting companies.

The South Sea House, Threadneedle-street.

The demolition has been begun of the South Sea House, in Threadneedle-street, lately vacated by the Baltic Society—a private association of merchants and brokers engaged in the Russian grain and tallow trades — who removed to Threadneedle-street after the pulling-down of the "Baltic" coffee-house in Sweeting's-rents for the building of Tite's Royal Exchange. The British Linen Company Bank of Edinburgh have bought the premises and site for 350,000*l.* from the Baltic Company. In the rebuilding the front will be set back for a widening of the thoroughfare in pursuance of a scheme by the City Corporation, at a cost of 14,400*l.* A site is being cleared in St. Mary Axe and Jeffrey's-square for the new offices of the Baltic, Mercantile, and Shipping Exchange Company, to be erected, at an estimated maximum cost of 175,000*l.*, after the plans and designs of Mr. W. Wimble and Mr. J. H. Smith as joint architects. The building (1773-4) now being pulled down should not be confused with the old South Sea House in Old Broad-street. That house, formerly the old Excise Office, was destroyed by fire in 1826; the site was taken for the City of London Club, built in 1833, from the designs of Philip Hardwick, R.A. The *later* Excise Office in Old Broad-street was built in 1770-5 at a total cost of 45,408*l.*, from the designs of, it seems, William Robinson, Surveyor to the Customs Board for London,* on the site at the rear of Gresham College and of Sir Thomas Gresham's almshouses; it was pulled down in 1854 when the ground was taken for sets of offices—Gresham House—erected after the plans and designs of Sir William Tite and E. N. Clifton.

The Cloudesley Charity Estate, Islington.

In 1517 Richard Cloudesley, an inhabitant of Islington, bequeathed in trust a plot of land, known as "Fourteen Acres" or "Stoney Field," and directed the trustees to apply the income, to the extent of 2*l.* 13s. 4d., for prayers for his soul in the parish church. That sum was confiscated *temp.* Edward VI. as being for superstitious purposes, leaving a residue of about 4*l.* 10s. The surplus, which will shortly have increased to some 6,000*l.* per annum, was in terms of a deed of trust applied, until 1810, for ecclesiastical and general expenses of the parish church of St. Mary. In 1811 a private Act was obtained for letting the land upon building leases. Then were built, in 1813, the Islington Chapel of Ease, Holloway-road (Wickens, architect), in virtue of a special local Act, and under the "Million" Act of 1818—58 Geo. III., cap. 45—the district churches of St. John, Holloway; St. Paul, Ball's Pond; and Holy Trinity, Cloudesley-square—the three being designed by Sir Charles Barry and erected in 1827-9. In terms of the Act 2 Will. IV., cap. 26, the income from the charity was to be used for the benefit of the entire parish and in relief from the rates, the parish church district surrendering the first 1,000*l.* a year equally among the chapel of ease and the three district churches. The parish vicar and churchwardens recently applied to the Court for a declaration of their title to a prior charge, under Section 8 of the Act, on the income, which now greatly exceeds 1,000*l.* a year, in lieu or in aid of the churchwardens' and St. Mary's district rates, formerly levied or authorised under sections of the Act. In giving judgment Mr. Justice Byrne stated that whilst the Act of 1868 abolished the compulsory collection of Church rates, Church rates and those two particular rates could still be made, and he was of opinion that the income beyond 1,000*l.* to arise out of the estate should go to the repair and maintenance of the parish church and chapel of ease and to the churchwardens' official expenses, in continuance of the two rates formerly levied. An inquiry was held this month, under the London Government Act of 1899, into the Islington Charities and local Acts, and it is understood that the Commissioners will insert in their scheme a clause affecting the surplus income derivable from the Cloudesley Estate.

"The Disfigurement of Dover."

Under the above title Mr. Richardson Evans, the Secretary of the "Society for Checking the Abuses of Public Advertising," has called attention in the daily papers to a flagrant example of advertising vandalism in Dover Bay. One of the American food companies, it appears, has got some one to erect high up on the cliffs, two monster boards on which the name of their product is painted "in letters that dominate and degrade the whole prospect." A memorial has been prepared to the Mayor and Town Council of Dover asking them to exercise whatever influence a municipality posssesses to cause the removal of nuisances of this kind. Mr. Evans adds:—

"If the burghers of Dover wish to protect themselves from an indefinite recurrence of such outrages they ought to follow the example of Edinburgh. The power which the municipality of that enlightened and eminently practical city obtained by an act of last Session has already been exercised to forbid specific defacements of the sort formerly committed with impunity. As soon as the people who resort to these barbarous modes of soliciting custom realise that the community is alive to its rights, they will desist."

Institute of Painters in Water-colours.

The exhibition at present open at the gallery of the Institute of Painters in Water-colours appears to be a kind of by-exhibition, as it is announced that "the eighteenth annual exhibition will be held in January and February." The present is professedly an exhibition of studies and sketches only, and each artist's drawings have for the most part been grouped separately. The collection includes some very interesting work; a good deal that is very mediocre; and some things that are exceedingly bad, and had no claim to be exhibited at all; the usual result when an exhibiting Society has rooms too large for its resources. A collection of landscape sketches by Mr. Wimperis are, as might be expected, of the first order as water-colour art, and a separate larger one, "A Sussex Common" (279), is still finer; but there are no other landscape sketches to rank with these for breadth and power. Among the best of the other landscape studies are some little ones by Mr. Frank Walton (61 to 70); those by Mr. John White (114-122), especially "A Moorland Valley" (121); Mr. F. G. Cotman's "Burseldon" (234); Mr. F. Walton's "Sennen Cove" (239), a delicately handled landscape a little in the manner of Mr. Albert Goodwin; Mr. Weedon's "Bosham" (291), and a collection by the same artist ranging from 451 to 463; Mr. Harry Hine's "Bluebells in Spring" (467); Mr. Joseph Knight's drawings (475-483), notably "Sand Dunes," "Morning Mists," and "Solitude"; Mr. David Green's "Rain" and "In Danger" (523, 524), the latter an admirable sea study; and a collection of Mr. Cotman's drawings (720-729). The drawings by the late Mr. Towneley Green are interesting, and some of them, as Nos. 385 and 386, would have worked out into admirable finished pictures. Mr. Fulleylove exhibits a great many small sketches (334-430) of subjects mostly connected with architecture, but not quite as interesting as we should have expected; there is a good sketch of the interior of St. Paul's Cathedral (410). Mr. E. C. Clifford has commemorated old Kew bridge by two good views of it (87 and 331). The contributions of the President, Mr. E. J. Gregory (339-347), seem not quite up to his usual standard, but, of course, contain some good work. Mr. Henry Stock contributes a sketch of an ideal composition, "The Reunion" (206), somewhat reminding one of Blake, and also two very delicate and beautiful portrait studies of the head of a girl (238 and 244).

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* See the print, 1771, engraved by his son, John Robinson; the design has been attributed to the elder Dance, also to J. Gandy.

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The London Sketch Club.

The Fifth Exhibition of the London Sketch Club ("Modern Gallery," 175, Bond-street) contains also some things which are hardly worth hanging in an art exhibition; "The Showman," for instance (73), and the two hard drawings of soldiers in uniform (136 and 140), and others. Landscape studies predominate, and some of these are fine; among the best may be named "Marshes" (2) by Mr. Haité; "In Welsh Meadows" (11) by Mr. Montague Smythe; "Bracken" (66) by Mr. Walker Fowler; and "The Forbidden Path" (79), a small rich woodland scene by Mr. E. O. Davey, somewhat spoiled by a bad figure. Mr. F. Hamilton Jackson sends two or three good and careful architectural sketches, in pencil, of old buildings in Italy; Mr. Shepard's "Souvenir of the Japanese Play" (138) has both humour and decorative effect; Mr. C. W. Quinnell's "Memories" (18), is a head painted with a good deal of feeling—the pendant to it, "A Reverie," we do not like so well; and Mr. C. J. Hobson's "In the Wood" (22), a female figure among the stems of trees, is not only a good nude study but a poetic and charming little picture.

Journalistic Suppression of Artists.

We have often commented on the manner in which English daily papers almost systematically (as it would seem) ignore the name of architect or sculptor in describing the inauguration of any new building or monument. The latest example is the following, from the *Times* of the 19th inst.:—

"MEMORIAL TO HELEN FAUCIT.

The Bishop of Worcester yesterday dedicated a pulpit with which Stratford-on-Avon Parish Church has been enriched by Sir Theodore Martin, in memory of the late Lady Martin (Miss Helen Faucit). The pulpit is octagonal in form, and in the Perpendicular style. The material chiefly used is dark green Italian marble, relieved by alabaster statuettes, which occupy recessed and canopied panels. The statuettes represent St. Ambrose, St. Augustine of Hippo, St. Jerome, and St. Helena. The last is the central figure, and in it the sculptor has reproduced the features of Lady Martin. The dedication service was attended by a large number of clergy and laity."

Then follow the names of some social and literary notabilities who were present. Not a word of the designer of the monument, or of the sculptor who executed the "alabaster statuettes." In the opinion of a newspaper reporter these are probably supposed to grow of themselves; at all events one need give no credit to the artist; it is only the persons who pay for the monument, and those who look on at it, who have the credit. This is partly, no doubt, the fault of the public indifference to art in England. If readers of papers cared to have the name of the artist the journals would find themselves obliged to give it. One might have thought, however, that a daily paper occupying such an exceptional position as the *Times* might give general instruction to its reporters and "readers" that, in recording a new work of art, the name of the artist counts for something.

Housing of the Working Classes, Devonport.—Mr. G. W. Willcocks, M. Inst. C.E., held an inquiry at Devonport Town Hall on the 18th inst. into the application of the Borough Council to the Local Government Board, for sanction to borrow sums of 6,380*l.* and 27,720*l.* for purposes of the improvement scheme made by them under part of the Housing of the Working Classes Act, 1890. Mr. J. F. Burns, Borough Surveyor, produced plans of the proposed areas, &c., and said they had been approved by the Local Government Board.

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

V.—Catalogue Raisonné of Examples.

(*Continued.*)

District III.—The Eastern Counties, including Norfolk, Suffolk, Essex, and Cambridgeshire.

This region is well supplied with early churches, though it is not easy to pick out from these the examples to which a pre-Conquest origin may reasonably be ascribed. As a whole, it is not rich in building stone, and flint rubble is largely employed, while Essex builders make a considerable use of Roman bricks. The prevalence in Norfolk, Suffolk, and Essex of round towers is a fact the significance of which has been much discussed.* In matters of the kind the simplest explanation is *cæteris paribus* to be preferred, and the form may be accepted in the meantime as due to the poverty of the available building material. The resulting absence of cut-stone quoins and, for the same reason, of pilaster strips, deprives us of a useful criterion of date, while the flint-rubble walls are, in most cases, tolerably thick. The only remaining criteria are the openings in the form of tower and chancel arches and doorways, double or single belfry windows, and small r. h. or circular lights in the lower stages of towers or the walls of naves or chancels. Some Essex churches are instructive as showing that the use of Roman materials does not necessarily involve an early date, for the tower arch at Felstead is turned in Roman brick, while the enrichments are Norman, and the wall is 4 ft. 5 in. thick. The two Cambridge examples show characteristic Saxon cut-stone work, which in the rest of the district is rare.

There are several examples of outstanding importance. In Norfolk, Dunham Magna possesses a Saxon nave and central tower bristling with characteristic details; while Bassingham is a rare example of a round tower with convincing marks of pre-Conquest date. In Suffolk the round tower of Herringfleet has unmistakable Saxon detail. The much controverted remains at South Elmham are put down in the following list as Norman for reasons given at the place.

Essex presents us with an enigma in the old church, now used as a barn, of St. Peter's-on-the-Wall, near Bradwell. The county possesses a unique treasure in the church of Greenstead, near Chipping Ongar, the nave of which is the only remaining example of Saxon timber work in the constructive part of a building.

Norfolk.

Proceeding through the county from its north-east verge, we come first to *Weybourne*,† the Saxon features of which, noticed by E. A. Freeman in vol. x. of "Norfolk Archæology," are to be found on the old tower, north-east of the present nave of the priory church.

Bassingham, south-west of Cromer, has a pre-Conquest tower, with contemporary nave preserved on the north and west. The distinguishing features are double belfry openings with triangular heads and mid-wall work, and a triangular-headed opening from the tower into the church above the plain tower arch that measures 12 ft. in height by 3 ft. 10 in. in width. The combination of these features is conclusive.

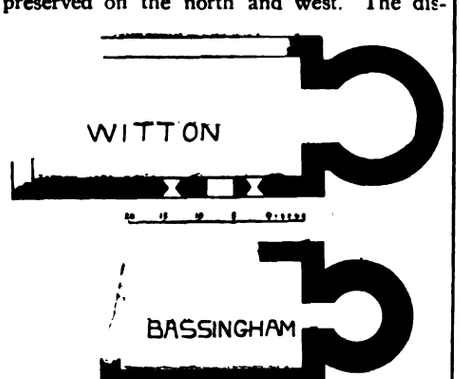

Fig. 17.—Plan of pre-Conquest Portions of the Churches of Bassingham and Witton, Norfolk.

At Antingham, near North Walsham, the ruined church south of the present edifice has no distinct pre-Conquest signs, while at North Walsham a mass of old masonry at the west end of the north aisle of the present fine church may be remains of a pre-Conquest edifice, but there are no distinguishing features.

Witton.—The round west tower and north wall of the nave, to a point about 44 ft. from the west quoin, are probably of pre-Conquest work, and the same would apply to the line of the south wall pierced by a later arcade. In the north wall are two small double-splayed circular lights. Plans of Bassingham and Witton are appended (fig. 17).

At Beeston St. Laurence, near Wroxham, the lower stages of the round west tower and west part of the north wall of the nave are older than the rest of the church, but there are no distinctive pre-Conquest features.

Coltishall.—The north wall of the nave, with two double-splayed circular lights close up under the thatched roof, about 15 ft. from the ground, appears to be the relic of a pre-Conquest church.

Passing westwards, and still in the northern half of the county, we find at [*Great Ryburgh*] that the round west tower and west part of the aisleless nave are Early, and the north-west quoin of the nave has some l. and s. feeling that is not, however, very pronounced. The tower arch, 6 ft. wide, is recessed, but the opening to the nave above it has a triangular head. There are no old windows. This is a case in which a judgment as to date, or rather period, is very difficult.

Near East Dereham there is a group of old churches, of which by far the most important is *Dunham Magna*, another most complete and valuable example of pre-Conquest architecture. It has an aisleless nave, central tower without transepts,* and chancel, and in all parts save in the last there are unmistakable details of the period. The most noteworthy features, beside the internal arcading already noticed as resembling that on the exterior of Bradford-on-Avon, are a triangular-headed west door, l. and s. quoins west of nave and at all four angles of the tower, belfry openings with mid-wall work and well-formed mitred cubical caps and bulbous bases, and circular lights on each face of the tower above the belfry openings. The only old windows below are two double-splayed ones north of the nave and south of the ground story of tower. The tower and chancel arches are developed in style, and the whole of the work, though distinctly not Norman in character, is of an advanced type.

Beeston-next-Mileham, a beautiful Decorated church, notable for its genuine old carved pews, shows externally in the clearstory on both sides the marks of large blocked circular windows. These are evidence that the walls are older than the arcades with which they are pierced, but the size of the windows (unless they were double-splayed) suggests a date not earlier than Norman times.

East Lexham.—This somewhat dilapidated church, with some l. and s. work and other pre-Conquest indications, possesses the curious feature of a mid-wall slab of stone filling one of the belfry openings, in which a cross of Early form has been cut (the cross is solid, the background cut away).

[*Newton, by Castle Acre,*] shows remains of mid-wall work in the dilapidated tower, which is axial.

Houghton-on-the-Hill, near Swaffham, is an interesting little church, with signs of antiquity about the nave in the shape of some l. and s. work and r.h. double splayed slits north and south of nave. In that to north the original wooden shutter remains in the central opening.

Near King's Lynn there have been mentioned as Saxon Flitcham church and the ruined chapel close to the keep at Castle Rising. Of these Flitcham has interesting early Norman portions, and Castle Rising (chapel) is a Norman apsidal oratory of a type represented by Mells chapel, near Wenaston, Suffolk. It has thick walls of flint rubble and small r.h. slits, widely splayed internally.

Returning eastwards upon a more southerly

* There are papers on the Round Towers of this region in *Archæologia*, xxiii.; *Journal of Archæological Association*, xxi., xxxvii., xliv., xlvi., xlviii.; and on Saxon Architecture in Norfolk in the *Archæological Journal*, vi.

† Names of churches containing Saxon work are printed in italics. Those enclosed in brackets are to be regarded as doubtful.

* As a matter of terminology, the word "central" as applied to a tower might be confined to cases where the plan is cruciform. A tower between nave and chancel of a non-cruciform church, such as Iffley, would more correctly be termed an "axial" tower.

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line, we find at Cranwich, between Stoke Ferry and Thetford, a round tower of a common type with an old west light splayed internally, but no pre-Conquest features.

Rockland, All Saints, a dozen miles farther east, presents us with a nave constructed in flint rubble with much herring-bone work, and showing l. and s. quoins at all its angles. The west tower and tower arch, as well as the chancel and chancel arch, are later. The east wall at the chancel arch is only 1 ft. thick. The measurements internally were c. 34 ft. by 19 ft. There are no old windows, but the openings of the south and (blocked) north door may be original. The l. and s. work is small in character, and seems to exhibit the dying out of a technique.

In the neighbourhood of Diss, South Lopham attracts attention for its fine Norman tower and various other features of the same date. At the west end of the north wall of the nave there occurs a small circular double-splayed light, with the pierced wooden shutter still in the opening, which may betoken an earlier date for this part of the fabric. Near it, however, in the same wall, is a blocked Norman door of the twelfth century.

Scole.—There are remains of l. and s. work at the south-east quoin of the original nave.

[*Gissing.*]—There is a combination of features here that makes the example instructive. The church has a round west tower with a Norman tower arch with chevron ornament, a small circular west light splayed inside and out, and double belfry lights with mid-wall shafts surmounted by cubical caps. The tower arch resembles the north door of the church, and may be an insertion, as the mid-wall work and double-splayed light can hardly be contemporary with the chevron ornament.

On the line from Diss towards Norwich we come to Tasburgh. The round west tower of this picturesquely-situated church possesses the very high and narrow tower arch (16 ft. 6 in. by 4 ft. 6 in.) characteristic of the East Anglian region. The belfry openings are late and the lower ones internally splayed. On the exterior there are two stages of shallow arcading in the flint rubble of the fabric that looks like Norman work.

At Colney, west of Norwich, on the ringing stage of the round west tower there are three r.h. lights splayed outside and in. Double-splayed lights also exist in the neighbouring church of Cringleford.

At Norwich (Cathedral Close) it has been pointed out that the west wall of the cloisters contains a range of six circular double-splayed windows of pre-Conquest character. The splays, which slope from an outer opening 2 ft. diameter to an aperture of 1 ft., are worked in the flint rubble of the walling and were finished with plaster. The wall is 3 ft. thick.

This is a test case upon the question whether or not the appearance of the double splay is an infallible indication of pre-Conquest date. The writer of a notice of the work in "Norfolk Archæology," vol. viii., thought that the wall might have been an outer wall of defence of a Saxon monastery earlier than the Norman foundation. There is no evidence of the existence of such a monastery, and the wall, independent of the openings, is in position and technique—flint rubble with some herring-bone feeling—what we should expect from the early Norman builders on the site. If in this case we explain the formation of the windows as a survival of an older technique into Norman times, it would govern many others where the double-splayed light is the only visible indication of pre-Conquest date.

Norwich, St. Julian.—The round west tower here has always been accounted pre-Conquest on account of two r.h. double-splayed windows on the ringing stage to north and south. The church exhibits Norman features in both the (aisleless) nave and chancel, but it is impossible to prove that the tower is not a relic of an older edifice. There are indications, in the shape of pilaster-like thickenings, north and south, where it joins the church, that may be quoted in favour of this view.

At Framingham Earl there is nothing now visible that indicates a specially early date. The neighbouring church of Framingham Pigot, which is reported on as having been Saxon, was rebuilt some forty years ago.

Howe.—The west tower here has as good a claim as any in the district to pre-Conquest rank. The tower arch, 12 ft. 6 in. by 6 ft. 9 in. between the jambs, with arch set back 3 in. on each side on the jambs, has shallow mouldings on the imposts (see *ante*, fig. 9), and on the lower stage of the tower, north and south, are small circular lights, splayed inside and out from a diameter of 2 ft. 6 in. to a central aperture of 10 in. (for plan of the light, see *ante*, fig. 6). Swainsthorpe and Shottesham St. Martin (now a ruin) have old r.h. loops, but are probably not pre-Conquest.

In the extreme south-east corner of the county we find the well-known round tower of Haddiscoe, with which may be compared the equally famous example on the other side of the Waveney, in

Suffolk,

of *Herringfleet*. In both these cases we have the pre-Conquest feature of double belfry lights, triangular-headed, with mid-wall work. The caps at Herringfleet are cubical, at Haddiscoe scalloped. Angle shafts are used on the external quoins of the openings, and the billet ornament occurs in hood mouldings round the apertures. Both churches have Norman doorways. If we take into comparison the similar example of Bassingham, already noticed, we may place Bassingham, which has no Norman features, in the pre-Conquest period, may see at Herringfleet, where the east belfry opening is more simply treated, a pre-Conquest tower modified by later Norman detail, and in Haddiscoe a Norman example retaining the native mid-wall work. The tower arch at Haddiscoe is of early character, and measures 12 ft. by 3 ft. 6 in., almost exactly the same as Bassingham.

Bungay, where there is a characteristic r. h. loop in the north wall 2 ft. 8 in. by 6 in. and marks of old lights in the lower stage of the tower, brings us into the vicinity of the interesting ruin at South Elmham, about the date of which there has been some controversy. We have here to all appearance a Norman apsidal chapel of a type represented not far away at Mells Chapel, near Blythburgh; at Castle Rising (*v. supra*); at Maplescomb-under-Kingsdown, in Kent, and other places. It is built of flints carefully faced, with walls about 4 ft. thick, pierced by internally splayed windows. The nave has a western division cut off by a wall, an arrangement to be paralleled in a Norman church not far away at Gillingham, near Beccles. The only feature that appears problematical is the chancel arch. The width of this between the existing jambs must have been about 20 ft., and for abutments there is on each side a portion of wall about 4 ft. thick and about 7 ft. in the direction of the thrust. If this wall, strengthened as it is by the walls of the nave and presbytery which join it at right angles, is held insufficient to support a single arch of 20 ft. span, a triple or double arch must be assumed, the intermediate piers of which can have rested on a sleeper wall which crosses the opening. This sub-divided chancel opening is an early feature (see *Archæological Journal*, vol. liii., p. 298 f.), and on the strength of its assumed existence here, South Elmham has been claimed on high authority for the seventh century. It needs hardly be said that there is nothing in the historical argument according to which this place is the "Elmham" where Archbishop Theodore fixed in 673 the second seat of the divided East Anglian diocese. As it is only some dozen miles from the original bishop's seat at Dunwich, such an arrangement would have been absurd, and the Elmham in question must be North Elmham, in Norfolk.

The portion of the plan of the ruin given in fig. 18 will facilitate judgment on the technical

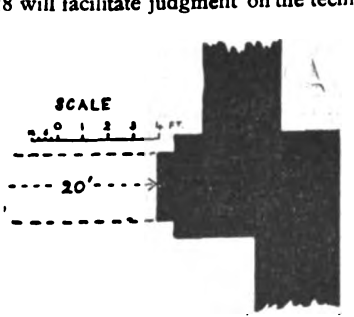

Fig. 18.—Southern Abutment of Chancel Arch at South Elmham, Suffolk.

question of the support of the chancel arch, and it should be added that the quality of the mortar is surpassingly good—so good, that at the west end a portion of the wall overhangs about 4 ft., with no support but the tenacity of the binding material of the masonry.

In the ruined church on the hill at Dunwich no pre-Conquest features are to be distinguished, but *Darsham* possesses what looks like a Saxon north door.

In the more southern part of the county a group of churches exhibit l. and s. work in the quoins and some other early features. There may be mentioned, in order from north to south, *Debenham*, where there are l. and s. quoins to the fine square west tower, *Gosbeck*, *Hemingstone*, *Barham*, and *Claydon*.

Essex.

The Essex churches are notable for the large employment of Roman material, the use of which does not, however, always betoken a pre-Conquest date. The tower of *Trinity Church, Colchester*, is one example. Another is *Great Hallingbury*, near Bishop Stortford. This church is rebuilt, but the old chancel arch remains, and shows an arch 11 ft. 6 in. in span, recessed on the west face, constructed of Roman brick, and springing from imposts of the same material. This looks like pre-Conquest work, but, on the other hand, the tower arch at Felstead, though turned in Roman brick, starts from Norman stone jambs with angle shafts. There are other examples of such arches where a decision as to date is difficult. The wooden nave of the church at *Greensted* is a unique example of Saxon timber construction. It is to be noted that there is no sign in it of the frame-and-filling technique which belongs to later mediæval times, but it is built of split boles of oak-trees set upright side by side with the rounded part outwards, after the fashion of the timber palisading shown on the moated mounds in the Bayeux tapestry.

A building of great interest is [*St. Peter's-on-the-Wall*] near Bradwell. This ancient church, now used as a barn, and measuring internally 49 ft. 9 in. by 21 ft. 9 in., has lost its presbytery, which was apsidal, but preserves traces of a sub-divided "arch of triumph," where we see the springing in Roman brick carefully laid of the subsidiary arches. The walls are 2 ft. 4 in. thick. The masonry is of small squared stones, in parts curiously like the *petit appareil* of early churches in Northern France. Long Roman stones are used upright in the quoins. This technique, the apse, and the subdivided presbytery opening seem early, but the puzzling features are the buttresses, 2 ft. wide by 1 ft. 10 in. in projection, that are partly in bond with the walls, and partly, as at the west end, built up against them, and leave the actual angles of the building free. It has been held on the one hand that the building was erected by Bishop Cedd in the seventh century, and on the other that it belongs to the twelfth or thirteenth centuries.* Its general site, the old Roman fortress of Othona, is in favour of the first view, but its actual location in the very opening of the principal gate of the fortress is against it, as in Cedd's time this gateway would still have been in use. It is a puzzling structure, and some further attention might well be paid to it.

Cambridgeshire.

This county presents us with two important monuments; *St. Benet's, Cambridge*, with its fine Saxon tower, where we find externally l. and s. quoins and mid-wall work in belfry openings, and in the interior a grand tower arch with moulded imposts returned along the east face of the wall, and pilasters carrying archivolt mouldings, at the springing of which are lions carved in relief, and *St. Giles, Cambridge*, where in a reconstructed church is preserved a good late Saxon tower-arch, now at the east end of the south aisle.

Brockwell Park Extension.—The contract for the purchase of the additional land—43 acres—at Brockwell Park, Herne Hill, was ratified three or four weeks ago, the purchase moneys amounting to 64,500*l.*, and towards the total costs a balance of about 3,700*l.* is still needed. The land has been bought from the Blackburn Estates trustees by means of contributions by the London County Council—in whom the freehold will be vested—30,000*l.*; Lambeth Vestry, 20,000*l.*; Camberwell Vestry, 8,000*l.*; Newington Vestry, 1,500*l.*; the Ecclesiastical Commissioners, 1,000*l.*; the City Parochial Charities Trustees, 1,000*l.*; St. George, Southwark, Vestry, 500*l.*; and an anonymous donor, 1,000*l.*

* See for the first opinion *Archæologia* xli., 421; for the second, *Archæological Journal*, xxxiv. 212.

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THE LONDON COUNTY COUNCIL.

THE weekly meeting of this Council was held at Spring-gardens on Tuesday, Mr. W. H. Dickinson (the Chairman) presiding.

Loans.—The following loans were granted :—Lewisham District Board, 1,300*l.* for brick and sewer work ; St. Pancras Vestry, 16,710*l.* for brick, sewer, and wood-paving works ; Battersea Vestry, 17,124*l.* for erection of stabling ; Hackney Vestry, 10,000*l.* for disinfecting station, &c. ; Kensington Vestry, 18,000*l.* for wood-paving works ; St. Marylebone Guardians, 9,000*l.* for additions to workhouse ; School Board for London, 150,000*l.* for schools, &c.

Rotherhithe Tunnel.—The Bridges Committee reported that, under the Thames Tunnel (Rotherhithe and Ratcliffe) Act, 1890, the Council was authorised to construct a tunnel between Rotherhithe and Ratcliffe, together with several roads and widenings and approaches. It would be first necessary to proceed with the acquisition of property, the estimate for which, including the cost of rehousing, reached a total of 846,750*l.* The Committee recommended :—"That the estimate to be submitted by the Finance Committee of 846,750*l.*, for the acquisition of property required for the purposes of the Rotherhithe Tunnel scheme, be approved, and that the Bridges Committee be authorised to incur expenditure on capital account up to that amount for the purposes of the scheme."

This was adopted, after an amendment to defer the matter for a year had been negatived.

Electric Generating Station.—The Highways Committee recommended :—

"That the Council do in connexion with the establishment of a generating station for the London County Council Tramways, seek powers in the next session of Parliament to acquire the St. Matthew's girls' school premises adjoining the Camberwell tramway depot, and that a clause be included in the Bill to provide that improvements made in the land in question after the 16th October, 1900, when the proposal to acquire such land was made public, shall not be taken into account in assessing compensation, if the improvements be made with a view of obtaining or increasing the compensation payable by the Council."

This was agreed to.

Improvement Schemes.—The Improvements Committee submitted a list of eleven public improvements for which Parliamentary sanction had been obtained. It was, the Committee remarked, very desirable that ten of them should be undertaken and carried out at the earliest possible moment, and as soon as the Council approved the estimates the necessary steps would be taken for the service of notices to treat upon the owners of the property to be acquired for the ten improvements in question. The Committee, therefore, recommended :—

"That the estimates of 660,750*l.*, 227,800*l.*, 92,400*l.*, 5,200*l.*, 6,000*l.*, 10,450*l.*, 171,300*l.*, 46,900*l.*, 41,200*l.*, and 45,030*l.* (amounting in all to 1,307,030*l.*), submitted by the Finance Committee in respect of the following ten improvements :—(1) Mare-street, Hackney ; (2) Goswell-road ; (3) St. John-street, Clerkenwell ; (4) Blackstock-road, Islington ; (5) Archway-road, Islington ; (6) Kentish Town-road ; (7) Nine Elms-lane ; (8) Battersea-rise ; (9) Blackheath-road, Blackheath-hill, and New-road ; and (10) High-street and Gardener's-lane, Putney, be approved ; and that the Improvements Committee be authorised to incur expenditure on capital account up to those respective amounts for the purpose of the ten improvements in question."

The recommendation was adopted.

It was also resolved, on the recommendation of the Public Control Committee, to sanction an expenditure of 5,515*l.* in the erection of a weights and measures office and coroner's court at Clapham.

Holborn to Strand—Architectural Features.—With regard to this scheme the Improvements Committee reminded the Council that the suggested designs for the elevations of the buildings to be erected fronting on the Strand and on the crescent road to be formed between Wellington-street and Clement's Inn would be exhibited at the Gallery of the Royal Society of Painters in Water Colours, at No. 5A, Pall Mall East, from Friday, October 26, to Saturday, November 3 (inclusive). The Committee added : "We have now the pleasure of reporting that Mr. R. Norman Shaw, R.A., has readily accepted our invitation to advise upon the designs in association with the Council's architect, but has expressed his desire not to accept any fee, as he states that he is anxious to place his services at the disposal of a body engaged in the congenial occupation of beautifying the architecture of the city in which one dwells."

This was adopted, as was a further report, setting out a scheme for rehousing 3,700 persons dispossessed of their homes by the improvements. The accommodation for these persons will be provided as follows :—On Duke's-court site and Marquis-court site, the corner of Kemble-street and Drury-lane (799) ; on Reid's brewery site (1,681) ; on the Herbrand site (680) ; and on the Millbank site (290).

With regard to St. Mary-le-Strand and St. Clement Dane's churchyards, the Council accepted the tender of the London Necropolis Company in 2,258*l.* for removing the human remains and reinterring them at Woking.

St. Martin's Church—Important Proposal.—The Improvements Committee reported that the Vestry of St. Martin-in-the-Fields had submitted a proposal for the widening of St. Martin's-place by the alteration of the steps in front of St. Martin's Church, and they had asked the Council to contribute part of the cost of the work. The steps had been in a dilapidated condition for some time, and owing to their condition and position were the cause of frequent accidents to pedestrians. The Vestry had agreed with the church authorities for the reconstruction of the steps in such a way as to remove the landing on the west side of the portico and to lessen the width of the landing on the south side. A continuous flight of steps would lead from the western front of the portico to the footway of St. Martin's-place, and the effect of the abolition of the landing would be to widen the footway to about 9 ft. The Committee regretted that it was not possible at the present moment to increase the width of the carriageway, but any increase in the width of the thoroughfare at this part, whether carriageway or footway, must be of great advantage to traffic generally. The Committee quite agreed with the Vestry as to the urgency of the work, and approved of the action taken by them in the matter. They considered that the Council might reasonably contribute one-third, not exceeding 270*l.*, of the net cost of the scheme which the Vestry propose to adopt, and recommended—

"That the estimate of 270*l.* submitted by the Finance Committee be approved, and that the Council do contribute, on the usual conditions, one-third of the net cost of the reconstruction by the Vestry of St. Martin's-in-the-Fields of the steps in front of St. Martin's Church in such a way as to increase the width of the footway on the eastern side of St. Martin's-place to about 9 ft., as shown upon the plan submitted by the Vestry on July 14, 1900, such contribution not to exceed the sum of 270*l.*"

Mr. Shaw Lefevre moved the following amendment :—"That the report be referred back, with instructions to take expert opinion as to the architectural effect of the proposed alteration, and to request the Vestry meanwhile to take no further action for carrying out the work." On a show of hands the amendment was adopted.

Art Gallery for Whitechapel.—The Theatres and Music Hall Committee reported having considered plans of the Whitechapel Art Gallery submitted by Mr. C. H. Townsend on behalf of the trustees, who intend applying for a music licence for the ground floor of the building, at the coming session. The gallery is situated in Whitechapel High-street. The premises have been erected for the purpose mainly of picture exhibitions, and contain ground and first floor galleries, but when used for public purposes under the licence it is proposed to shut off the lower gallery from the upper one by means of iron doors at the foot of the stairs. Seating accommodation will be provided for 622 persons. The site does not comply with the regulations, as out of a total boundary of 414 ft., 42 ft. front to High-street, 8 ft. to Angel-court, a narrow cul-de-sac, 20 ft. to an open private yard with a gateway to Osborn-street, and the remainder is enclosed by other buildings. The only public exit from the hall is at the south end, where two doorways, having a total width of 11 ft. 2 in., open into a vestibule 16 ft. 6 in., and from this vestibule, which is 22 ft. long, two outer doorways having a total width of 11 ft. open into High-street. The control of the Art Gallery is vested in trustees and is regulated by a scheme approved and established by the Board of Charity Commissioners. Having regard to all the circumstances of the case, the Committee recommended :—

"That Mr. Townsend be informed that the Council will be prepared to grant a certificate under section 12 of 41 and 42 Vict., cap. 32, in regard to the Whitechapel Art Gallery, on being satisfied that the usual conditions have been complied with."

This was carried.

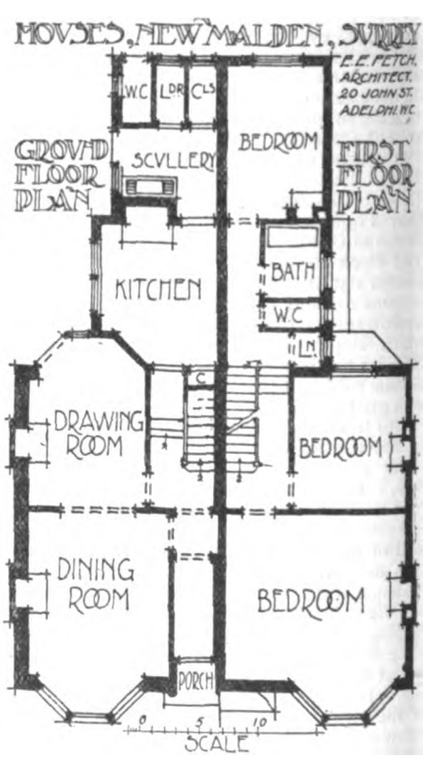
Temporary Structures.—In connexion with the march of the City Imperial Volunteers through London on the 27th inst., the Building Act Committee reported that, in view of the probability of temporary stagings being erected for the accommodation of sightseers, they had thought it advisable, following the practice which was adopted at the time of the Diamond Jubilee procession in 1897, to issue to the occupiers of premises on the line of route notices calling attention to the fact that it is unlawful to erect such temporary structures without first obtaining the Council's licence in respect thereof ; and also calling attention to the necessity of balconies, intended to be used, being properly shored up to prevent risk of accident.

They had also made special provision for dealing promptly with any structures which may be found to be dangerous.

The report was adopted, and after transacting other business the Council adjourned for a week.

HOUSES AT NEW MALDEN, SURREY.

THESE two small houses have been recently erected in the Pressburg-road. The accommodation provided consists of two sitting-rooms, five bedrooms, and the usual offices. In the architectural treatment of the elevations a design in harmony with rural surroundings has been adopted, in preference to the stereotyped suburban villa house, and with regard also to the effect of light and shade produced in bright sunshine by the boldly projecting bays, gables, and eaves, upon the grey, broadly treated



rough-cast, while the red brickwork of the ground story and the white paintwork of the windows and entrance should give the houses a cheerful aspect even on dull, grey days, of which we have so many in this climate.

It is proposed to erect more houses of a similar type in the locality, which is rapidly becoming an important suburb of Greater London.

Mr. G. B. Willett has executed the work from the designs and under the superintendence of the architect, Mr. Ernest E. Fetch, of London.

WORKMEN'S DWELLINGS, LIVERPOOL.—A Local Government Board inquiry was held on the 16th inst. in reference to an application made by the Liverpool Corporation to borrow 30,000*l.* for the erection of ninety-five workmen's dwellings, on the tenement principle, in Kempston-street, Gildart-street, Constance-street, and Fontenoy-street, which were included in one of the insanitary areas, where condemned property had been demolished.

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APPLICATIONS UNDER THE 1894 BUILDING ACT.

The following applications under the 1894 Building Act have been dealt with by the London County Council. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. The buildings are new erections unless otherwise stated :—

Lines of Frontage.

Finsbury, East.—An electric central station at Oak Wharf, City-road, St. Luke's, at the corner of Graham-street, so far as relates to the omission of the detached office building next the City-road basin (Mr. H. B. Rennie for the County of London and Brush Provincial Electric Lighting Company).—Consent.

Wandsworth.—The retention of two projecting pilasters with bases, and a plinth, in front of the Royal Oak beer-house, East Hill, Wandsworth (Mr. T. W. Biggs for Messrs. Stansfeld & Co., Limited).—Consent.

Chelsea.—The erection of buildings on the south-west side of Park-walk, between Chapel-street and Winterton-place, Chelsea, so as to allow the land required to be dedicated to the use of the public for the purpose of widening Winterton-place.—Refused.

Lewisham,†—A dwelling-house, with bay windows on the south side of Sydenham Park, Sydenham, next No. 50 (Mr. G. Tolley for Mr. E. C. Christmas).—Refused.

Lewisham.—Erection of five houses with one-story shops on the West side of High-street, Lewisham (Messrs. Sills & Leeds for Messrs. W. G. Larke & Sons).—Consent.

Lewisham.—Erection of one-story shops on the west side of Catford Hill, Lewisham (Mr. A. Stuart for Mr. H. T. Holdron.—Consent.

Deptford.—Erection of one-story shops, with bay windows over, on part of the forecourts in front of Nos. 402 and 404, New Cross, Deptford (Mr. J. Webster).—Consent.

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Woolwich.—Erection of one-story shop, with wooden balustrade over, on part of the forecourt of 148, High-street, Plumstead (Mr. T. Bradshaw).—Consent.

Hackney, Central.—An addition to a one-story building at the rear of 24, Southgate-road, Kingsland (Mr. G. Flaxman for Mr. E. Madge).—Consent.

Width of Way.

Poplar.—Three blocks of dwellings on the east and west sides of Ann-street and the west side of Brunswick-road, Poplar, respectively. (Mr. J. Briggs for Housing of the Working Classes Committee of the London County Council).—Consent.

Southwark, West.—Block of artisans dwellings on the north side of Sumner-street, Southwark, to extend over Martagon-place. (Mr. F. H. Jackson for the City of London Electric Lighting Company).—Refused.

Chelsea.—One-story lavatories in the playground of the Roman Catholic Schools for Girls, Chelsea. (Messrs. J. Brown & Son).—Consent.

Projections.

Islington, East.—The retention of a projection (an illuminated sign) at the Montague Arms public-house, Benwell-road, Islington (Mr. W. H. Fisher for Mr. J. C. Truman).—Consent.

Finsbury, Central.—Retention of an iron and glass shelter at the entrance to the Clerkenwell Town Hall, Rosebery-avenue, Clerkenwell (Mr. A. G. Langdon for Vestry of Clerkenwell).—Consent.

Greenwich.—A projecting lamp in front of the Three Tuns public-house, No. 18, London-street, Greenwich (Mr. J. R. Johnston for Messrs. Taylor, Walker, & Co.).—Consent.

Kensington, South.†—An iron and gtass covered way in front of No. 14, Upper Phillimore-gardens, Kensington (Messrs. Shuffrey & Co. for Mr. B. L. Ronald).—Consent.

Strand.—An oriel window at the first-floor level of a three-story building on the north side of Horse and Dolphin-yard, Soho (Mr. A. Ventris for Board of Works for the Strand district).—Consent.

Strand.—An iron and glass shelter at the entrance to Mr. Lowenfeld's theatre next the Lyric Theatre, Shaftesbury-avenue, St. James's (Mr. L. Sharp for Mr. Lowenfeld).—Consent.

Marylebone, West.†—A balcony at the first-floor level in front of 12, Marble-arch, Edgware-road, St. Marylebone (Mr. A. E. Nightingale for Mr. T. C. Reece).—Refused.

Marylebone, West.—Re-erection of balcony at the first-floor level in front of 42, Montagu-square, St. Marylebone (Mr. F. W. Hunt for Honourable Miss Powys).—Refused.

Lines of Frontage and Width of Way.

Bethnal Green, North-East.—An extension of the periods within which the re-erection of buildings on the site of the Arabian Arms public-house, Nos. 222 to 232 (even numbers only), Cambridge-road, and Nos. 2, 4, 6, and 8, Bishop's-road, Bethnal Green, was required to be commenced and completed (Messrs. H. Dawson & Son).—Consent.

Line of Frontage and Space at Rear.

Islington, West.—Bakehouse with a room and store over at the rear of 80 and 81, Goodinge-road, Holloway (Messrs. Higgs & Rudkin for Mr. W. Ritter).—Refused.

Width of Way, Lines of Frontage and Space at Rear.

Lambeth, North.—Buildings on the site of 136 to 146 (even numbers only), Kennington-road, and 67 and 68, Walnut Tree-walk, Lambeth (Messrs. Waring & Nicholson for trustees of the Lambeth Walcot Charity Estate).—Refused.

Adaptation of Footways for Carriage Traffic.

Holborn.—Widening and adaptation for carriage traffic of Richbell-place, Lamb's Conduit-street, Holborn (Messrs. Lander, Bedells, & Crompton).—Consent.

Norwood.—Widening and adaptation for carriage traffic of a portion of Benton's-lane, Gipsy Hill, West Norwood (Messrs. Barlow & Roberts).—Consent.

The recommendations marked † are contrary to the views of the Local Authorities.

NEW WORKING RULES BETWEEN LONDON BUILDERS AND STONEMASONS.

We have received from the Secretary of the London Master Builders' Association copies of the rules now in force as between their Association and the Carpenters' or Joiners' Societies, the National Association of Operative Plasterers, and the Operative Stonemasons' Society. The two first-named sets of rules were agreed to under the dates April 19 and March 10 respectively of the present year; those concerning the Stonemasons' Society are of later date (July 16), and one of the new rules (No. 2) has not yet come into operation. Rule 10, which is the other new one, practically puts the provision for a "Conciliation Board" on much the same footing as in the case of the carpenters and the plasterers. The following is the text of the two new rules in the agreement between the London Master Builders' Association and the Operative Stonemasons' Society; the word "employer" standing throughout for a member of the Builders' Association, the word "workman" for a member of the Stonemasons' Society:—

"2. That the present rate of wages shall be advanced one halfpenny per hour from Saturday, November 3, 1900.

* * * * *

10. (A.) For the adjustment of all disputes and to avoid stoppage of work, it is agreed that upon a difference arising between an employer or upon the works of an employer and any of his workmen, from any cause whatever, notice shall be given by the Association or Society of the complaining party to the Association or party representing the other side, and the subject-matter of dispute shall thereupon be referred to the Board of Conciliation, who shall be summoned within seven days, and, if practicable, shall give their decision within the next six working days, proceeding in the following manner:—

(B.) For all purposes of the foregoing rules the Board of Conciliation shall consist of three members nominated by the employers and three by the workmen. Each party shall send to the other within one week from the date of signing these rules, and within one week from January 1 in each year, the names of six persons from whom three shall be selected to act as their representatives on the Board of Conciliation for the current year ending December 31, and in the event of the death or resignation of any member, either party shall appoint another member within one week, notice being given thereof. The number of representatives of the employers and of the workmen on the Conciliation Board shall always be equal, and shall be so maintained during the sitting.

(C.) The Board of Conciliation so constituted, if unable to agree, shall make application to the Board of Trade under the 'Conciliation Act, 1896,' or apply for the appointment of a person to act as a conciliator. The Board of Conciliation shall have power to decide all questions arising between the employer and the workmen, including any questions between one trade and another as regards demarcation of labour or other matters, provided that for the decision of any question involving claims or rights of other sections of the building trades a Joint Conciliation Board shall be constituted of the three representatives nominated by each trade involved and by a similar number of representatives of the employers, so that members of the Joint Conciliation Board may be specially represented on such Board, and so that the numbers of representatives of the employers and the workmen on such Joint Conciliation Board shall be equal and be so maintained during the sitting.

(D.) A Joint Conciliation Board shall have the like powers as a Conciliation Board and be regulated in the same manner.

(E.) The Conciliation Board or a Joint Conciliation Board shall have power to make such rules and regulations for the transaction of business as they may approve.

(F.) In the event of an application being made to the Board of Trade or a person being appointed as conciliator, the decision of such person or the Conciliation Board shall be final and binding on both parties."

Copies of all three sets of rules, we may add, can be obtained from the Secretary of the London Master Builders' Association, 31 and 32, Bedford-street, Strand, price 2d. each, or 1s. 6d. per dozen copies.

Books.

Injectors: Their Theory, Construction, and Working. By W. W. F. Pullen, A.M.Inst.C.E., M.I.M.E. The Technical Publishing Company, Ltd., Manchester. 1900. Second Edition.

So far as we are aware, the only treatise devoted exclusively to a consideration of the injector is that written by Mr. Pullen, of which the second edition is now published. In the arrangement of his book, the author has departed from the practice adopted by most writers, in the respect that historical references are reserved until theoretical points have been fully discussed. The introductory chapter contains an explanation of the action of the steam injector, and of the apparently paradoxical results obtained with it in practice. Following this introductory matter there is a mathematical investigation relative to the efflux of steam under different conditions, to the limits within which the injector is capable of working, and to the weight of water which can be delivered through cones of various diameters with steam at varying pressures. In connexion with the last-mentioned point, a set of twenty-five curves is given in two diagrams, from which the reader may see at a glance what is the proper size for an injector to supply steam boilers of from 0 to 1,600 horse-power, when steam pressure varies from 10 to 140 lbs. per square inch. Mr. Pullen directs attention to a somewhat curious point relative to the diameter of the delivery cone. Thus, in the case of an injector designed for a maximum quantity of feed-water per pound of steam, the maximum feed will theoretically require a delivery cone of maximum diameter. But if the injector be regulated so that a minimum quantity of feed-water is delivered per pound of steam, the delivery cone is not required to be so large as under the former condition of working; and if it remains constant (as it always does in practice) the cone cannot be full of water. This conclusion, as the author points out, "appears antagonistic to the general laws of hydraulics, where the pipe must be full before a reduction of velocity is accompanied by a corresponding increase in pressure." Practical experience seems to suggest the explanation that the steam is not entirely condensed in the combining cone, and that this, together with vapour given off from the water at the temperature of delivery, may produce a pressure in the delivery cone surrounding the jet of water sufficient to ensure steady motion. Nevertheless it appears desirable that regulation of the steam and water cones should be accompanied by corresponding regulation of the delivery cone. As Mr. Pullen remarks, this has not hitherto been attempted in practice.

Most of the remaining chapters are devoted to the description and illustration of different forms of injectors, and in the present edition all the leading types of steam-injectors are included, though it must not be supposed that every individual maker is mentioned by name. A few interesting notes are to be found with regard to air-injectors and air-ejectors, as used for forced draught, or for producing a partial vacuum. The water-injector, in which water forms the motive power, is also discussed. Apparatus of this kind is employed at the Barry Docks for pumping out water when dock gates have to be examined or repaired. The injectors at that place are supplied with water at 700 lbs. per square inch, and they deliver about 5,000 gallons of water per hour. The maximum lift of the injectors is about 10 ft., and the height to which water is forced above the injectors is 35 ft.

The book would be improved by a separate chapter dealing with practical applications of injectors and apparatus of a like nature. It is true that some mention is made by the author of different purposes for which injectors and ejectors may be used, but the references in question are mixed up in the historical sketch constituting the concluding chapter, and there are many methods of utilising these useful and beautiful appliances which the author does not mention in any way. Taking the work as a whole, it may be said to present a complete and well-reasoned exposition of the subject.

The Reclamation of Land from Tidal Waters. By Alexander Beazeley, M.Inst.C.E. London: Crosby Lockwood & Son. 1900.

In the compilation of this book we imagine the author must have had a somewhat ungrateful task. He was invited to rewrite a useful work by the late Mr. J. Wiggins, F.G.S., on "The Practice of Embanking Lands from the Sea," and it was stipulated that the subject should be brought "thoroughly up to date, and be of a severely practical character." The method adopted by Mr. Beazeley is to give copious quotations from the work mentioned, generally beginning with some such phrase as, "Mr. Wiggins mentions," "Mr. J. Wiggins lays great stress," "Mr. John Wiggins has laid down some rules," &c. In addition to these lengthy extracts there are others from the writings of various authorities, whose opinions are sometimes at variance one with another. The result is not particularly satisfactory. There is so much "Wiggins" that one begins to acquire confidence in his teaching, and to experience the desire for more. The author has also quoted so much from other authors, that one likewise feels tempted to refer to their respective works for further information and guidance. Mr. Beazeley has evidently been at

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great pains to collect the most trustworthy opinions and facts, although some of them are by no means new; and it is probably owing to the conscientious manner in which these data are presented, to the exclusion of his own personal experiences, that one fails in great measure to recognise in him a leader and a guide.

Apart from these unfortunate attributes it must be acknowledged that the volume contains a large amount of very useful information, dealing with the most salient features of land reclamation. The nature and suitability of the site, different modes of embankment and drainage, maintenance, warping, and after cultivation all receive due attention; and numerous notes and references are appended, so that those desiring further details may see at a glance where such may be obtained. Regarding groynes and protective outworks, the author remarks: — Substantial and well-constructed though it may be, and however great the care bestowed upon due employment of the means needful for keeping it in proper condition and repair, the bank is strong so long only as its foundation remains secure. . . . . There is no feature of greater importance in connexion with the dykes than the projecting works, or groynes." In view of these opinions, it seems a little disproportionate that, whilst the "bank" should receive treatment covering 114 pages, the all-important subject of protective works should be dismissed in 17 or 18 pages. Something more might very well have been said about the latter, and detailed examples of recent work would have been especially valuable. The chapter on Legal Requirements could certainly be omitted without impairing the value of the volume as an engineering handbook, and without detracting much from its general usefulness, for reclamation works are never likely to be undertaken unless under proper legal advice. The index is of somewhat meagre proportions; it contains no reference to several important modern works mentioned in the text, and, curiously enough, no place has been found in it for Mr. Wiggins, the main source of inspiration.

The Chemistry of Materials of Engineering. By A. Humboldt Sexton. Manchester: The Technical Publishing Company, Limited. 1900.

At the commencement of the nineteenth century chemistry was the hobby of a few eccentric students of science, and occasionally served as a source of amusement for a wealthy audience; at its close, chemistry is taught in every school, and is of recognised value in every art and industry. The artist may paint beautiful pictures, but they will soon fade if he work with pigments which readily undergo chemical change under atmospheric influences; the engineer may construct well-devised machinery, but his ingenuity will be unavailing if his materials contain chemical impurities which influence prejudicially the strength of those materials; the architect may erect soul-inspiring edifices, but his skill will be but of transient value if he build with materials of feeble chemical stability.

The ancients and mediævalists learned to paint and construct with durable materials through knowledge gained by experience, such knowledge being handed down from generation to generation. But in transmission important facts gradually became lost in oblivion and had again to be learned by costly experience. "Experience teaches fools," says an old adage, and as it is possible to acquire the knowledge that the hand will not retain its normal condition under the influence of the heat emitted by glowing carbon without gaining practical experience by actually thrusting the hand into an incandescent bed of fuel, so is it possible, by a study of the laws which govern changes of form in matter, to erect durable structures without previous experience in the erection of edifices of an unstable character. That is one of the primary advantages of scientific knowledge and of the power of scientific observation: it enables us to avoid troubles which otherwise would not be avoided until knowledge had been gained by painful practical experience.

Professor Sexton's book is designed to assist the engineer in becoming acquainted with the chemical properties of the principal materials used for engineering construction; and as these materials are identical with those used by the builder, the book will, to a lesser extent, be of service to those engaged in building construction. We say to a lesser extent because thirteen of the twenty-five chapters into which the book is divided are entirely devoted to iron and steel, whilst the more important building materials, stone, brick, mortar, and cement are allowed only three chapters altogether, and are very superficially treated. The extent to which Portland cement is used by engineers certainly entitles it to greater consideration than it receives in the few lines here devoted to it, and we find no mention whatever of selenitic mortar or cement, although gypsum itself is briefly described. Other chapters deal with copper, and the more common metals and alloys, with fuel, water, lubricants, and paints and varnishes; whilst the final chapter briefly describes the characteristics of materials of minor importance, such as emery, glue, and leather.

The book will meet the requirements of many men in this country, for engineers and builders who possess very little knowledge of chemistry (we should not like to venture a statement as to their number) will find a large amount of useful information here set forth in a clear and simple style. In Germany the book would have less chance of success, because German engineers and builders learn at school most of the information to be found in it. The rising generation of British builders and engineers will also learn during their early training all, and we hope more than all, that this work can teach them regarding the chemistry of constructive materials. Meanwhile the book may be of much service to those who have not received a modern education, although the inexcusable negligence of the author in failing to provide an index has greatly detracted from its value for reference purposes.

Incidentally, Professor Sexton, writing as a metallurgist, makes a complaint regarding the manner in which engineers and architects draw up their specifications for steel girders. He says:—

"There is, unfortunately, no doubt that engineers often specify steel to be made by a particular process from habit or fancy, without any clear idea as to why the metal made by that process should be better than that made by any other. Such specifications have lowered engineers very much in the eyes of practical metallurgists, and have made the latter think that too often the former do not know exactly what they want. Architects are, perhaps, even worse sinners in this respect than engineers, it being no uncommon thing for girders and other articles of structural steel to be specified to be made of 'mild steel' without any restriction as to composition or provision for testing."

We fear that practical metallurgists are sometimes lowered in the eyes of engineers and architects by the condition of the article the metallurgist sends out as a finished girder. Reputable metallurgists never endeavour to sell unsound girders, neither do reputable engineers or architects fail to examine the girders they employ for constructive purposes. Architects are quite justified, in the present condition of chemical science, in neglecting to give much attention to the chemical composition of the steel they use, and in relying almost entirely upon physical tests. A girder may be made of metal of satisfactory chemical composition and yet be a very unsatisfactory constructive material. In relation to the use of metal girders a knowledge of chemistry is of value as an aid to the selection of the best method of preserving the girder from corrosion, and in forming a judgment as to the positions in which the metal may with advantage be used; but chemical tests must not be used as a substitute for physical tests.

With regard to Professor Sexton's statement that architects commonly neglect to make any provision for testing, we can only say that this is contrary to our experience. In every trade and every profession a certain proportion of unqualified men are to be found, but we should be sorry to regard their sins of omission or commission as common to the trade or profession they may represent.

Archæological Survey of Egypt: Eighth Memoir. The Chapel of Ptahhetep and the Hieroglyphs. By N. de G. Davies. London: Kegan Paul & Co.; and Offices of the Egypt Exploration Fund. 1900.

The great interest of this volume of the Archæological Survey publications, to artists at least, lies in the outline copies of the representations of birds and animals in the interior of the Chapel of Ptahhetep at Saqqareh. The originals are in relief and coloured, though the remains of the colour are stated to be exceedingly fragmentary; but the drawings of the birds, though only the outlines of most of them is given, are remarkable examples of powerful indication of structure and character by means of flat profile representations. It is curious how much they remind one of the style of some of Blake's decorative animals in the margin of the plates to the Book of Job. There are also various drawings of pottery and instruments from the hieroglyphs, and an elaborate drawing of that singular architectural adornment of the Egyptians, the false door in the wall of the chapel, together with some restorations of its colour design, which apparently can still be pretty clearly made out.

Some photographs from the actual walls, on a smaller scale than the drawings, show the general effect and character of these singularly interesting representations of ancient hunting and farm scenes.

Chippendale, Sheraton, and Hepplewhite. Furniture Designs. Reproduced and arranged by J. Munro Bell. London: Gibbings & Co. 1900.

This is a volume in which a number of the plates from the furniture books of Chippendale, Sheraton, and Hepplewhite, are reproduced, so as to bring together the typical designs of these three celebrated eighteenth-century cabinet-making artists. It is a very useful publication, inasmuch as the original books are not easily to be had, and the main contents of the three can here be studied together.

We have on a former occasion gone at some length into the merits and demerits of Chippendale and Sheraton furniture, from the artistic point of view, and it is hardly worth while to open up the subject again in connexion with this re-issue of their designs. We may merely observe that the modern admiration for Chippendale has been a very undiscriminating and uncritical one, and fashion has led to the acceptance of good and bad from him alike. His workmanship is always first-rate and conscientious, and his faculty for shaping and giving contour to objects like chests of drawers, cupboards, and tables, led him to produce works remarkable both for elegance and for the fine finish of workmanship. On the other hand, many of his much-lauded chairs are very bad in design, both on structural and æsthetic grounds. There are very few of those given in this collection which any artist of the present day would admire, if they were produced as modern works; and his so-called "Chinese" furniture designs are, as far as design goes, little better than gimcrack. As a designer, Sheraton was on the whole superior to Chippendale, especially in chairs; the only point in which Chippendale is undoubtedly better is in his drawers and cupboards with modelled contours, which, when not spoiled by too much carving, are more refined and out of the common than anything produced by Sheraton. In the main, however, the latter is a distinctly more architectonic designer of furniture; and several of the chair designs shown on plates 134-135 of Mr. Bell's reproduction are quite admirable.

Hepplewhite was not equal to the other two in the main; but in his designs for the less ornate classes of furniture, such as bedroom chests of drawers, &c., he showed excellent taste, and produced effective and characteristic furniture in a simple and inexpensive manner. Some of his sofas and settees also are very good.

BOOKS RECEIVED.

French Architects and Sculptors of the Eighteenth Century. By Lady Dilke. (Geo. Bell & Sons.)

A Digest of Cases Relating to the Construction of Buildings. By E. S. Roscoe. Fourth Edition. (W. Clowes & Sons.)

Churches and Chapels; their Arrangements, Construction, and Equipment. By F. E. Kidder. Second Edition. (New York: W. T. Comstock.)

St. Jude's Church, Old Bethnal Green-road.—Towards the renovation of the fabric, which is in a dilapidated state, the Ecclesiastical Commissioners have agreed to contribute 300*l.*, provided that a further sum of 700*l.* is raised within a certain time. The church was built in 1845-6, after Clutton's designs, and serves a thickly-populated district. The organ, by Crang & Hancock, and formerly in St. Vedast's, Foster-lane, was rebuilt by Walker in 1853.

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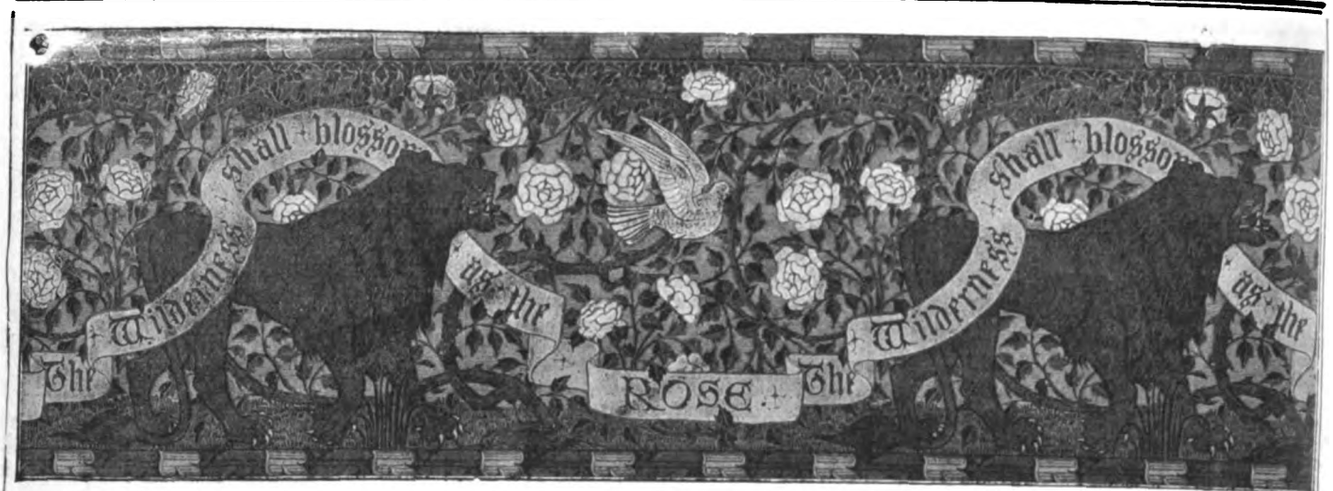


The "Lion" Frieze. Made by Messrs. Jeffrey & Co. Designed by Mr. Walter Crane.

Illustrations.

THE GRAND PALAIS DES BEAUX-ARTS, PARIS.

WE give this week an illustration, from a photograph specially taken for the *Builder*, of the central portion of the eastern façade of the large Palais des Beaux-Arts at Paris, which at present reckons as part of the Great Exhibition just about to close, but which is, as we presume our readers will remember, a permanent building on the grandest and most monumental scale, which will in future be the site of the annual exhibitions of the Salon, and will probably also be used from time to time for great Government fêtes and celebrations.

Several designs were made for this building before the Government were satisfied; we published in our issue of August 1, 1896, a façade for it which was designed by M. Loviot, and was of great merit, but had not the monumental and dignified character of the building actually carried out, the joint design of three architects, MM. Thomas, Louvet, and Deglane.

The façade is of such length that it is impossible to get a photograph which will give any idea of the whole, except in a very foreshortened perspective. The present illustration shows the great central portico, and on either side of it the commencement of the long flanking colonnades, standing in front of the deeply shadowed wall which is set back a considerable distance from the line of the colonnade. The façade is carried out in an exceedingly white stone *(calcaire grossier)*, which has a beautiful effect on a bright day.

It is to be regretted that the monumental unity of the design is spoiled by the large mass of glass roof which appears above the balustrade; but it was considered that no other method of roofing would ensure a sufficiency of light for the art galleries.

The building is of immense size; internally it is in fact two buildings, the western portion forming a separate set of galleries, with its own great hall and staircases, to be used for separate exhibitions; though the whole exterior has been cleverly conbined into one design, which gradually changes its character on the flanks of the building, so that the western and eastern fronts have quite a distinct character.

Some of the details, such as the fillets drooped over the blocking, and the immense central ornament on the circular pediment, will appear very *rococo* to English eyes, in the present phase of architectural feeling; they certainly cannot be defended on grounds of pure taste; and there seems to be rather a confusion of scale in some places. But it is a building to be judged in itself and on the spot. The effect of its vast scale, the boldness of its conception, its crowd of colossal sculptures, and the splendid execution of every portion of the work, leave the actual spectator little in the mood to be too critical.

DESIGNS FOR FRIEZE AND WALL PAPERS.

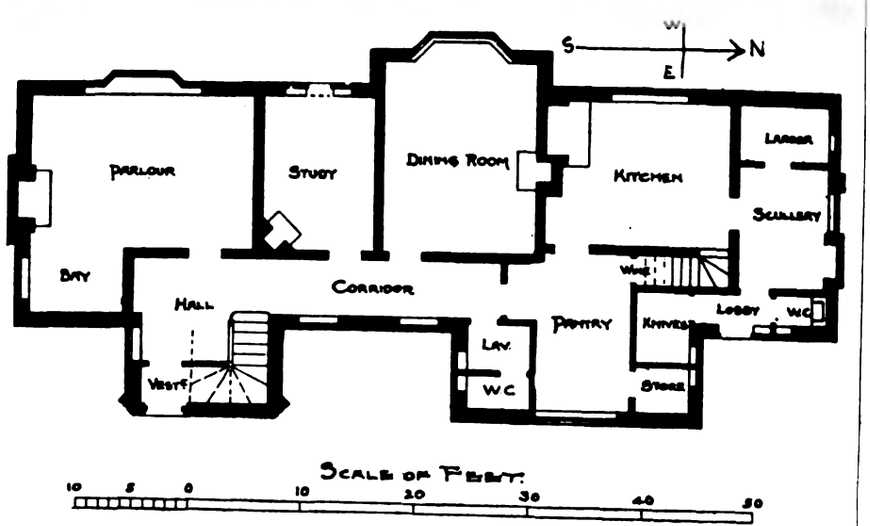
THE frieze and wall papers illustrated in the plate are manufactured by Messrs. Jeffrey & Co., the well-known firm at Islington, and form part of their exhibit in the Paris Exhibition.

The "Sylvan" frieze, designed by Mr. Stephen Webb, is intended to be executed in green and ivory for a drawing-room; though we are not sure that we should not prefer it simply in relief.

The "Cockatoo and Pomegranate" paper, designed by Mr. Walter Crane, is an embossed leather paper, treated in silver decorated in coloured lacquers, by hand, upon a background of turquoise green.

The "Roseneath" paper is designed by Mr. Sidney G. Mawson.

We append also an illustration of the "Lion" frieze designed by Mr. Walter Crane, and which runs over the whole of the exhibits.



House at Cley, Norfolk. Plan.

HOUSE AT CLEY, NORFOLK.

THIS house, now nearing completion, stands on the slope of the hill overlooking the valley of the Glaven, and commands an extensive and varied prospect of a (fortunately) but little-known part of Norfolk.

It has been treated in the local manner with flint walling, brick dressings, and pantile roof, and incorporated with it is much of the material from an older house in the village, lately taken down. The dining-room will be panelled with old oak from floor to ceiling, and the other rooms treated in character. The outbuildings and stables will adjoin the house on the north side, and gardens and terraces are being laid out on the south and west.

The builder is Mr. Charles Tuthill, of Fakenham.

E. GUY DAWBER.

ST. STEPHEN'S NATIONAL SCHOOLS.

THESE views illustrate a portion of the back and of the interior of these schools. The drawing was exhibited at the last Royal Academy Exhibition. The work shown is an extension equal to more than doubling an old National School built in 1858. For the purpose of this increase, three houses adjoining have been absorbed, while an extra story has been built over the old school. In this way the numbers of the scholars have been raised to 866—as infants 310, girls 286, boys 270—as compared with an overcrowded accommodation on an average attendance of 318.

The undertaking was a formidable one for the parish, and occupied four years—November, 1894, to November, 1898—when the last section, the new story over the old building, was opened. Actual building work was commenced in May, 1896, and the first opening took place in November, 1897, when an account of the building and a list of the firms employed was given, as also in November, 1898, when the whole was completed.

It is only necessary to add that the work shown in sketches made on the spot is all in stock bricks with red brick arches and copings. The windows have wood frames with iron casements. The roofs are covered with green slates. The front elevation, also in stock bricks with stone dressings and red brick chimneys, faces to the wide open area of the Great Western Goods-yard and is seen from the main line at Westbourne-park station in a long distance view.

In the interior view the large arch shown carries the boys' corridor, the bull's-eyes over it lighting the upper part of the lofty corridor at this point, which is also the object of the light window on the back elevation at this level. The junction of the old and new corridors differing in widths and height is effected by a bay cross vaulted at a lower level.

The uppermost dormer seen in the back elevation is one of those that give sunshine and air to the boys' classrooms along the north front.

A determining point in the plan is the pass door of the two staircases at the first-floor level, affecting the levels of the ground-floor and mezzanine cloakrooms and providing a feature

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of some interest in the elevation of the boys' and girls' entrances. The boys' schoolroom, of an L shape, covering the whole area of the first-floor of the old building, is the chief feature of the interior, but from convenience and for safety of exit, the two ground-floor rooms, marked in plan, have been adapted as a parish hall. Messrs. Rudd & Son, of Grantham, have been the contractors throughout, no clerk of works being employed. A. T. B.

THE "CASINE," CLONTARF, DUBLIN.

THE "Casine," as it is called—probably the same word which is now written "Casino"—was built at Clontarf a little after the middle of the last century, from the designs of Sir Wm. Chambers, as a residence for Lord Charlemont.

The plan, as will be seen, is entirely symmetrical. The detail of the order employed is somewhat richer than that of any example of Doric given by Chambers in his work on the Five Orders.

The Casine was one of the buildings set by the Architectural Association of Ireland to be measured for their Travelling Studentship. The studentship was obtained by Mr. Henry Lyons for these drawings, with two other sheets of enlarged details and mouldings.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The annual dinner of this society was held at the Masonic Hall, Sheffield, on the 17th inst. The chair was taken by the President, Mr. Joseph Smith. After the loyal toasts had been honoured, Mr. Peter Maskall, the Vice-President (who was in the vice-chair), gave "The Lord Mayor and Corporation," and spoke of the schemes of public improvements which were before the Sheffield City Council. The toast was responded to by Mr. J. M. Furness (Chairman of Highway Committee) and Commander Scott. Mr. E. M. Gibbs proposed the toast of "The Royal Institute of British Architects." Mr. Charles Hadfield, in responding, said that the Institute deserved a sympathetic recognition from country members. Other toasts included "The Visitors," proposed by Mr. Edward Holmes and responded to by Judge Waddy; the "Surveyors' Institution," proposed by Mr. T. Winder and responded to by Mr. Frederick Fowler; "The City and Trade of Sheffield," and "The Sheffield Society of Architects and Surveyors," proposed by Professor Ripper and acknowledged by the President.

ENGINEERING SOCIETIES.

YORKSHIRE COLLEGE ENGINEERING SOCIETY.—A lecture on the "Organisation and Methods in Engineering" was delivered before the members of this Society, on the 15th inst., by Mr. Wilson Hartnell, M.I.M.E. He remarked that examples of order and method were to be found in the administration and working of the Yorkshire College, and, indeed, of all other successful human institutions. The finest examples of organisation were to be found in Nature, such as in the construction of plants or other living creatures, and, in fact, it was upon the arrangements of the parts of their structures that the idea of organisation was founded. From Nature also they had the most perfect examples of method, as in the manner in which buds were gradually developed, and perhaps the most perfect examples of classification were to be found in natural science, such as in botany. In the application of these principles to engineering works, however, though all were more or less organised, there was a great difference in the extent to which they were carried out. Of late years a great deal had been said in regard to the ability of their engineering works to maintain their position in the face of foreign competition, and it had been said that in other countries, especially in America, organisation and method had been carried out to a greater extent than in this country. This might or might not be true as a whole, but we had many highly organised works in this country, as, for instance, Messrs. Willans & Robinson's, at Rugby. Mr. Hartnell proceeded to describe the system in vogue at the works of Messrs. Marshall, Sons, & Co., of Gainsborough, where, he pointed out, the principles he referred to had been adopted with remarkable success. There was not, he said, a single works in Leeds to compare with the orderly, systematic manner in which these works, or those of Messrs. Willans & Robinson, of Rugby, were conducted. In concluding, he impressed upon his hearers, as the coming engineers of the twentieth century, the immense importance of organisation and method.—*Leeds Mercury.*

METROPOLITAN ASYLUMS BOARD.

AN ordinary meeting of the Metropolitan Asylums Board was held on Saturday at the Board's Offices, the Embankment, Sir G. Goldsworthy presiding.

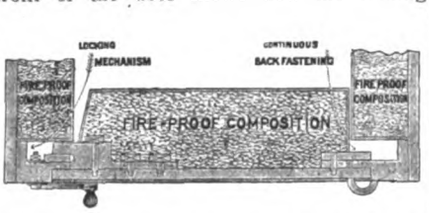
Joyce Green Hospital.—The Finance Committee recommended that application be made to the London County Council for a loan of 75,000*l.* on account of the cost of the erection, &c., of the Joyce Green Hospital, to be repaid by equal annual instalments of principal spread over a period of 30 years, at interest at the rate of 3½ per cent. per annum. After some discussion the matter was referred back to committee to see whether the period of the loan could be extended to fifty years.

Witham School.—On the recommendation of the General Purposes Committee it was agreed that, so soon as the Witham School is handed over to the managers for purposes in connexion with the work of the children's department, a cheque for 10,000*l.* be drawn to the South Metropolitan School District Board on account of the purchase of the whole of the property of that district.

TRADE CATALOGUES.

WE have received from the Sanitary Lead-Lining and Pipe-Bending Company, of Cremorne Wharf, Lot's-road, London, S.W., copies of their most recent illustrated sheets and price-lists. The firm is principally engaged in the manufacture of Brighton & Venning's patent lead-lined cast-iron pipes and fittings for use as soil-pipes, drain ventilating-pipes, waste-pipes, &c. There can be no doubt whatever as to the advantages of these pipes and fittings; the lead is protected by the iron shell from external injury and from bending and sagging, and the iron is protected by the lead lining from internal corrosion. The question, however, arises whether, especially in junctions, the lead lining fits closely to the iron shell throughout; there seems a possibility of part of the lining in these fittings expanding and contracting more than other parts and, perhaps, finally rupturing. We are not aware that this has ever occurred in practice. Fittings in large variety are supplied by the company, including single and double junctions of different angles, bends, swan-necks, inverted junctions for anti-siphonage pipes, diminishing-pipes, &c. The pipes and fittings are made in diameters from 2 in. to 6 in., the lead-lining varying from 5 lbs. to 8 lbs. per square foot, and the cast-iron shell from ⅛ in. to ⅜ in. in thickness. The lead-lining of the spigot pipe is turned back outside the iron shell, so that the two surfaces of lead come in contact with each other in the lower part of the joint; the upper part of the joint is made tight by caulking with molten lead or with cold lead or brass caulking rings.

Messrs. George Price, Limited (Wolverhampton), send us an illustrated catalogue of their "Twentieth Century" bent steel safe with solid steel doors and patent automatic side-locking mechanism. The plan of the front of the door shows how the locking



Plan of Door of the "Twentieth Century" Safe.

mechanism is kept to the side so as to leave the whole door entirely lined with fireproof composition, not cut up by locks or bolts. They claim also that by removing the lock from the door and placing it in the frame of the safe, it is impossible to drill into it. The firm are introducing their safe in a somewhat cheaper form, known as the "Twentieth Century Special List" safe. Specimens of the safe can be seen in London at Messrs. Griffiths & Sons, 43, Cannon-street.

The Hathern Station Brick and Terra-cotta Company (Loughborough) send us a catalogue which is, as they describe it, really an instruction book for architects and engineers who may not be familiar with the working of terra-cotta. A true terra-cotta clay must, they observe, of its nature be liable to a large shrinkage, and they point out that the larger the blocks used the more time should be allowed to the manufacturer. Small blocks enhance the cost, but they give a better chance of a good result. Brief directions are given for measuring and taking quantities for terra-cotta, and as to the information required by the manufacturer; and an example of the manner in which the firm prepare a key elevation to a scale of 1 in. to the foot, with every block numbered for fixing. A good many photographs of buildings carried out in terra-cotta facing are given, some of them very good designs; but the company are rather deceived in thinking that architects are only "just beginning to realise" the advantages of terra-cotta, for the fact is that the feeling of the profession is beginning to go against the wholesale use of terra-cotta for carrying out a whole design of a building, though it was very popular for a time.

A pamphlet has been sent to us describing and illustrating the Bingham Patent Pavement as used in the streets of Sheffield. It is the invention of Colonel Bingham, and consists in the use of lines of granite setts alternating with rather narrower courses of wood, the Stringy Bark (*Eucalyptus obliqua*) of Tasmania being found to be the best for the purpose. The testimony in regard to its non-slippery quality seems very strong, but we can hardly believe that it can be, as stated by some witnesses, "as noiseless as a wood pavement." It is evidently, however, a form of street pavement worth attention.

Messrs. G. A. Fuller & Co. (New York) send us a pamphlet containing description and structural diagrams of Broadway Chambers, a high building erected by them from the designs of Mr. Gilbert Cass, architect, and illustrated by a model at the Paris Exhibition. Views of the model and of the actual building are also given. The pamphlet is a useful practical description and illustration of the method of construction employed.

The Worthington Pumping Engine Company (London and New York) send a pamphlet containing illustrations of their pumps as used at the Paris Exhibition. The entire water supply of the Exhibition was furnished by four Worthington triple-expansion high-duty pumping-engines located in the Worthington Pavilion, Quai d'Orsay. These engines have a capacity of 40,000,000 gallons per day, the water delivered being pumped to the basin of the Château d'Eau on the Champ de Mars, and after use in this fountain, passing by underground conduits to the Machinery Hall, where, after being used for condensation purposes, it is returned to the Seine. The illustrations are beautifully executed and of much interest.

The Edison and Swan Company, Limited, of Queen-street, London, send us a new illustrated catalogue of electric bells and accessories which they have just published. In addition to being a complete compendium of everything in connexion with electric bells, it gives lists of induction coils, automatic apparatus for lighting gas burners in inaccessible places, &c. We are glad to notice that the use of simplex steel tubes is recommended for wires which have to pass through plaster or between floors. These tubes would be a very effectual protection against damp or accidental injury, and would add very little to the total cost of the installation. The copper tape and wire rope they sell for lightning conductors are excellently adapted for the purpose, both from the theoretical and the practical point of view. The patent automatic speaking-tubes are a combination of a speaking-tube and a telephone system. At present it is necessary to have a special mouthpiece for every main tube; but in this new system one mouthpiece serves for any number of tubes. At the multiple switch-board, also, any electric telephone can be easily connected directly to the speaking-tube terminal, and so direct communication established. The wares of this company are all of English manufacture, and are well known in the trade for their high quality and finish.

Turr's Acetylene Gas Syndicate, Limited, of Westminster, sends us a catalogue of apparatus

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for generating, purifying, and utilising acetylene. The syndicate makes a speciality of village and church lighting. Reference is made to the illumination of the church of St. Peter and St. Paul at Great Missenden as affording an example of the effectiveness of acetylene for church lighting. It is claimed that in the chancel, where the lights are concealed and reflected slightly downwards from a height, the illumination is particularly good. It is also claimed that acetylene is especially serviceable in dye works and other places where it is of importance that objects should appear of the same tint when the gas is in use as when the objects are viewed in daylight.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTURAL EDUCATION.

SIR,—Every one interested in architectural education will be glad to see Professor Simpson supporting so warmly, as he does in your last issue, the proposal to establish in London (as a preliminary to pupilage) a two years' day-course of architectural training such as that he has successfully established at Liverpool.

I am, however, surprised at his hesitation as to whether the Architectural Association is the proper body to undertake this work. If not, what body is? Is its labour of fifty years to be relinquished because it needs expansion?

I do not hesitate to say we must be first or last of the architectural teaching bodies of London. There is no middle course.

The question for every member of the Architectural Association to decide is whether the architectural profession is to set the standard of training, and to keep its educational system as much as possible under its own control. I can scarcely imagine that there will be two opinions as to the vital importance of doing both if we want to retain our *esprit de corps*, and to prevent art being subordinated to science in our schools.

The Architectural Association has clearly proved, in the face of much competition in evening teaching, that students of architecture prefer to be connected with a teaching body managed by architects for the benefit of architects only. This is what I mean by *a purely architectural college*, a phrase which Professor Simpson thinks a mistake. I am just as warmly in favour of a mixed art school for *junior* art students as is the Professor. The new National Art School at South Kensington will form such a school; but when a man has settled which branch of art he will pursue, then let him waste no time in selecting a training ground where that particular art is most thoroughly taught. As a school where a complete architectural curriculum is provided, leading up (without cramming) to the qualification for membership of the Royal Institute of British Architects, the Architectural Association must hold its own by the establishment of systematic day courses, and a crafts school attached.

If taken up with vigour and promptitude these day-courses (unlike its evening tuition) will have few competitors; nor need there be any doubt that directly its system and standard of training is up to the mark it will be recognised by, and affiliated to, the London University and very possibly subsidised by the Government.

If we all put our shoulders to the wheel, instead of hesitating to face a difficult but a proud task, we shall succeed.

My estimate of 1,000*l.* as the amount of the guarantee fund required to cover possible losses in establishing the two years' day courses is founded on data which may be taken as reliable. Professor Simpson has, I think, overlooked the fact that we have premises sufficient for a beginning, and that the deficit on the working would diminish each year as more students entered. According to his estimate of the number of students, we may anticipate the scheme would succeed beyond our dreams. W. HOWARD SETH-SMITH.

SIR,—Professor Simpson, in his letter of your issue of the 20th inst., advocates a preliminary training, extending over two years, for architectural students before entering an architect's office. He instances the training given at Liverpool, but writes as if no such facilities offered to London students.

Mr. Seth-Smith, also, in his Presidential address to the Architectural Association, briefly dismisses the architectural training at this college as "a department of what is really an engineering school." There seems to be, therefore, some misunderstanding amongst architects as to the position of architectural instruction held here, and I ask your permission to briefly explain it.

It is true that architecture is a department of the Faculty of Engineering, and that a matriculated student, whether in architecture or engineering, takes the same general course for the first two years; but his third year is exclusively devoted to architectural studies.

It is, moreover, open to any student not to enter for the full matriculated course, but to devote the whole of his time for one or two years, or for a longer period, to architectural studies exclusively, spending much of his time in the studio, but taking regular courses of lectures, as detailed in the syllabus, which it will be found are arranged so as to conveniently come within a two years' course; or he may attend for part of his time only, and select the special courses he desires to take up.

It is further open to such a student to include in his curriculum courses of lectures under any other professor in the college, while the fine collection of architectural casts and specimens of materials and models, and the architectural library provided by the Carpenters' Company and brought together by my predecessor, the late Professor Banister Fletcher, are open equally to all students of my department for the purposes of study.

I have no wish to seem to oppose Mr. Seth-Smith's scheme for day classes at the Architectural Association; on the contrary, I wish it all success, and believe that if it tends to promote the custom for architectural students to take a definite course of training before entering an office, this college, as well as the Architectural Association, will reap the benefit of an increased demand for systematic architectural education, and that there will be work for each to carry on in a not unfriendly rivalry. R. ELSEY SMITH.

King's College, London.

CARTHUSIAN HOUSES.

SIR,—I fear I cannot help your correspondent much, but the little I can I hope will be of use:—

Mount Grace.—There is a history and guide compiled by O. W. Smithson and printed by W. R. Smithson, Northallerton; this has a plan reproduced from the Yorkshire Archæological Society's plan. The Yorkshire Archæological Society's excursion to Mount Grace, September 10, 1890, has a good plan, also one of the small houses round the cloister.

London.—A good paper on the "London Charterhouse" was published in the *English Illustrated Magazine*; it shows a drawing of the building as Sutton left it, and a plan of a single house and several nice little sketches of different bits.

The English province contained nine houses, viz:—

Witham, Somerset	1181
Hinton	1227
Beauvale, Notts	1343
London	1371
Kingston-on-Hull	1378
St. Annes, near Coventry	1381
Epworth, near Lincoln	1376
Mount Grace, Yorkshire	1397
Shene, Surrey	1414

Scotland.—Perth, the only house: 1.420.

If your correspondent applies to Mr. W. H. St. John Hope (Society of Antiquaries), or to Mr. J. D. Micklethwaite (Dean's Yard, Westminster), who are the two best authorities on monastic plans, they are the most likely to be able to help him.

HENRY A. RYE.

THE STATISTICS OF SAXON CHURCHES.

SIR,—My attention has been directed to a contribution with the above title (one of a series) in your issue of October 13, in which the writer, Professor Baldwin Brown, refers to an opinion I have expressed respecting the age of the columns from the ruined church of Reculver, now preserved at Canterbury.* That opinion was that the columns in question were probably Saxon imitations of Roman work, and could not be assigned to the Roman period. To that opinion I adhere, and will, with your permission, give as shortly as possible the reasons on which it is founded.

Taking the three divisions which constitute a column and beginning with the base, it will be seen from Professor Baldwin Brown's illustrations (fig. 7) that the main features of the Reculver examples consist of what may be called two discs, the upper being the smaller, placed directly one upon the other. Both have the edges ornamented with corded beads. As a variation, in the lower disc of the second base a long key pattern of strange proportions is introduced between the corded beads. This ornament is not shown in the illustration. The arrangement here briefly indicated differs entirely from known Roman work. The attic base is the usual form to be found in this country, such a base for example as that from St. Pancras, Canterbury, given by Professor Baldwin Brown in his illustrations. Variations of this base may be observed occasionally, but these variations are mostly confined to difference of proportion in the mouldings, the arrangement of the two torus mouldings with a hollow between them being the constant feature. Professor Baldwin Brown himself acknowledges the unlikeness of the bases in question to the usual Roman type.

The next division, the shaft, again differs from Roman rules. Fragments of shafts of the Roman period are to be met with on various sites and in county museums. Almost invariably such fragments show a tapering from bottom to top. The shafts of the columns of the basilica of *Calleva* (Silchester) were thus formed, as were those of the great colonnade at Lincoln. The same was also the case in the columns of the large building found in Chester in 1893. The shafts of all these columns were of considerable dimensions. Smaller ones show diminution and occasionally an *entasis*, but this latter feature is of comparatively rare occurrence. Both the Reculver shafts are of the same diameter top and bottom. There is no diminishing. Professor Baldwin Brown assumes that the absence of *entasis* or of tapering in the shafts is immaterial, although these features are to be found in Roman examples all over the country, apparently basing this opinion on the fact that certain shafts in the churches of Lanchester and Chollerton, supposed to have been brought from Roman stations in their vicinity, have no such characteristics. These shafts, however, have marks of rehandling which may have effaced the comparatively slight tapering they originally had, or they may, indeed, not be Roman at all, for mediæval monolithic shafts are not unknown.

Another peculiarity of the Reculver columns must be mentioned. Like the usual form in mediæval work, they are built up of numerous drums. Were they Roman, one might expect to find them monoliths or built in sections of much greater length than they present.

The last and not least important of the three divisions is the capital. Here again there is the same difference from Roman work as has been remarked in the bases and shafts. The neck mouldings of both the Reculver capitals are distinctly non-Roman in character, whatever else they may be. The type of Roman necking in this country is a half round moulding with a hollow one beneath it, divided from it by a flat fillet.

In the Reculver examples we have a heavy half-round moulding between two beads. Above this necking comes a square block cut into three horizontal ridges, one over the other and largely rounded at the corners to fit it to the circular shaft. The three ridges may possibly be meant to represent the tiers of leafage in a Corinthian capital, but nothing resembling them is discoverable amongst the known Roman capitals in this country, nor anything so clumsy as this attempt to fit a square capital to a circular shaft.

These capitals have apparently lost their *abax*, the addition of which would have given them a less uncouth look.

Professor Baldwin Brown repeats a suggestion made in Mr. C. Roach Smith's work ("The Antiquities of Richborough, Reculver, and Lymne," note to p. 108), that these capitals may have been adorned, or may have formed a ground work for enrichments in gilt bronze. If so, where are the signs of the fastenings of such metal work which would inevitably have been visible in the stone? It does not seem probable that such refined adornments were likely to be found in buildings of so remote a province of the Roman Empire as Britain, or that they would have been used at the late date the rude character of the columns implies.

In Professor Baldwin Brown's last paper, No. IV. (see *Builder*, October 20), an illustration is given on p. 337, fig. 12, of a capital of a column of the south door of the nave of Stopham Church, Sussex, of undoubted Saxon work. This capital shows on a small scale a considerable likeness to the Reculver examples, with the exception that it is less clumsily adapted to the shaft than in the larger and more celebrated ones.

Possibly Saxon bases of a similar form to those of the Reculver columns may yet be discovered.

GEORGE E. FOX.

SIR,—I notice that Professor Baldwin Brown claims a Saxon date for the church of Kingsbury, Middlesex. Will he kindly say upon what grounds this claim is based? I visited the church a few days ago and could not see any work of earlier date than the twelfth century, save some Roman flue tiles built into the walls.

I should like to ask, too, if it is safe to assume that the shafts at Lanchester and Chollerton must be Roman because they are monolithic. Are they not of the same date as the capitals and arches they support? Gundulf used monolithic shafts in the crypt at Rochester, and Ernulf in the crypt at Canterbury. The twelfth-century builders of Kirkstall Abbey used them in the dorter subvault, and they are to be found in later work at Fountains and Jervaulx.

Perhaps someone who knows the parish churches in the northern part of England can quote other examples. W. H. ST. JOHN HOPE.

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* In a paper in the *Archæological Journal*, liii, p. 355, entitled "The Roman Coast Fortresses of Kent."

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Columns in the Crypt, Repton Church, Derbyshire.

Sir,—In the interesting paper on "The Statistics of Saxon Churches," by Professor Baldwin Brown, published in the *Builder* on October 13, a reference is made on p. 307 to the two columns at present in the porch of Repton Church, Derbyshire, which the writer says "*may* have stood originally in the opening between nave and transept. These are obviously like the crypt, late in the style."

This point has been dealt with fully in a book on Repton by the Rev. F. C. Hipkins, F.S.A., published last year.

On p. 24 is a plan showing the Saxon portion of the church, which had north and south transepts separated from the nave by two arches resting on a central column; and on p. 22 is a drawing made in 1847 showing these two Saxon arches as then existing. In 1854 came a "restoration," and that interesting feature was swept away, the columns and arches being replaced by pointed arches and sexagonal piers to match the rest of the nave, solely arising from a mistaken idea of uniformity. The two Saxon columns were, however, preserved, and placed in the church porch. These are built up of several circular drums, and, therefore, different to the columns in the crypt, which are monolithic, tapering, and spirally-wreathed, the space between each wreath having an outward swell.

I enclose a photograph of this crypt taken by Mr. W. B. Hawkins and myself.

Monolithic shafts might imply a survival of Roman influence, but there does not appear to be any proof of Roman occupation in the neighbourhood of Repton. C. B. Hutchinson.

CONCRETE BUILDINGS.

Sir,—I notice in your last week's "Notes" an interesting description of an eight-story concrete building, now being erected in Washington. From your remarks following the description, you are evidently unaware of the fact that to-day at least one building of almost similar construction is in existence in this country, and that another is in course of erection. The completed building I refer to is Messrs. Weaver's flour mill at Swansea, and the one in course of erection is a large seven-story warehouse on the quayside at Newcastle-on-Tyne, for which I am the architect.

Personally, I am of opinion that all building regulations should permit of reasonable latitude as regards thickness of walls and some other matters, whereby encouragement would be given to the introduction of concrete construction where found suitable, as, for instance, where difficulties arise in obtaining good foundations for buildings of brick or masonry. F. E. L. Harris, A.R.I.B.A.

Manchester.

RE COMPETITION AT NEWPORT.

Sir,—On March 3 last you inserted an advertisement inviting architects to submit designs in competition for a public library and technical institute at Newport, Isle of Wight.

I sent in my designs on April 30 last, and have been informed by the railway company that they were duly received, but from that day to this I have not heard one word from the Committee, although I have written to them on the subject.

Could you kindly make inquiries and find out if anything more is to be done in the matter, or if it is dropped, and whether any award will be made, and when?

I enclose my name and address.

A Competitor.

Board School, Queen's Park, Glasgow.—A secondary school is being built at Queen's Park, on ground adjoining the old Queen's Park school. The building will consist of two floors. On the ground floor there will be a manual workshop, a cooking department, a physical laboratory, a chemical laboratory, a lecture-room, cloakrooms, &c., and there will be a drill-hall measuring 74 ft. by 41 ft. Up stairs will be six classrooms, two art rooms, a sewing-room, and a gymnasium, measuring 41 ft. by 26 ft. The contractors include Mr. James Maben, joinery; Mr. H. Haddow, plumbing; and Mr. Wm. Forbes, plastering. The gasfitting will be done by Mr. John Hunter; Mr. James M'Grory will do the painting work; the glazier work will be executed by Messrs. Meikle & Sons; the steelwork by Messrs. P. & W. M'Lellan; and the smith work by Messrs. P. & R. Fleming. Messrs. H. & D. Barclay, of Glasgow, are the architects.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

15. The Electric Arc—Carbon—Hissing—Rotation—Arc between Metal and Carbon—Candle-power of the Arc—Rectified Current.

THE electric arc was discovered by Sir Humphry Davy in 1800. He found that when two pieces of wood charcoal were connected to the terminals of a powerful voltaic battery, then touched together and separated, a kind of electric flame was kept up between them, and a dazzling light was emitted by the white hot ends of the pieces of charcoal. To utilise the electric arc for illuminating purposes has, however, taken several generations of physicists and inventors, and it is only within the last ten years that it has been adopted on any extensive scale. It is also rather extraordinary that, notwithstanding the many elaborate researches made on the electric arc, there are still many phenomena connected with it of which no satisfactory explanation has been given. Quite recently, however, some notable advances have been made by Mrs. Ayrton, and by the aid of the oscillograph many puzzling experimental results have been explained.

An electric arc can be maintained between pieces of various substances besides carbon, provided that the difference of pressure between the two pieces can be maintained sufficiently high. For example, if we have a pressure of twenty-five volts we can maintain an electric arc between two copper rods by feeding them together as the copper melts. Practically, however, carbon is the only substance used for arc lamps. The reasons of this are because carbon is a very poor conductor of heat as compared with metals, and hence the heat is localised at the ends of the rods and because it is very infusible, and hence a very high temperature is obtained. Again, carbon is easily disintegrated, and thus a long arc can be easily maintained. For these reasons it is very unlikely that any substance will be discovered superior to carbon for maintaining the arc.

Carbon is one of the chemical elements, and exists in three allotropic forms. The first of these is charcoal, and is obtained by the carbonisation of wood, paper, silk, and other organic substances. The second form is graphite, which is a well-known minera found in mines, and also in the hard carbon deposit in gas retorts. It is better known under the names of black lead or plumbago, and the form best known is that used in lead pencils. The third form is the diamond, which is a non-conductor of electricity. Both the first and third forms can be converted into graphite by subjecting them to very high temperatures. The carbons used for arc lamps are made out of powdered coke or gas carbon mixed with coal tar syrup or some similar carbonaceous substance. The paste is forced through a small round hole by hydraulic pressure, and the cylinder thus formed is cut into convenient lengths. These rods are then dried and baked at a dull red heat for several hours. They are classified as solid or cored. In cored carbons a narrow hole is drilled down the centre of the rod and filled up with a softer form of carbon. Great improvements have recently been introduced into the manufacture of carbons, owing to the great demand there is for the highest grade carbons, which are a necessity when enclosed arc lamps are used.

When a direct current arc is started between two carbons, it is found that after a little while the end of the positive carbon is hollowed out, forming a little cup called the crater, and the end of the negative carbon is more or less pointed. A very little inspection shows that the end of the positive carbon is very much brighter than the end of the negative carbon. Of the light sent out at least 85 per cent. comes from the crater, about 10 per cent. from the negative carbon, and only about 5 per cent. from the arc itself. The positive carbon wears away about twice as fast as the negative carbon. If we project the image of the arc on a screen by means of a lens, then we can see that little bits of carbon get detached from one pole and immediately fly across to the other. There is a column of vapour between the two carbons at an exceedingly high temperature. The measure of this temperature is still un-

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determined, but the most recent determinations indicate that it must be at least 6,000 deg. Fahr. At this temperature diamond is turned into graphite. After an arc lamp carbon has been used it is found that its end has been turned into graphitic carbon and it will mark paper just like a lead pencil.

Suppose now that we have an arc between two solid carbons, about a quarter of an inch apart, and suppose that they are in series with a battery of accumulators giving 100 volts and an adjustable resistance. Then, if the carbons are about 0·4 of an inch in diameter, the following phenomena are observed on varying the adjustable resistance. When we have a large resistance in circuit the current will be small—about three or four amperes ; but the voltage between the carbons will be high—about eighty volts. On diminishing the variable resistance the current in the circuit will increase, but the volts between the carbons will diminish. When the current rises to about twenty amperes the volts between the carbons will have fallen to about fifty-five. At this point a curious phenomenon happens—the arc gets into an unstable state and begins to hum. If the resistance be still further diminished the current will increase by a jump of about two or three amperes, and the pressure will suddenly diminish by about ten volts. The arc will now make a hissing noise, On diminishing the resistance still further the current will go on increasing, but the voltage across the arc will remain practically constant, the arc, however, always hissing.

If the carbons be close together and the arc be silent it is found that the difference of pressure between the positive carbon and the arc is about three-fourths of the total pressure between the carbons. Hence three-fourths of the resistance the current meets in getting from one carbon to the other lies between the positive carbon and the arc. Hence also three-fourths of the work done takes place at the surface of the crater, and this accounts for its high temperature. If now the current be increased until the arc hisses there will be a sudden drop of ten volts between the carbons, but of this drop seven volts takes place between the positive carbon and the arc, showing that there is a sudden lowering of resistance at the surface of the crater.

The following experimental results obtained by Mrs. Ayrton are very instructive. The table gives the pressure between the carbons and the pressure between the positive carbon and the arc with the largest silent current and with a hissing current of 25 amperes.

Length of Arc in Millimètres.	Largest Silent Current.		Hissing Current of 25 Amperes.	
	Pressure Between Carbons in Volts.	Pressure Between Positive Carbon and Arc in Volts (Calculated).	Pressure Between Carbons in Volts.	Pressure Between Positive Carbon and Arc in Volts.
1	42·2	32·1	32·1	24·4
2	44·5	32·2	34·6	25·2
3	47·5	32·3	37·0	25·7
4	49·4	32·4	40·5	25·7
5	53·0	32·5	43·9	27·9
6	55·0	32·6	45·9	27·2

These results prove that of the ten volts drop in pressure that takes place when the arc begins to hiss, about two-thirds is due to the lowering of the resistance on the surface of the crater, and the remaining third is due to a lowering of the resistance of the arc itself.

Mr. Trotter, in 1894, showed that when the arc was humming it was rotating with a velocity varying from 50 to 450 revolutions per second. He proved this by observing the arc through a disc having alternate arms and spaces and kept rotating rapidly. He found that when the revolutions were 450 per second the arc broke into a hiss. Now Mrs. Ayrton proved that hissing was caused by the crater becoming too large to occupy the end of the positive carbon and beginning to extend up the side. She also showed that if air were excluded from the arc, then there was no sudden drop of ten volts in the pressure, even when the current was three times as great as that which would cause hissing in air. Hence it seems exceedingly probable that hissing is caused by the air getting into contact with the crater. The oxygen in the air combining with the carbon on its surface would account for the sudden diminution in its resistance. Also the inrush of the surrounding air through a crack in the positive carbon leading to the crater would be sufficient to explain the rotation of the arc and the consequent hum just before hissing commenced.

One of the most interesting theories to explain what is going on in the arc is the electrolytic theory given by Dr. Fleming. In the electrolysis of liquids the molecule of the electrolyte is broken up into two ions which move in opposite directions with different velocities. Suppose, then, that something analogous to this is going on in the column of carbon vapour forming the arc. In this case the complex carbon molecule will be split up into positive and negative ions, and these will be moved rapidly in opposite directions. Dr. Fleming supposes that the negative ions move with such velocity, that by their impact the crater on the positive carbon is hollowed out, and that the positive ions move more slowly. The crater would always be covered with a cushion of these negative carbon ions, and this would create a resistance at this point which would account for the sudden drop in the electric pressure in getting from the crater to the arc. Again, owing to the affinity of carbon vapour for oxygen at high temperatures, it would follow that if air got access to the crater, then the negative ions would be destroyed by chemical combination, and the resistance at this point would therefore be diminished. An intermittent action would be set up, as diminishing the resistance would increase the current and so cause a greater rush of ions. The electrolytic hypothesis seems to explain all the observed phenomena.

We have hitherto considered the direct current arc, but an electric arc can also be maintained between two carbons connected to alternating current supply mains. In this case there is, of course, no difference between the shapes of the ends of the carbons. They are both moderately blunt. The arc is not continuous, but goes out twice during each complete alternation of the current. This phenomenon has been utilised to find out when the speed of an alternator is the same as the speed of the other alternators connected to the mains. If the flywheel of the alternator is illumined by an arc-lamp supplied from the mains, then when it has the required speed the flywheel appears either stationary or revolving slowly backwards according to the number of its spokes.

As an alternating current arc has a very variable resistance owing to the current through it always changing in magnitude, its power factor is not unity. If we use solid carbons, then it is difficult to maintain the arc, and its power factor is low, but the luminous efficiency is high. If we use cored carbons, the arc is very stable, and the power factor is nearly unity, but the luminous efficiency is not so high. Messrs. Duddell & Marchant have recently tried the effect of coring carbons with various substances, and have obtained extraordinary results. For example, with carbons cored with chromium oxide, a brilliant spluttering light was obtained, drops of molten metal being ejected. The arcs can also be coloured, and so ornamental illuminations can easily be made with these carbons. Again, on coring a carbon with a soda glass rod, it was found that only fifteen volts were required to maintain a one-millimetre fifteen-ampere arc. Hence six of these arcs could be used in series on a 100-volt circuit. Their luminous efficiency, however, was low.

An electric arc may be maintained for a short time between a metal and carbon electrode. In this case it is found that as a rule the current flows only in one direction. The current seems to flow much more easily from the metal to the carbon than in the reverse direction. The more rapid cooling of the metal assists the flow of current from it and hinders the flow towards it. If the metals did not melt so rapidly, this would give us a practical method of converting an alternating current into a unidirectional current.

Measuring the candle-power of the electric arc is a difficult and lengthy operation. It is difficult because the quality of the light given out is so different from the light of the standard glow-lamp with which it is compared, that it is almost impossible to tell when the two shadows of the photometer bar are of the same depth or when the two spots on the photometer screen are equally bright. Again, the candle-power in all directions must be measured and the mean taken if we wish to get an accurate measurement of the quantity of light being sent out. If we could surround the arc with a perfect diffusing globe which would appear equally bright in all directions and whose co-efficient of absorption was known, then we could greatly simplify the process of getting the "mean spherical candle-power" of an electric arc.

The following measurements may be taken as an indication of the manner in which an ordinary direct current arc sends out its light. The carbons were vertical, and were kept at a distance of 4 mms. apart during the experiment. The current was 9 amperes and the pressure 48 volts.

The angles given are the inclinations of the rays whose candle-power was measured to the lower carbon. The positive carbon was the upper one.

Angle in degrees	90	80	70	60	50	40	30	20	10
Candle-power	190	200	500	680	920	1,000	1,400	860	40

It will be seen, then, that horizontally the candle-power of this arc was 190, but that the candle-power of rays inclined 60 deg. to the horizontal was 1,400. If we measure the candle-power of rays sent up above the horizontal, we find that they are all less than 190, and diminish rapidly. Hence nearly all the light given out by the direct current arc is sent downwards. In practice the following empirical formula is often used to give the mean spherical candle-power of a direct current arc lamp :—

$$\text{Mean spherical candle-power} = \frac{H}{2} + \frac{M}{4}.$$

Where H is the horizontal candle-power and M the maximum candle-power. For example, the candle-power of the arc measured above would be given as $\frac{190}{2} + \frac{1,400}{4}$ *i.e.*, 445. This method of comparing arc lamps is not very scientific, but it is often used by makers in rough workshop tests.

It is sometimes assumed that the hollowing out of the end of the upper carbon is advantageous, as at first sight, seeing that we have a greater extent of white-hot surface, we might expect that more light would be thrown downwards. It can be proved, however, mathematically that the light sent out by a cavity is exactly the same as if the cavity were filled up and the end of the carbon were flat. Hence the light of maximum intensity proceeding from the crater goes vertically downwards and is intercepted by the negative carbon. It is owing to the negative carbon getting in the way that the light falls off so rapidly as we get underneath a vertical arc. For this reason there have been many attempts to make arc lamps in which the carbons are placed vertically side by side and the arc is kept at their ends by means of electro-magnetic repulsion from a coil excited from the mains.

With alternating current arcs as much light is thrown upwards as downwards, and hence alternating current arc lamps for street lighting are generally fitted with a large enamelled iron reflector which reflects back a considerable fraction of the light proceeding upwards. The relative advantages of alternating and direct current arc lamps must be carefully considered in practical work. With direct current arc lamps ordinary solid carbons can be used, but with alternating current we must use cored carbons. For the same power the light given out by the direct current arc is greater, and the dark space underneath the lamp is smaller than with alternating currents. Again, for the same power and pressure the alternating current is the larger, and hence there will be a larger ohmic loss in the mains. On the other hand, if we have an alternating current system of supply there will be the great advantage of having only one set of mains and much simpler arrangements than if we put down a direct current set specially for arc lamp lighting.

Mr. Ferranti's solution of the difficulty is to

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use rectified current, that is direct current which pulsates in intensity. He gets this current from the alternating current supply by means of his rectifiers. This necessitates having a special set of mains for the arc lamps, but avoids the necessity of having separate plant. Ordinary direct current arc lamps are used, and the regulation of the rectifiers is good. If the rectifier be adjusted for 12 amperes, then with its full load of thirty lamps in series the current would be 11 amperes, and on short circuit only 14 amperes. The power factor of the primary circuit is, however, low, being only 0·6 at full load. These rectifiers are extensively used in this country. Another solution of this problem is to use an alternating current motor to drive a direct current dynamo, and much can be said in favour of this method.

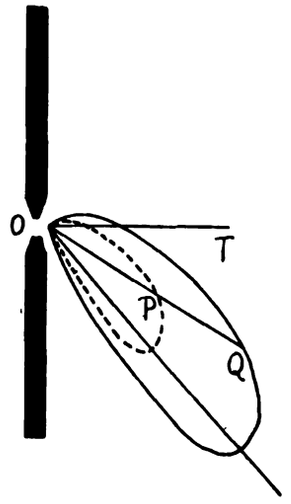

Fig. 1.

Figs. 1 and 2 illustrate the distribution of light coming from a continuous current and an

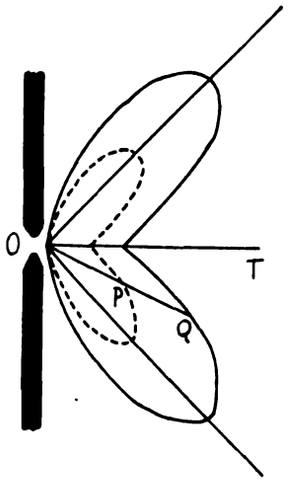

Fig. 2.

O Q = Candle-power of the violet rays.
O P = Candle-power of the red rays, which emerge in the direction O Q.

alternating current arc respectively. The full lines give the curve of candle power when two pieces of violet-coloured glass are inserted between the arc-lamp and the photometer screen and the standard lamp and the photometer screen. Hence these lines give the curve of candle power for the green rays. The dotted lines give the curve of candle power for the red rays, ruby glass being placed in front of the two lamps. It will be seen that the arc lamp sends out considerably more rays in proportion from the violet end of the spectrum than from the red end when compared with the relative proportions of the rays sent out by a glow lamp. The light sent out by the electric arc has a distinct violet tinge. When the arc hisses the light changes in character, the blue and green rays now being predominant, which shows that the temperature has been lowered. When the arc is surrounded by a good diffusing globe, these effects are not so conspicuous.

Several attempts have been made to produce a three-carbon arc-lamp for use on three-phase circuits. In the most successful lamp for this purpose the three carbons are placed vertically, the arcs being kept at their ends by means of electro-magnetic repulsion. Of course, each arc goes out twice in every complete period of the alternating current, but as there are forty or fifty periods in a second, it is quite impossible for the eye to see this, and the effect produced is that of three glowing points joined by a triangle of arcs. As everything is symmetrical, and the carbons consume at the same rate, it seems a promising method of converting electrical energy into light.

GENERAL BUILDING NEWS.

RECONSTRUCTION OF PARISH CHURCH, LOFTUS-IN-CLEVELAND.—On the 13th inst. the Marquis of Zetland laid the foundation-stone of the new chancel and other works connected with the parish church at Loftus-in-Cleveland. In the new designs the tower and the western gable remain as before, while the south wall will also stand, though its windows will be remodelled. The wall on the north side of the nave will be reduced in height, and will be the boundary for a side-aisle which will be formed by the erection of a series of stone pillars, carrying by means of five arches a clearstory wall, with seven small windows, to the same height as the south wall. The new chancel will be the same width as the nave, viz., 24 ft. interior and 29 ft. 9 in. exterior measurement, and will extend 33 ft. from the chancel steps to the eastern window, thus affording ample space for a surpliced choir as well as for the communion furniture. The roof of the nave and chancel will be continuous, the interior being open timbered (pitch pine) and the exterior covered by red tiles. On the north side of the chancel will be a transept, providing space for an organ chamber 15 ft. by 12 ft. 6 in., below which will be the heating chamber, the floor dividing the two being constructed of Messrs. Dorman, Long, & Co.'s steel joists filled in with concrete. Beyond this transept, and being designed in accordance with the north aisle, is a clergy vestry, having access to the chancel, and being entered from the churchyard by a Gothic door. The chancel floor will be elevated from that of the nave, and be approached by six steps. The south wall of the nave and chancel will be strengthened by four substantial buttresses. The pulpit will be of moulded freestone. The windows, twenty in number, will be of traceried design in stone, filled in with tinted glass. The whole of the stonework used in the new portion will, like the old, be obtained from the Marquis of Zetland's quarries. The eastern gable of the chancel will be surmounted by a small Maltese cross. The doors and other woodwork on the same level are of solid oak; and while the chancel will have a tesselated pavement, the nave will be laid with wood blocks embedded in concrete. The cost of the work is estimated at 2,700*l.* Messrs. Bastiman Bros., of Middlesbrough, are the building contractors, and they have sub-let the plumbing and glazing work to Mr. Harrison, of the same place. The architects are Messrs. Clark & Moscrop, of Darlington.

PRESBYTERIAN CHURCH, BIRKENHEAD.—This church, erected in the Tranmere district of Birkenhead, was recently opened. It is in the Gothic style of architecture, and includes also the ministers' vestry, and committee and cloak rooms. It is 90 ft. long and 60 ft. broad at the transepts. There is seating accommodation for 600 persons, the seats near the pulpit being arranged in a semi-circular form, which enables those of the congregation who occupy the side seats to hear and see the preacher without difficulty. The roof is lined with oak, and is a principal feature of the interior, while there are two rows of fluted pillars. The organ is placed in a recess at the back of the rostrum, while the keyboard is in front of the latter, inside the communion rails. The cost of the church will be about 5,000*l.* The edifice has been erected from designs by Mr. R. G. Sykes, architect, Liverpool. The lighting arrangements have been carried out by Messrs. Stott, of Oldham and Liverpool; the heating and ventilation (hot water and low pressure) by Mr. Hinson, of Birkenhead, and the ornamental ironwork outside by Mr. James Worrall.

CHURCH, GRAYSHOTT, HINDHEAD, HANTS.—The Church of St. Luke, at Grayshott, Hindhead, was consecrated on the 17th inst. The building, which is not yet completed, will accommodate 930 persons. Messrs. I'Anson & Son, of London, are the architects.

CONGREGATIONAL CHURCH AND SUNDAY SCHOOL BUILDING, WEST HARTLEPOOL.—On the 17th inst. the foundation-stones were laid of a Congregational church and Sunday school building at the corner of York-road and Park-road, West Hartlepool. Mr. W. Lister Newcombe, of Newcastle, is the architect.

RESTORATION OF TREDINGTON CHURCH, WORCESTERSHIRE.—On the 19th inst. the Church of St. Gregory, Tredington, was re-opened, after restoration. The work carried out includes a new roof, a new east wall, and new flooring all over the church. The old pews have been put in order, and the glass in the windows has been restored. This work has cost about 3,000*l.* The architect for the restoration was Sir Arthur Blomfield. Messrs. Collins & Godfrey, of Tewkesbury, were the builders employed.

CHURCH SCHOOLS, ALMONDSBURY, GLOUCESTERSHIRE.—New schools in connexion with the Church of St. Mary the Virgin, Almondsbury, were opened on the 18th inst. The main schoolroom is 48 ft. by 32 ft., whilst the department for the infants measures 30 ft. by 18 ft. In addition, there are two classrooms, and cloakroom accommodation. Movable screens will give, when necessary, a hall about 60 ft. by 30 ft. Accommodation is provided for 211 scholars, the number in the old school being 166. The building is of red Cattybrook bricks, freestone dressings, roofed with Broseley tiles, and hot-water apparatus is employed for heating purposes. Mr. H. M. Bennett, of Bristol, is the architect, and the builders are Messrs. Adams & Jefferies, of Oldland Common. The cost was 1,375*l.*

THEATRE, WOOLWICH.—The new Grand Theatre, which has been erected in Wellington-street, Woolwich, was opened by Sir Henry Irving on the 18th inst. The building is at the junction of Wellington-street and Lower Market-street, the main frontage being 80 ft. long. The building materials used were red brick with Bath stone pilasters and dressings. There is a central dome with iron corona. The main entrance to private boxes, stalls, and dress circle is by a low flight of steps from the street level. Through the entrance doors is the entrance hall with painted ceiling, walls decorated and panelled in fibrous plaster with ornamented Watteau panels, the floor being of marble mosaic. Passing through the entrance hall the foyer is reached, a semi-circular apartment with similar treatment to the entrance-hall. Corridors lead from hence to stalls and dress circle. There will be seating accommodation for 3,200. The auditorium has a clear width of 62 ft. and a depth of 75 ft. On the ground floor are the orchestra stalls, pit stalls, and pit, with heavy rake. Over this is the first tier, with four rows of dress circle and seven rows of balcony. There are six private boxes, three on each side of proscenium, all entered from their own staircase without entering the auditorium. Above the first tier is the gallery, with its fourteen rows of seating. The circles are constructed on the suspensory principle, with no column or obstruction to sight of any kind. The building is lighted throughout by electricity. The stage has a depth of 42 ft. by 80 ft. wide, with a height from stage to grid of 56 ft. There is a complete system of hydrants, and the stage is cut off when necessary by an automatic steel-framed asbestos curtain. The heating is on the low-pressure hot-water system. The building has been erected by Messrs. W. Johnson & Co., Limited, of Wandsworth Common. Mr. Bertie Crewe was the architect.

SUNDAY SCHOOL BUILDINGS, LEWES, SUSSEX.—The foundation-stone of a Congregational Sunday School building was laid at Lewes on the 17th inst. The site is near the Cliffe Bridge, and the building will accommodate 340 persons. Mr. E. J. Hamilton, of Brighton, is the architect, and Mr. E. Hammond, of Lewes, is the builder.

OBSERVATORY TOWER, OXFORD.—A tower for the accommodation of a new telescope is in course of construction at Oxford. The design of the tower is by Mr. T. G. Jackson, R.A. The building is 35 ft. in external diameter, and 53 ft. to the top of the dome. The engineer's work has been accomplished by Sir Howard Grubb, F.R.S., of Dublin.

PUBLIC LIBRARY, LIMEHOUSE.—The foundation-stone of a public library in Commercial-road, Limehouse, was laid on the 19th inst. The site is at the corner of Commercial-road and Norway-place, and there will be an open space in the rear, so that the reading-rooms, &c., can be lighted from three frontages. The frontage of the land to Commercial-road is about 55 ft., the depth from north to south being 138 ft. The accommodation on the ground story for the public will be a newsroom, 27 ft. by 38 ft., for seventy readers. This room will be lighted from Commercial-road and Norway-place. The room for the commissioner and chief librarian, 13 ft. by 18 ft., will also be provided adjoining the entrance from Commercial-road. The corridor leading to lending library and reference-room will be 7 ft. 6 in. wide, and the inner hall from which the newsroom and residence will be reached will be 12 ft. by 14 ft. The lending library will be in the centre of the building, entered from the main corridor, and will have counter space 30 ft. long, upon which indicators showing the numbers of the books which are in or out will be placed. The space for the public, 9 ft. by 21 ft., will be enclosed by framed and glazed partitions. The book shelves in the leading library will have a capacity of about 10,000 books, and further accommodation for about 6,000 books will be provided in the basement, where there will be rooms for assistants, binders, and also heating chamber. The lending library will be lighted by windows looking into Norway-place and by large lantern lights. The reference and magazine-room, 43 ft. by 19 ft., at the south end of the site, will be pleasantly lighted by windows looking south into a garden reserved for the purpose of securing such lighting. This room will accommodate from sixty to seventy readers. A room for the sub-librarian has been devised between the lending library and reference and magazine-room. The heating of the building will be by hot water at low pressure. The lighting will be by gas for some time to come, but the building will be forthwith wired

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for electric lighting so as to avoid cutting away, &c., in the future when that light can be installed. Most of the architectural features will be executed in Portland stone, and the rest of the external work will be of yellow stone brickwork. Messrs. Sabey & Son, of St. Peter's-street, Islington, are the builders, and Messrs. F. & S. Flint Clarkson, of Bloomsbury and Poplar, the architects.

Public Baths, Birkenhead.—The new public baths at Birkenhead were opened on the 18th inst. The following description appeared in the *Liverpool Post*:—The site of the baths is on the south-easterly side of Livingstone-street, between St. Anne-street and Price-street, the main elevation being to Livingstone-street. Two entrances are provided—one for the first-class and ladies', and one for the second class. The first class swimming bath is 63 ft. by 24 ft., with dressing boxes along one side and one end. The second class swimming bath is 75 ft. by 30 ft., with dressing boxes along both sides, so arranged that the tops form a gallery, to be used for swimming galas, &c., and a large gallery is also constructed at one end of the bath. There are nineteen slipper baths—namely, twelve second-class gentlemen's, three ladies', and four gentlemen's first-class. A vapour bath and a needle and shower bath are provided in connexion with each of the classes of slipper baths. Salt and fresh water will be supplied to both slipper and swimming baths. In the whole of the building the various classes are accommodated with waiting-rooms, sanitary arrangements, &c. The building is constructed of brick, with red pressed brick and terra-cotta dressings. The contractor for the erection of the building was Mr. James Merritt, of Birkenhead. The contractors for the boilers, heating apparatus, and laundry machinery were Messrs. Thomas & Taylor, Limited, of Stockport, and Messrs. Newton, Chambers, & Co., Limited, of Sheffield, have carried out the contract for supplying and fixing the salt water storage tanks and filter. The cost of the building, including machinery, is about 11,000*l.*, and of the salt water storage tanks and filter about 1,600*l.* The baths were designed by and erected under the supervision of Mr. Charles Brownridge, A.M.Inst.C.E., Borough Engineer and Surveyor.

Weights and Measures Testing Station, Newcastle-on-Tyne.—The new station for the testing of weights and measures at Newcastle-on-Tyne was opened on the 19th inst. The building is situated in the City-road, and consists of two stories. The materials used were red brick and stone dressings. The architect was Mr. A. Stockwell, Newcastle. Messrs. J. & W. Lowery, of Newcastle, were the contractors, and Messrs. J. C. Nicholson & Co., of the same town, supplied the machinery. A lift by Messrs. Waygood has been installed. The cost was 2,650*l.*

Vicarage, Clevedon, Somersetshire.—A new vicarage house at Clevedon was dedicated on the 18th inst. The house is built of local Pennant stone to the first floor, the rest of the building being of brick covered with hanging Broseley tiles. The dressings are of Box Ground stone, and the roofs are of Broseley tiles. The builder was Mr. W. A. Green, of Clevedon, the cost of erection having been 2,500*l.* Mr. F. W. Hunt, of London, was the architect.

Congregational Lecture Hall, Woking.—Memorial stones of this building were recently laid; the edifice will comprise a lecture hall to seat 250 people with kitchen and other offices. It is proposed to build, as soon as possible, a church in connexion therewith. The cost of the whole scheme is estimated at 6,000*l.* Mr. W. H. Seth-Smith is the architect.

Cottage Hospital, Burford, Oxon. — A cottage hospital is about to be erected at this place; the architects are Messrs. Waller & Son, of Gloucester, and the builder, Mr. A. Groves, of Milton-under-Wychwood.

Church Restoration, Sunningwell, Berks.—The ancient porch of this church is now being restored under the supervision of Mr. A. W. Poynter, architect; the builder is Mr. Alfred Groves, of Milton-under-Wychwood.

Restoration of St. James's Church, Bermondsey.—This church was reopened on the 15th inst. after undergoing a thorough restoration and renovation. Mr. A. H. R. Tenison was the architect.

Sunday School, Hepworth, Yorks.—School buildings erected in connexion with the Hepworth Wesleyan Chapel have been recently opened. The estimated cost is 1,600*l.* Mr. Joseph Smith, of Sheffield, was the architect.

Memorial Chapel, Sandford, Bristol.—The new Memorial Centenary Wesleyan Chapel erected at Sandford was recently opened. It stands on a site adjoining the old chapel, and is built of Rowberrow stone. The work has been carried out by Mr. Ford, Mr. J. Scourse, and Mr. J. Cole, of Cheddar; the architects were Messrs. Foster & Wood, of Bristol.

Golf Club-house, Dullatur, near Glasgow.—A club-house erected at Dullatur was recently opened by Mr. Alexander Wylie, M.P. It was built from plans prepared by Mr. John Robb, architect, of Glasgow.

Nurses' Home, Liverpool.—The new Central Home for District Nurses, at Liverpool, was opened on the 19th inst. The building is situated at the corner of Prince's-road and Parliament-street. Mr. J. Francis Doyle was the architect. The building contractor was Mr. Isaac Dilworth. Mr. S. R. Henshaw carried out the plumbing and decoration, and Messrs J. R. Cooper & Sons the heating arrangements. Mr. G. Morris was the clerk of works.

Wesleyan Methodist Assembly Hall, Linthwaite, Yorkshire.—A Wesleyan Methodist assembly hall at Linthwaite was opened recently. Messrs. John Kirk & Sons, of Huddersfield and Dewsbury, were the architects, and the following were the contractors:—Masonry, Messrs. David Haigh & Sons, Golcar; joinery, Mr. William Schofield, Linthwaite; plastering, Mr. James Walker, Slaithwaite; plumbing, Messrs. George Garton & Son, Huddersfield; painting, Mr. Thomas Cartwright, Milnsbridge; slating, Messrs. Pickles Bros., Huddersfield; concrete and wood-block floors, Mr. Roger L. Lowe, Farnworth, near Bolton; heating, Messrs. Tomlinson & Milan, Limited, Huddersfield; furnishings, Messrs. Alfred Taylor & Hobson, Limited, Huddersfield; and mosaic pavement by Messrs. T. A. Heaps & Co., Huddersfield.

Church of the Holy Virgin, Churchill, Weston-super-Mare.—The new church, dedicated to the Holy Virgin, at Churchill, near Weston-super-Mare, was recently opened. The building is situated above Stock-lane on the right hand side of the Bridgwater-road, leading from Churchill to Langford, and is 2½ miles from Sandford G.W.R. Station and 12 miles from Bristol. The church and the residence of the curate-in-charge (which is situated in close proximity to the sacred edifice) were presented by Field-Marshal Sir Lintorn Simmons. The gift is intended as a memorial to Dame Blanche Simmons and to other members of Sir Lintorn's family. The site was presented by the same gentleman who also generously endowed the mission. The church consists of a nave to seat about 120 people, and a chancel in the form of an apse, built in a very free treatment of 13th Century style, and having on the south side of the chancel a recess and vestry. The main walls are constructed of Rowberrow stone from the neighbouring quarries, with Ham-hill stone dressings set in random range work. The external face of the walls are in rock work with dropped, crossed rubber work, whilst the internal facing is wrought in fine chiselled-dressed tooling. The roof of the nave is of open pitch pine, having carved ribs resting on stone corbels and is open at the apex. The roof of the chancel is of oak and is in the shape of a barrel vault, with red oak ribs. The east end of the church terminates in an apse of three sides. There are five lancet windows on the south side, three on the north side, six in the chancel and three much larger windows in the west wall, all being filled with plain cathedral glass in small leaded squares. The floor of the chancel is laid with glazed Staffordshire tiles in pattern, and wood blocks form the floor of the nave. The choir stalls are of carved oak. The lighting is by means of brackets of hammered iron-work of antique pattern, which burn acetylene gas generated in a small detached building on the south side of the church. Heating is accomplished by small-bore pipes. The roof is covered externally with strawberry coloured Broseley tiles, and at the apex at the west end is a turret, in which a bell is placed. The north porch is of open-timber work, oak; the roof consists of oak tiles, and the floor is laid with slates, set on edge, in squares. In the west wall, on the outside, a few feet from the ground, is inserted a large polished granite tablet, on which is a suitable inscription. The principal entrance to the church is through a porch, with a framework of oak which is covered with oak shingles, and has a flooring of tiles set on edge. There is an oak screen between the chancel and the vestry, and at the west end is placed a font of Ham Hill stone. The house of the curate-in-charge, which is near, is constructed of similar material. There are two floors and an attic. On the ground floor is the entrance-hall, from which open three rooms, and in which is a cut-off door leading to a spacious kitchen and servants' quarters. A broad staircase leads to a landing, from which there is access to several bedrooms and bathroom and offices, and, through a cut-off door, to the servants' apartments. There is also a second staircase for the use of domestics. There are two rooms in the attic. Angular tiles from Bridgwater cover the roof, and the gables are faced with vertical Broseley tiles. The architects are Messrs. Samson & Cottam, of Taunton and Bridgwater.

Union Chapel, Lynn.—The ceremony of laying the foundation-stones of this building recently took place. The site of the building is the old toll-bar premises, and at the rear a schoolroom has already been erected. The style of the new building will be Early English. It will be built of red brick, relieved with white Costessy ware dressings. The extreme dimensions will be 60 ft. by 40 ft., and there will be seating room for 320 persons, exclusive of the accommodation in the choir gallery. The architect is Mr. J. L. Carnell, of Lynn, and Mr. W. F. Smith is the builder. The cost of the chapel is estimated at 1,470*l.*

Baptist Church, Chalk Hill, Bushey.—The Bushey and South Watford Baptist Church, Chalk Hill, has recently been reopened, after having been closed for some time for the purposes of redecoration, and for making some additions and improvements. The additions consist of a new eastern porch, entrance-hall, lavatory, &c. The architect is Mr. W. H. Syme.

Mission Hall, Aberdeen.—The mission hall in Correction Wynd, in connexion with the West Free Church, was reopened on the 19th inst., after extensive alterations and improvements. The architect was Mr. G. Bennett Mitchell (of Messrs. Davidson & Garden). The contractors were—masonry, Messrs. Eddie, Findlay & Henderson; carpentry, Messrs. Watson & Robb; plumber, Mr. A. B. Robertson; slater, Mr. George Davidson; plasterers, Messrs. J. Bannochie & Son; heating, Messrs. Tindall; ventilation, Messrs. D. Macandrew & Co.; painters, Messrs. Garvie & Sons.

Improvements, Old Aberdeen Reading-room.—The extension and improvements at the Old Aberdeen Branch Reading-room have now been completed, and the reading-room was open on the 20th inst. Formerly the reading-room was somewhat small, and in rather bad repair. The Public Library Committee have now, however, had a brick wall removed, and an adjoining room taken in, so that the reading-room now runs along the whole of the building on the first floor. The interior of the room has been entirely redecorated. Improved lighting facilities have been provided, with the necessary additional furnishings. The alterations have been carried out under the supervision of Mr. John Rust, City Architect. The contract for the alteration was in the hands of Mr. John Williamson, Huntly-street.—*Aberdeen Free Press.*

SANITARY AND ENGINEERING NEWS.

Water Supply, Weardale and Shildon District, Durham.—In consequence of the constantly growing demand for water in the district supplied by the Weardale and Shildon District Water Company, the directors have deemed it expedient to take the preliminary steps towards the construction of a large impounding reservoir in Upper Weardale. With a view to obtaining extended Parliamentary powers for this purpose, a series of comprehensive surveys is being made by the staff of Mr. Hawkesley, C.E., consulting engineer to the company, and a private Bill seeking the necessary powers will probably be lodged next month, in time to be dealt with in the ensuing session of Parliament.—*Leeds Mercury.*

Water Supply, Prestatyn.—The Urban District Council of Prestatyn have decided to proceed for Parliamentary powers to acquire, by compulsion or otherwise, certain waterworks in the district. Mr. Charles H. Beloe, of Messrs. Beloe & Prest, engineers, Liverpool, has been appointed engineer to prepare plans and give evidence before the Parliamentary Committee. The waterworks were established some few years ago at a cost of over 3,000*l.*, but during the past two years the supply has become inadequate, as Prestatyn has almost doubled its population.

Drainage Works, Earls Colne, Essex.—Messrs. Taylor, Son, & Santo Crimp, engineers, of Westminster, have prepared a scheme for the drainage of the parish of Earls Colne. The estimated cost, omitting some portion of the scheme, is 7,000*l.*

Edinburgh and District Water Supply.—This work is making rapid progress. The Water Trustees visited the site in the Talla Valley the other day on an official visit of inspection. According to a report in the *Scotsman*, the party was conducted over the new works by Mr. Tait, the engineer, who explained the principle of the construction of the puddle trench, how the great embankment supporting it would be raised, its breadth being 650 ft. at the base, and tapering to 20 ft. at the top, the capacity of the reservoir (2,700,000,000 gallons), and the amount of water that could be drawn for the town supply, and what would require to be given off for compensation. With the wet weather which has recently prevailed, the Talla and all its tributaries were in flood. The main stream, despite its size, was found running remarkably clear, and it was stated, after an examination of the gauge, that the flow of water in it on one occasion was equal to about 45,000,000 gallons in twenty-four hours. It was by such floods, Mr. Tait said, occurring frequently during the winter season, that they expected speedily to fill the reservoir when it was finished. Not a great deal of work has been accomplished in connexion with the construction of the reservoir since the middle of 1899. This was owing last year to the stoppage of the original contractors, and this year to the difficulty experienced by the new contractor, Mr. Best, in getting labour on account of the war and other causes. A very important addition, however, to the contractor's plant, by which, it is hoped, great progress will be made with the construction of the puddle trench, was very noticeable in an aerial wire-rope railway, which has been carried right across the valley, and is 1,500 ft. in length. It is driven by means of steam power and a drum set high up on the east side of the valley. It will be used to deposit the clay in the trench over which it is suspended. The clay is brought by rail from Carluke, and unloaded at a spot near to the engine-house of the aerial railway. There it is "soured," and thereafter filled into a large hopper capable

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of carrying three or four tons. This hopper is suspended in mid-air from the ropes, and travels very much the same way as a cable-car does. It can be lowered from the engine-house at any point, and the clay shot from the hopper at the place where it is wanted. The new house, which has been erected on a terrace on the east hillside of the valley, and has cost about 1,600*l.* It is a substantial structure of rubble, faced with red sandstone, and has stepped gables and large bay windows. The part of it which will be used by the trustees on their periodic visitations includes on the ground level a large dining-hall, 42 ft. by 20 ft., with the walls and ceiling tastefully panelled in pitch pine; a spacious entrance hall, treated in the same fashion; and suitable kitchen, lavatory, and cloakroom accommodation; while upstairs are a smoking-room and several bedrooms. To the rear is the house of the superintendent of the reservoir and a yard, with coachhouse, stable, byre, &c. Several of the officials engaged in the Talla contracts were present, including Messrs. Best and Messrs. Thomas & William M'Alpine, of Messrs. R. M'Alpine & Sons, Glasgow.

MIDLAND RAILWAY EXTENSIONS AT BINGLEY.—The work of doubling the Midland Railway between Bingley and Thwaites has now been completed. Some time ago the bridges on the route were tested, four of the heaviest types of engine being run across them simultaneously, and it has been evident during the last few weeks that the finishing touches were being put on. On Sunday a large gang of men commenced the work of making the junctions at the Bingley north box—where the widening commences—at Marley and at Thwaites, and then the running of the trains commenced. The work of extension has taken about eighteen months, having been commenced in the early part of 1899. The total length of the extension is two and a quarter miles, and the works have been carried out by Mr. W. Mousley, the contractor who constructed the Midland extension between Skipton and Ilkley. From the north signal box at Bingley the extra accommodation has been gained by putting down a line on each side of the previous main road, but after passing through the bridge at Crossflats which carries the Keighley and Bradford road over the railway the extra lines have been laid on the western side only up to Thwaites, where the extension terminates. The principal works which have had to be dealt with in the course of the extension have been the widening of the bridge at Crossflats and the spanning of the river Aire with another bridge at Marley. At Crossflats the extra lines have been provided for by adding an arch to each side of the existing bridge, whilst at Marley a new bridge had been erected to carry the new lines at a distance of some 50 ft. from the other and older bridge. The new bridge is carried across the stream by four steel columns, which have each been sunk into the river bed to a depth of more than 80 ft. The side girders are in three sections, and are supported at the banks by heavy masonry, and over the river, of course, by the columns named. Messrs. A. Handysides & Company, Limited, of Derby, have been the sub-contractors for the steel and iron work required for the bridges. The extension has been carried out from plans prepared by the company's chief engineer, Mr. J. Allen McDonald, M.Inst.C.E., and the works during progress have been under the superintendence of Mr. Cecil E. Hawley, Assoc. M.Inst.C.E.—*Bradford Observer.*

ELECTRIC LIGHTING NEWS.

ELECTRIC LIGHTING, HORNSEY.—Colonel Luard, R.E., recently held an inquiry at the Hornsey District Council offices into the application of the Hornsey District Council to the Local Government Board, for sanction to borrow 73,500*l.* for the purpose of making an installation of the electric light in Hornsey. Mr. Robert Hammond, Consulting Electrical Engineer to the Council, explained that the cost of the undertaking would be as follows:—Generating works, 28,110*l.*; feeders and distributors, 31,003*l.*; public lighting, 4,700*l.*; meters, house connexions, &c., 4,575*l.*; and general charges, 5,112*l.*; a total of 73,500*l.*

ELECTRICITY WORKS, AND REFUSE DESTRUCTOR, HACKNEY.—On the 18th inst. the foundation-stone was laid of the electricity works and refuse destructor, which are being constructed by the Hackney Local Authorities at a cost of about 250,000*l.* Nearly the whole of this amount is to be expended on providing a system of electric supply for the district. The buildings will stand upon a site five acres in extent in Milltields-road, adjacent to Lea Bridge. The electric supply will involve the laying down of many miles of cables, and the residents in fifty miles of streets will be provided for. The public lighting of sixteen miles of thoroughfare will also be effected, with arc lights. Mr. Robert Hammond is the engineer.

H.A.C. ELECTRIC LIGHTING.—The headquarters of the Honourable Artillery Company are being wired for the electric light, and everything will be ready for the reception of the C.I.V. on Saturday. Some special fittings have been designed for the rooms in this well-known building, and the arms of the H.A.C. are being worked in them. The contract is carried out by Messrs. Donnison, Berlyn, Sillem, & Co., of London and Liverpool.

FOREIGN.

FRANCE.—The monument to Chopin has been set up in its place in the Luxemburg Garden. It is the design of M. Dubois (sculptor) and M. Eugène Petit (architect), and consists of a portrait bust on a narrow stele, decorated with a female figure in relief. The whole stands on a granite base.——A large group of school buildings has just been completed at Bagneux, near Paris.——M. Redon, the architect, is occupied in the works for fitting up the Pavillon Marsan at the Louvre for the Musée des Arts Decoratifs. The work will be completed and the collection arranged in January.——The Bishop of Saint-Brieue has founded in his diocese a committee of Breton archæologists, which is to be consulted in all questions concerning the restoration, alteration, or rebuilding of ecclesiastical edifices in the diocese.——The Municipality of Avignon are continuing their work of destruction of the ancient city, and have now, under the pretence of consideration of public health, demolished a fresh portion of the ramparts, the Porte de l'Oulle leading to the bridge of Avignon. The Commission des Monuments Historiques appears to be powerless to arrest these operations.——The Government has presented to the Municipality of Paris the fountain in ceramic ware which was erected in the Champs Elysées in connexion with the great Exhibition, and which was made at the national manufactory at Sèvres.——The Government propose to annex to the city of Paris all the suburban Communes comprised between the Seine and the portion of the fortifications which it has been decided to suppress. The names of these Communes are Soulogne, Bellamont, Neuilly, Le Vallois-Perret, Clichy, and Saint Ouen.

GERMANY.—It is proposed to erect a large synagogue in Düsseldorf, and sketches are invited by Mr. J. Levison of that city. The competition is open to all architects, and the drawings have to be sent in by December 17 next. The premiums offered are 3,500, 2,000, and 1,200 marks respectively, for the designs selected first, second, and third in order of merit.——The city authorities of Dresden having determined to erect a new town hall, or municipal buildings, have invited designs from German architects; the author of the first premiated design will receive 10,000 marks, and those designs adjudged second and third will be allotted correspondingly lower premiums. The date fixed for sending in the drawings is February 15 next.

AUSTRIA-HUNGARY.—The town authorities of Zara are about to erect a large educational institution for girls, the work to be commenced in December next.——The Municipality of Prague have decided to improve both the old and part of the new city by providing better means of communication where desirable and economically feasible.——German-Austrian architects are invited by the Municipal Authorities of Baden to send in competition designs for a large bathing establishment together with a hotel. The prizes offered are 3,000, 2,000 and 1,500 kronen respectively for the first, second, and third premiated designs. Drawings have to be sent in by January 7 next.

UNITED STATES.—The completion of the rapid-transit tunnel in New York is likely to be followed by the construction of many private tunnels, connecting the underground stations with office buildings, hotels, &c. It is believed that where the buildings to be served are near a station, the construction of such private tunnels will prove to be a profitable undertaking.——The Wachusett dam about to be constructed for the Metropolitan Water Board in Boston will be one of the largest of its kind. Though not very long (about 1,400 ft.) the height in the middle will be 200 ft. above the rock foundation; the masonry at the foot of the dam will be 175 ft. in thickness, whilst at the top it will be 23 ft. It is to be built of rubble masonry, faced with coarse ashlar.——The price of building materials in the United States has become materially reduced during the past few weeks.

INDIA.—The heavy rain which has of late fallen on the Ghats have caused serious landslips; a particularly bad slip has occurred on the Bhore Ghat, destroying much of the line of the Great Indian Peninsula Railway near that locality.——The large railway station buildings at Secunderabad are nearly completed.——The extensive alterations which have been in progress during the past eighteen months, to buildings and bridges in Lahore station yard, are expected to be completed before the end of the current official year.——It has been decided to build some large suspension bridges at certain points along the Srinagar-Leh road (Central Asian trade route), and one of them, to be known as the Kargil bridge, has been already taken in hand.——Mr. John Adam, architectural engineer and surveyor to the government of Bombay, has recently retired from that post.——The Governor-General has sanctioned the survey for a proposed line of railway from Pegu station, on the Burma railways, to Moulmein, a distance of 114 miles; the work has been placed under the control of the government of Burma.——The city of Guntur is to be provided with new waterworks, the supply being taken either from springs in the neighbourhood, or from the Kistna canal.

MISCELLANEOUS.

BRITISH FIRE PREVENTION COMMITTEE.—The Executive of the British Fire Prevention Committee have decided to postpone the opening of their new testing station until after Christmas, as their testing operations are principally carried on in the spring and summer months, and many of the firms who wish to have tests undertaken prefer to avoid the winter weather for research work of this description. During the first part of the current session the Executive of the Committee will hence be mainly occupied in dealing with tests already undertaken in the summer, but in respect to which reports have not yet been issued. They will also be preparing an analysis of the tests undertaken to date, for which there appears to be considerable request. The offices of the Committee at Waterloo-place will again be available during the winter months as a reading-room, and a file of over sixty technical journals from different parts of the world has been arranged for, whilst a small collection has also been formed in the reading-room with a view to showing materials that have been subjected to tests.

THE HOUSING OF THE WORKING CLASSES.—The London County Council have lately had under their consideration and have passed some schemes, with plans prepared by their Housing of the Working Classes Committee, for the erection of artisans' dwelling-houses, in blocks, upon the east side of London Fields, Hackney, the site of Reid's brewery, Clerkenwell-road (which has now been cleared); the south-west side of Drury-lane, near Crown and Martlett courts; and Portpool-lane, Gray's Inn-road. The Council have also signified their approval of the plans submitted to them by the Engineer's Office of and on behalf of the London and South-Western Railway in respect of five blocks of similar dwellings on the Boniface-street and Upper Marsh, Lambeth, site.

THROGMORTON-STREET.—The new restaurant and offices will shortly be opened to the public. The premises have been erected after Mr. Charles Reilly's plans and designs by Messrs. Colls & Sons, whose tender for the first portion of the structure amounted to 38,696*l.* The site, in Throgmorton-street, and Throgmorton-avenue, was leased by the Drapers Company to Messrs. J. Lyons & Co.; for the new buildings was pulled down the screen-front—one bay excepted—designed for Drapers Hall by Herbert Williams, who in 1865-70 reconstructed the Hall, with its inner quadrangle, ladies' parlour, court, and livery-rooms, and principal staircase. The remaining bay of the screen-front is converted into a state entrance into the hall, besides the new chief entrance and the staircase on the Throgmorton-avenue side as part of the alterations recently carried out for the Drapers Company under the superintendence of Mr. T. G. Jackson, R.A. After a fire in 1774, Robert Adam repaired the interior of the hall and reinstated the main front; the Company's Hall had been rebuilt from designs ascribed to Edward Jerman, who died in the autumn of 1668, and it is believed that Cartwright, the mason, completed the work.

PULPIT, ST. NICHOLAS CHURCH, TUXFORD.—A votive offering, consisting of a sculptured pulpit chiefly made of marble and alabaster, has recently been placed in this church. It is designed in the Perpendicular or fifteenth-century style of Gothic, and stands upon a massive shaft of polished Devonshire marble. Each cant in the body of the pulpit has a recessed panel, with an ogee head of carved tracery work, into which is introduced much delicately carved foliage of a conventional type. In the central panel is a representation of the crucified Christ, carved in the round in pure white Castellina marble, whilst on the north side is a statue of St. Agnes, and on the south one of St. Anne, both in the same material. These figures are accentuated by the dark-coloured polished marble against which they stand. The top cornice is of veined and polished alabaster, and at each angle are carved figures of angels. A suitable inscription has been cut into the plinth. The work has been carried out in its entirety by Messrs. Harry Hems & Sons, of Exeter.

PUBLIC IMPROVEMENTS, ECCLES.—On the 18th inst., at Eccles Town Hall, Col. J. T. Marsh, R.E., held a Local Government Board inquiry into an application by the Corporation of Eccles for permission to borrow 5,308*l.* for electric lighting purposes, and 2,185*l.* for private street improvements. Evidence was given by the Surveyor, Mr. Pickton.

ADDITIONS TO WORKHOUSE, BELFAST.—On the 18th inst. a Local Government Board inquiry was held at Belfast, relative to the application of the Board of Guardians to borrow 13,500*l.* for building new boardrooms and clerks' offices at the workhouse.

FIRE TESTS WITH "MACK" SLABS.—No. 52 of the publications of the British Fire Prevention Committee contains the records of a test of a partition formed with "Mack" patent slabs, erected by Messrs. J. A. King & Co. The partition was composed of slabs, each 10 in. in height and 2⅜ in. thick, and of lengths varying from 1 ft. 6 in. to 4 ft. 10½ in. The slabs, according to the maker, were made of plaster, with cocoanut fibre, cork dust, and reeds embedded therein and running horizontally along their whole length. There were from thirty to forty reeds in each slab.

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The slabs were delivered at the testing station with square ends. The ends were afterwards sawn out to form the vertical V joints. The slabs were set with mortar mixed in the proportion of 2 parts of plaster of Paris, 1 part of lime, and 2 parts of sand The vertical joints were grouted in with the same material. The inside face of each slab was keyed for plaster. The inside of the partition was plastered one coat of coarse stuff, composed of plaster of Paris and sand in equal proportions, and with a finishing coat of plaster, sand, and lime in the proportion of 1 part of plaster of Paris, 2 parts of sand, and 1 part of lime. The outside of the partition was plastered one coat with lime, putty, and plaster of Paris in equal proportions, mixed with water, to which a small proportion of sugar was added. The result of the test was as follows:—The gas fire was lighted at 3.30 p.m. At 3.32 p.m. the setting coat of plaster on the fire side of partition commenced to blow off; at 3.34 p.m. the setting coat had all blown off; at 3.35 p.m. fine hair cracks, following the horizontal joints of the slabs, began to appear on the passage side of partition; at 3.41 p.m. steam began to issue at various points from these joints; at 3.44 p.m. fine hair cracks following the vertical joints of slabs began to appear on the passage side of partition; at 4.11 p.m. the fine hair cracks in the vertical joints almost closed up; at 4.15 p.m. the setting coat of plaster on the passage side of partition showed two blisters about the centre, one at the level of the fifth joint and the other at the level of the seventh joint; at 4.45 p.m. the gas was turned off. The fire had not passed through the partition, and the surface on the passage side, except for the hair-cracks and two blisters before mentioned, was unaffected by the fire.

Refuse Destructor, Ramsgate.—The large refuse destructor erected at Ramsgate has recently been put into operation. According to *Pullen's Kent Argus*, the installation for the consumption of rubbish consists of four cells, each having a grate area of 30 square feet, with a drying hearth at the back of each cell. They are of the Horsfall patent type, fed from the back, and arranged in one block, side by side. Each cell is guaranteed to consume ten tons of refuse in every twenty-four hours. Forced draught from the boilers is provided to each of the cells from a suitable blast fire, so arranged as to work either independently or in conjunction. The induced current of air serves to ventilate the feeding floor and consume any gases given off by the refuse deposited thereon. The only opening for the escape of the products of combustion is in the front of each furnace over the clinkering door, so that all the fumes given off by the green refuse in drying have to pass forward and over the hottest part of the fire before they can escape to the chimney, and are thus cremated within the furnace itself. The boilers are of the Babcock and Wilcox water-tube type of the best make. Each boiler has a heating surface of 870 square feet, suitable for a working pressure of 120 lbs. per square inch, and provided with all the necessary safety valves, steam gauges with automatic closing valves, check valves, &c. The feed pump is a Worthington regular pattern, with steam cylinders 4½ in. diameter, brass lined, with 4 in. stroke. The patent centrifugal dust-catcher is constructed of Stourbridge fire-bricks, faced on the outside with High Broome facing-bricks. It is strengthened by three 12 in. by 2 in. wrought iron rings, each made in four pieces, and bolted to iron vertical stays. Five cleaning doors are provided, four giving access to the external chambers, and the fifth through a tunnel to the central wall. An overhead railway of Cox & McTaggart's patent system will be provided for the removal of clinker. The railway will form a circuit, passing along the furnace fronts into the clinker-crushing house out on to the crushing-floor and back into the destructor house. It will carry two strong steel buckets of a capacity of 60 cubic feet each, and hung on trunnions, so as to be readily tipped. A clinker-crushing mill of Cox & McTaggart's patent system is fixed in the crushing-house below the floor level, and fed by a hopper delivering the clinkers between two interchanging cast-iron fluted rollers of 20 in. diameter and 21 in. long. The crushed clinker is then raised automatically by a patent elevator into a revolving screen. A heavy overgeared mortar-mill with revolving cast-iron pan, 8 ft. diameter, is provided. The engine for driving the whole of the machinery is of the horizontal right-hand type, and made by Messrs. Ransome, Sims, & Jeffries, of Ipswich. The buildings throughout are lighted by electricity, generated by a dynamo supplied by Messrs. Ernest Scott & Mountaine. The chimney is 102 ft. 8 in. high from ground level to top of cap; it is constructed in outer and inner shells, the outer being of octagonal shape on plan, and standing on square base with plinth, quoins, cornice, neck moulds of Portland stone, the cap being of heavy cast-iron construction. The offices for manager and workmen are fitted with pitch-pine furniture, and there are a men's messroom and bathroom. The chief contractors for the whole of the works have been the Horsfall Destructor Company, Limited, Leeds; the sub-contractors being Messrs. Hayward & Paramor, of Dover and Shorncliffe, for buildings; Mr. G. Tourney for the chimney shaft; Messrs. Stephenson for clinker and mortar mills; Messrs. A. & J. Main for ironwork of roof and girders; Messrs. Ernest Scott & Mountaine for dynamos and lamps; Messrs. Christian & Phipps for general electric lighting; and Messrs. Ransome, Sims, & Jefferies for the engines. Mr. T. G. Taylor is the Borough Surveyor.

Property Sales.—(1) The lease of Lees or Leighs Priory, near Felsted, in Essex, founded in or about 1230 by Sir Ralph Gernon for Augustine canons and friars, and dedicated to the Virgin and St. John the Baptist. The priory, once famous for the extent and magnificence of its buildings, is now represented by a lodge (since a farmhouse) and the late fifteenth-century gatehouse, a handsome massive building of red brick with stone mouldings and tracery, and having corner turrets, octagonal on plan, panelled, and embattled. At the Suppression, the priory, valued by Speed at 141*l.* 14s. 8d., was bestowed upon Sir Richard Rich, Chancellor of the Court of Augmentations, who altered and enlarged the premises, building two quadrangles, and made extensive additions to the park. Rich, who founded the school and almshouses at Felsted, was elevated Baron Rich of Leez in 1547; his grandson was advanced Earl of Warwick in 1617. William, second Duke of Manchester, sold Lees and some adjoining property to the guardians of Edmund Sheffield, Duke of Buckingham, whose brother and heir sold it to Guy's Hospital. The hospital governors pulled down nearly all of the buildings and converted the grounds into farms. (2) The Priory, at Orpington, in Kent, a gabled house whereof the greater portion was built in the year 1471, after the early Tudor style. The oldest part is a stone annexe (1393) which was used by the priest who served the church; some of the principal rooms, fitted with oak and chestnut wood-work, were added by the Honourable Richard Spencer, who died there in November, 1661. In 1032 the priory belonged to Christ Church, Canterbury. (3) The Abbey-house estate at Abingdon, in the grounds of which stand the remains of the monastery originally removed thither from Bagley Wood by Cissa, *temp.* Centwine, who ruled over Wessex, 676-85. Having been destroyed by the Danes in 871, it was refounded by Alfred's grandson Edred in 955, and augmented by Edgar and Canute. The foundation increased in opulence, in so much so that at the Dissolution the revenues were valued at 1,876*l.* 10s. 9d. per annum. (4) A freehold property extending over two acres on the east side of Church-street, Kensington, and abutting upon Kensington Palace-gardens. On the site stand York House and Maitland House, with frontages of 172 ft. and 115 ft. respectively. In the latter house lived James Mill (*obiit* 1836), the historian of India, whose memorial tablet is in the parish church, and in York House lived the Princess Sophia, daughter of George III., who died there on May 27, 1848.

Proposed Public Library and Museum, Chatham.—A Local Government Board inquiry has recently been held at Chatham with reference to the application of the Town Council for sanction to the appropriation of a site at the rear of the Technical Institute, New-road, for the erection of a public library and museum, and to borrow the sum of 2,500*l.* for their erection.

LEGAL.

THE DISTRICT SURVEYOR AND THE BUILDER.

At the Lambeth Police-court, on Tuesday afternoon, Mr. Hopkins concluded the hearing of two summonses taken out by Mr. Ellis Marsland, District Surveyor for Camberwell, against Mr. J. F. Thompson, a builder, of Addington-square, Camberwell; one for beginning to execute work in respect of which a notice was required, before serving such notice; and the second for failing to comply with a notice of irregularity. The case was first before the Court on the 2nd inst., when Mr. Marsland stated that on April 4 he found that an addition had been made to Mr. Thompson's premises without notice. It was then practically completed. The addition consisted of a dressing-room opening out of a bedroom on the first floor. A doorway had been formed from the bedroom; adjoining the dressing-room was a bathroom. Mr. Hopkins asked the witness whether he meant that a new room had been built. Mr. Marsland replied, "Yes, at the side;" adding that an enclosure was formed of old sashes and match-boarding, and that the roof was covered with wood and not with slates, tiles, or metal. After a good deal of correspondence, he met the defendant on June 13, and pointed out the irregularities, and the defendant promised to amend them; but he afterwards resolutely refused to admit that this was an addition to the premises. When the case was first before the Court the defendant made a somewhat involved defence, and Mr. Hopkins said he would adjourn the summonses to go and see the place for himself. Upon the case being now called on the defendant did not answer. Mr. Hopkins, addressing Mr. Marsland, said, "I have come to the conclusion that this is a building, and that whatever you are asking for must follow. What are you asking for?" Mr. Marsland: "An order to amend according to the notice served on the defendant on June 16." Mr. Hopkins made an order accordingly, and also directed the defendant to pay the costs of the proceedings.

RECENT PATENTS:

Abstracts of Patented Inventions.

12,924.—Lavatory Basins: *B. M. Fletcher.*—As the valve is depressed by the action of the pull the basin discharges into an intervening chamber, whose contents are thence forced, by means of a pump, into the outlet pipe; from the chamber a pipe leads to another chamber, through which the pull-rod is passed, a flat upon the rod places the two chambers in communication with the air, so as to relieve the pressure before the valve has been opened.

12,928.—A Combined Fastening: *J. M. Forney.*—The contrivance combines a lock and a sliding bolt; by the former is secured a bent arm which engages with a spring catch that is to be raised with a key placed over an angle-shaped lug or pin; the arm is forced out of the lock by means of a spring.

12,931.—An Appliance for Vices: *C. Wisenbach.*—The inventor seeks to minimise friction between the vice's moveable jaw and the adjusting-screw's collar by placing between them a channelled plate with anti-friction balls and a loose washer, a forked lug upon the plate engages with a pin upon the jaw which is also pressed by projections from the plate.

12,967.—A Fastening for Sashes, &c.: *H. Weatherill.*—The fastening is adapted for doors, shutters, and window sashes; to a plate upon one of the meeting-frames is attached a spring bar that will engage with a notched catch upon a plate secured to the other frame, the bar (which has a handle) may either be joined to the former plate or be bedded to a solid part or to a spring affixed to the plate—the spring being secured with a bolt or rivet whose nut can be turned in the plate's countersunk portion; the catch may be dispensed with, and in order that the bar shall not be unduly forced the latter plate is fashioned with a raised portion, or is arranged so that it will overlap the former plate.

13,035.—A Pantograph: *T. Roche.*—The instrument, whilst primarily intended for marking out boot and shoe patterns, is described as being available in respect of other designs and patterns. Its three extensible parallel bars carry clamping wing nuts, together with pointers and scales, a spindle set in a socket in the table upon ball-bearings carries the middle bar of the pantograph, roller castors being placed at the ends of the diagonal, a tracer and a cutter or marking tool are carried by the extended ends of the two side-bars, respectively, the paper under the tool or cutter is held with a spring-clip over a glass sheet, and is fed from a roll beneath the table, there are slots in the plate underneath the tracer for an adjustment of the pattern.

13,049.—Composition for Glass Bricks, Slabs, Tiles, Plaques, &c.: *T. F. Walker, E. M. Walsh, and S. B. Walsh.*—For producing an opaque golden-brown glass called "aventurine" copper or brass filings are melted with soda and sand. For articles of a larger size the fragments are welded and melted together in a mould, the mould, muffle, kiln, or oven being luted or closed so that air shall not obtain access to the mass when in a molten condition.

13,101.—Hydraulic Cranes: *H. Berry.*—For a hydraulic crane fitted with a jib, whose length can be adjusted and which may be luffed without an alteration of the load's height a fixed jib is provided for the crane-post; at its outer end is an adjustable jib that slides between rollers and is turned out with a hydraulic cylinder and ram, between arms, whose lower ends are pivotted to a strut and whose upper ends are joined to the ends of a second pair of arms pivotted to the sliding jib, is mounted a pulley which affords compensation for the lifting chain and becomes relatively displaced with the jib's inward motion, thereby taking up the chain's slack and sustaining the load at a height that remains constant.

13,110.—Hinges for Doors and Gates: *J. Priest.*—In order that the strap hinge may not become displaced lengthwise upon the pin, its central portion is fashioned with a recess, or the strap itself is pressed into recesses, or rings are employed, and for lifting the gate or door off its hinges the top-bearing is caused to slide up upon its back-plate; a set-screw for adjusting the hinge and taking up wear, together with similar screws above and under the pin, may also be used.

13,124.—Roof Glazing: *W. Lawson.*—Corrugations that bend both inwards and downwards are formed upon the flanges of the leaden or other sheet metallic supporting strips; the drifting sideways of rain water past the joints is prevented by means of corrugations, turned ontwards, upon the flanges of the caps; for purposes of free ventilation the latter corrugations should extend along the flange's width; in some instances the caps can be discarded or the supporting-strips and caps can be made sufficiently stiff for enabling the bars to be dispensed with also.

13,146.—A Substitute for Wood, Stone, &c.: *C. Dörr.*—A plastic compound is made by mixing finely divided inorganic substances, such as sand, gravel, &c., or sawdust, &c., with from 10 to 30 per cent. of tar and heating the admixture to from 150 deg. to 200 deg. C., in order to remove its more volatile constituents, or the watery constituents of the tar may be previously removed by distillation; before it has become cold the compound is pressed and stamped into the shapes desired, and, accord-

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ingly with its composition, its hardness will be found to vary from that of granite to that of hard wood.

13,202.—A METHOD OF DESCRIBING CONIC SECTIONS: *W. Ziethen.*—Four bars freely jointed together form a rhombus A B C D, a diagonal bar is inserted through and travels easily in two studs over the joints at B and D, and in a stud at its middle point E, beneath the middle stud, at E, is a marking stile; another bar also travels through the middle stud, through a stud over the joint at A, and through a stud at F, remote from the rhombus—it can be clamped to the studs at A and F; spikes are fitted to the studs at F and C so as to hold those two studs in fixed places upon the drawing board or sheet, and a tracing-point is fitted beneath the stud at A. When the tracing-point describes a circle with the radius A F, the stile at E will set out an ellipse, since during the whole movement F E + E A = F E + E C = A F a constant length, whilst the diagonal bar through points B and D forms a tangent to the ellipse whose major axis = the distance from F to A, and whose foci are at F and C. If it be desired to describe a hyperbola, the points A and C are interchanged and the stile will pass between the foci; for a parabola one discards the use of a centre at F and causes the tracing-point to travel along a straight edge or line. The instrument will also avail for the trisection of angles when it is otherwise adjusted for describing an equilateral (or rectangular) hyperbola.

13,239.—TIPPING-BUCKETS FOR CRANES: *E. Davies and J. Jones.*—The lifting-chain and the tipping-chain, both being secured to the frame at the pillar's top, are passed around pulleys in turn, and so, respectively, to the bucket and a hook which a short chain joins to the bucket. Whilst the load is being raised a sliding block, to which a rope is fastened, falls in a slot in the crane's pillar, and carries with it another sliding block, the motion setting up engagement between a bar upon the one block and a pin upon the other block. An adjustable stop will arrest the ascent of the latter block at a predetermined point, when the bucket is allowed to fall, whilst a further rise of the former block brings about a tilting of the bucket.

13,324.—A CRADLE OR CHAIR FOR USE BY HOUSE DECORATORS AND OTHERS: *J. Stone.*—Slotted hooks, turned over the roof's edge or gutter, support a horizontal rail, whose lifting-tackle and pulley-blocks hold up the cradle or chair, which is to be pulled sideways with an endless cord. the cord being passed over pulleys mounted upon blocks clamped on to the rail, and through eyes on the cradle, and having a weight attached to its lower end. Adjustable screwed rods, having forked pointed ends that press against the wall, are made fast with clamping screws, and serve to keep the top hooks in their places. Beneath the chair are horizontal rods, whose rollers bear against the wall, and chains, that extend from the stage's floor to a straining or distance frame, are secured to a common uniting-block, whose hook serves for joining the staging on to the lifting-tackle.

13,342.—A CIRCULAR-SAW GUARD: *P. Lavaur.*—The advancing wood raises the guard's front cover by means of a lever which a cord joins to a second lever beneath the bench, as the wood turns the arms of a star upon which are rollers that press down the end of the lower lever, a V-shaped piece provided with a shield is pivotted upon the front cover, and whilst at first raised with the cover becomes disengaged as the wood touches the tail whereby the shield drops over the wood and falls behind it when the wood has passed forwards; the principle of the invention is specified as being adapted, with certain variations of the mechanism, for use with band and other saws.

13,355.—A BOX FOR WATER-METERS: *H. van W. Field.*—In order to allow for different depths of the meter the box which contains it is made in two sliding parts, fastened together with set-screws and caulked, at the top is a water-tight cover which can be removed at will, and through the bottom is passed a double pipe joint, having two passages through which the water flows to and from the meter, and joined to the meter pipes by means of a screw-union tightened with an elliptically-shaped gasket that is prevented from turning (and so blocking the passages when the union is being screwed-up) by being sunk in a seating of its own shape; upon removal of the meter a screw cap is put upon the joint which gives a free way from the branch pipe to the service pipe.

13,423.—TREATMENT OF WOOD: *H. C. Williams, E. Bagshawe, and W. H. Pendlebury.*—For waterproofing, fireproofing, and colouring purposes, the wood is, in the first place, treated with an alkaline solution that will dissolve starchy matters, gums, &c., and then, after having been immersed in hot water, is heated to 300 deg. Fahr. and cast into substances which will fill up the pores—for instance, oils, wax, and silicates of potash and soda, to which can be added colouring matters.

13,463.—PIPE JOINTING AND PACKING: *A. C. Trew.*—For making a joint for drain, sewer, and other pipes, undercut flanges are formed upon the pipe ends, which will lie upon a recessed half-socket. The space between the flanges is also to be filled with cement. When cement has been poured into the cavity or recess, then the joint between the pipes' ends is completed by filling the grooves with putty, or some similar material, in which a strip of metal has been wrapped.

13,528.—METALLIC PROPS FOR PITS, &C.: *G. Spencer and F. Chambers.*—The flanges of a bar, having a H-section, are bent so as to form circular arcs, which are joined by a web at the diameter. In the case of a tubular prop its end is closed with either a welded plate or a cap. Within the prop's end is an extended rim through which a holding pin is thrust. In certain modified shapes a bevelled outer rim is fashioned upon the cap so as to prevent the prop ends from becoming splayed outwards when they are subjected to pressure, or the cap may have one outer rim, or inner and outer rims, the prop's lower end being closed and rounded.

13,573.—A CEMENT: *S. J. Woodhouse.*—A cement for use in caulking joints in gas retorts and furnaces, and in steam and hydraulic pipes, for moulding bricks, blocks, and slabs, &c., or for making crucibles, is composed of fireclay, cast-iron or steel borings, lime or forge slag, and refuse from pottery or glassworks, and is to be mixed with water when needed for use. A glazing substance should be laid on when the inside of gas retorts and the jointing of retort-caps, &c., have been caulked.

MEETINGS.

FRIDAY, OCTOBER 26.

Architectural Association.—Mr. Francis Bond, M.A., on "French and English Cathedrals." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. H. D. Searles Wood on "Building Materials." 8 p.m.

Institution of Junior Engineers.—Annual General Meeting at Westminster Palace Hotel. 8 p.m.

SATURDAY, OCTOBER 27.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection and Demonstration at Aylesbury Dairy Company's premises, St. Petersburgh-place, Bayswater. 3 p.m.

Builders' Foremen's Association.—Meeting at Memorial Hall, Farringdon-street, E.C. 7.30 p.m.

MONDAY, OCTOBER 29.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. H. D. Searles-Wood on "Sanitary Building Construction and Planning." 8 p.m.

WEDNESDAY, OCTOBER 31.

City of London College Science Society.—Dr. J. H. Gladstone, F.R.S., on "Metals of the Ancients."

Sanitary Institute (Lectures for Sanitary Officers).—Mr. W. C. Tyndale on "Calculations, Measurements, and Plans and Sections." 8 p.m.

THURSDAY, NOVEMBER 1.

Civil and Mechanical Engineers' Society.—Mr. G. F. Emery on "Patent Law." 8 p.m.

Carpenters' Hall, London Wall (Lectures on Sanitary Building Construction).—Mr. James Bartlett on "Setting Out Work and Bye-Laws." 7.30 p.m.

FRIDAY, NOVEMBER 2.

Sanitary Institute (Lectures for Sanitary Officers).—Professor Henry Robinson on "House Drainage." 8 p.m.

SATURDAY, NOVEMBER 3.

British Institute of Certified Carpenters.—Meeting at Carpenters' Hall. 6 p.m.

Dundee Institute of Architecture.—Opening lecture, "Some Byeways in Architecture," by Mr. G. S. Aitken, F.S.A. 7 p.m.

Institution of Junior Engineers.—Visit to Millbank Station of London Hydraulic Power Company. 3 p.m. (Postponed from October 27.)

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection and demonstration at the Sewage and Destructor Works, Ealing. 2.15 p.m.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

October 9.—By HUMBERT & FLINT (at Watford).

Watford, Herts.—Church-rd, "St. Hubert's Lodge," f. £1,350
10 and 12, Langley-rd., f. 410
4, 6, 8, 10, 22, and 24, Nascot-st., f. 1,480
Westbury-rd., "Verdun" and "Halstow," f., r. 56*l.* 560
Leavesden, Herts.—Watford-rd., enclosure of land, 6 a. 0 r. 8 p., f. 1,300
Abbots Langley, Herts.—King's Langley-rd., enclosure of land with cottage thereon, 4 a., f. 630

October 10.—By H. DONALDSON & SON.

Hackney.—3 and 22, Wharf-rd.; 19, Marian-sq.; also Alexandra Wharf, u.t. 68 and 48 yrs., g.r. 108*l.* 10s. 3,400
Wharf-rd., factory premises, warehouse, &c., u.t. 68 yrs., g.r. 30*l.*, r. 165*l.* 1,200
5 to 15 (odd), Wharf-rd., u.t. 68 yrs., g.r. 30*l.* 1,300

By PHIBBS, GIBSON, & CO.

Norwood.—89, St. Julian's Farm-rd., u.t. 84 yrs., g.r. 7*l.* 7s. 400
29, 33, and 35, Chestnut-rd., u.t. 91 yrs., g.r. 30*l.*, r. 146*l.* 1,510
Dulwich.—7, Acacia-grove, u.t. 50 yrs., g.r. 3*l.*, e.r. 36*l.* 360
8, Acacia-grove, u.t. 50 yrs., g.r. 3*l.*, r. 36*l.* 300

October 11.—By BELLAMY & MOORE.

Hackney.—34 & 36, Annis-rd., u.t. 44 yrs., g.r. 8*l.*, r. 56*l.* 545

By FRED. W. HARRISON.

Bermondsey.—Spa-rd., i.g.r. 100*l.* u.t. 14 yrs., g.r. 50*l.* 450

By NEWBON, EDWARDS, & SHEPHARD.

Paddington.—80, Praed-st., u.t. 21 yrs., g.r. 6*l.*, r. 75*l.* 450
Clerkenwell.—72, Myddleton-sq., u.t. 12 yrs., g.r. nil, r. 57*l.* 15s. 280
Hornsey.—25, Harvey-rd., u.t. 92 yrs., g.r. 6*l.* 10s. £345

By E. & A. SWAIN.

Notting-hill.—6 & 8, St. Charles-sq., u.t. 72 yrs., g.r. 17*l.* 850
18 to 24 (even), St. Charles-sq., u.t. 72 yrs., g.r. 34*l.* 1,670

By FISHER, STANHOPE, & DRAKE.

Stoke Newington.—99, Cazenove-rd., u.t. 73 yrs., g.r. 14*l.*, e.r. 80*l.* 900
215, High-st., u.t. 47 yrs., g.r. 8*l.* 12s., r. 70*l.* 990
36, Bouverie-rd., u.t. 57 yrs., g.r. 7*l.* 10s., r. 36*l.* 410
Stamford Hill.—Nos. 23 and 25, u.t. 42 yrs., g.r. 18*l.*, e.r. 130*l.* 1,200

By C. C. & T. MOORE.

Homerton.—97, 99, and 101, Glyn-rd., and 6, Chelmer-rd., u.t. 81 yrs., g.r. 13*l.* 1,300
79 to 95 (odd), Glyn-rd., u.t. 81 yrs., g.r. 30*l.* 2,960
2 and 4, Chelmer-rd., u.t. 81 yrs., g.r. 5*l.* 660
51 to 77 (odd), Daubeney-rd., u.t. 81½ yrs., g.r. 28*l.* 3,670
Bow.—36, Lincoln-st., f., r. 26*l.* 520
Hackney.—100 to 106 (even).—St. Peter-st., u.t. 55 yrs., g.r. 19*l.* 1,130

By STIMSON & SONS.

Victoria Docks.—North Woolwich-rd., f.g.r. 40*l.*, reversion in 97 yrs. 880
Westminster.—14 and 16, Chadwick-st., f., e.r. 50*l.* 690
39, Chadwick-st., u.t. 26 yrs., g.r. 40*l.*, r. 100*l.* 430
Woodford.—1 to 4, York-villas, f., r. 78*l.* 10s. 865
Battersea.—16, Latchmere-rd., u.t. 65 yrs., g.r. 5*l.* 5s. 300
Southwark.—2 and 4, Gladstone-st., u.t. 28 yrs., g.r. 6*l.*, r. 57*l.* 550
Camberwell.—14, Dagmar-rd., u.t. 57 yrs., g.r. 7*l.*, e.r. 45*l.* 450
Old Kent-rd.—44 to 56 (even), Bridson-st., u.t. 24½ yrs., g.r. 14*l.* 390
Rotherhithe.—85, Clarence-st., f., r. 30*l.* 340
Brixton.—10, Medwin-st., u.t. 75 yrs., g.r. 6*l.* 10s., e.r. 34*l.* 300

By RAWLINS & CO. (at Barking).

Barking, Essex.—St. Awdry's-rd., &c., 126 plots of building land, f. (in lots) 5,016

October 12.—By P. & G. GERN.

Walworth.—146, Lorrimore-rd., r. 45*l.*; also l.g.r. 8*l.*, u.t. 50 yrs., g.r. 13*l.* 415
Kennington.—1, Reedworth-st., u.t. 65 yrs., g.r. 1*l.* 10s., r. 32*l.* 335
New Kent-rd.—Gurney-st., "Gloucester House," u.t. 42 yrs., g.r. 20*l.* 665

By W. R. NICHOLAS & CO.

Saffron Walden, Essex.—"Bury Hill House," f. 1,635

By NOTT, CARTWRIGHT, & ETCHES.

Pimlico.—113, Lupus-st., u.t. 33 yrs., g.r. 9*l.*, r. 100*l.* 920
67, St. George's-rd., u.t. 30 yrs., g.r. 12*l.*, r. 100*l.* 810
Westminster.—53, Tachbrook-st., u.t. 20 yrs., g.r. 6*l.*, r. 50*l.* 350
Streatham.—14, Leigham Vale, u.t. 85 yrs., g.r. 6*l.* 10s., r. 40*l.* 450
43, Leverson-st., u.t. 97 yrs., g.r. 8*l.*, r. 45*l.* 440
Tooting.—22, Longley-rd., f., e.r. 60*l.* 750

By ROUCH, PARKHOUSE, & LUCK.

Highgate.—Shepherd's Hill, "Shepherd's Cot" and nearly 1½ a., u.t. 77 yrs., gr. 57*l.* 10s. 1,800

By BRUTON, KNOWLES, & CO. (at Chippenham).

Bremhill, Wilts.—Cadenham Manor Estate, 156 a. 1 r. 30 p., f. 8,000

By MORRIS, MARSHALL & POOLE (at Bishop's Castle).

Clun, Salop.—Whitcott Farm, 241 a. 2 r. 18 p., f., r. 140*l.* 2,750

October 13.—By H. J. WAY & SON (at Newport).

Whitwell, Isle of Wight.—Moorbills Estate, 60 a. 2 r. 21 p., f. 1,825

By RAWLINS & CO. (at Croydon).

Croydon.—Sanderstead-rd., &c., 19 plots of building land, f. 2,681

By THORNBORROW & CO. (at Carlisle).

Holme Low, Cumberland.—Longcummercatiff Farm, 60 a. 1 r. 33 p., f. 2,040

By MORRIS, SONS & PEARD (on premises).

Taunton, Somerset.—East-st., the London Hotel, with shop and warehouse adjoining, area 53,774 ft., f. 7,900

October 15.—By TOPLIS & HARDING.

South Lambeth.—13, 14, and 16, Wilkinson-st., u.t. 62½ yrs., g.r. 16*l.* 10s., r. 122*l.* 1,340

By GREEN & SON (of Hammersmith).

Hounslow, Middlesex.—1 to 6, Maswell Park-ter., u.t. 93 yrs., g.r. 24*l.* 990
1 to 6, Maswell Park-villas, u.t. 93 yrs., g.r. 24*l.* 900
Chiswick.—64 to 70 (even), Paxton-rd., f. 1,340
24, Upham Park-rd., u.t. 68½ yrs., g.r. 5*l.* 5s., r. 30*l.* 285
Camden Town.—7, St. Paul's-cres., u.t. 50 yrs., g.r. 4*l.*, r. 40*l.* 455
Leytonstone.—14, Harrow-rd., f. 280

By PERCIVAL HODSON.

Highbury.—51, Elwood-st., f., r. 55*l.* 560
17 to 23 (odd), Elwood-st., u.t. 42 yrs., g.r. 10*l.*, r. 78*l.* 645
Finchley.—Nether-st., a corner building site, f. 380

By WILLIAM HOUGHTON.

Leyton.—Oliver-rd., a freehold building estate, area 16 acres 7,250
Chelsea.—14 and 16, Meek-st., u.t. 83 yrs., g.r. 13*l.* 12s., r. 68*l.* 745
Walthamstow.—Duke's Head Passage, a freehold building site, c. 100
1, 2, and 3, West-avenue, f., r. 93*l.* 16s. 1,250
West-avenue, a freehold building site 150
West-avenue, Amina Cottage, f. 735

By ALFRED RICHARDS.

Edmonton.—Hertford-rd., William the Fourth building estate, 8 a. 2 r. 11 p., f. (including f.g.r. 27*l.* 3s., reversion in 7 years) 5,825
Enfield Highway.—Turkey-st., The Harrow b.-h. and nearly ¼ of an acre, f. and c., r. 40*l.* 1,550

By NORMAN & SON (at Stratford).

Victoria Docks.—Grange-rd., three plots of land, f. 120
Graham-rd., a factory site, area 9,000 ft., f. 185
Stratford.—36, Wingfield-rd., f. 330
Leyton.—12 to 20 (even), Grange Park-rd., f. 1,720
Forest Gate.—Hamfrith-rd., Hailey Lodge, f., r. 65*l.* 1,350

[See also next page.

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COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*St. Matthias' Church Schools	Salford Corporation	60*l.*, 30*l.* and 20*l.*	Nov. 22

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Alterations to School Buildings	Waltham Holy Cross Sch. Bd.	Clerk, School Board Offices, Waltham Abbey	Oct. 29
Street Works, Catherine-street, &c.	Mountain Ash (Glam.) U.D.C.	Surveyor, Town Hall, Mountain Ash	Oct. 30
*Kerbing, Paving, &c.	Lewisham Board of Works	Surveyor's Department, Board's Offices	do
Farm Buildings, Stanton	Swadlincote U.D.C.	T. Kidd, Surveyor, Swadlincote	Oct. 31
Public Offices, Whitbarrow-lane	Lymm U.D.C.	S. P. Silcock, Architect, Warrington	do.
Road Works	Erdington (Birmingham) U.D.C.	H. H. Humphries, Surveyor, Public Hall, Erdington	do.
Viaduct, &c., over River Dearness, near Durham	North-Eastern Railway Company	C. A. Harrison, Central Station, Durham	do.
Road Works, &c., Union-road	Oswaldtwistle (Lancs.) Corporation	R. N. Hunter, Surveyor, Town Hall	do.
Road, Porth, Wales	.....	T. Rees, Civil Engineer, Corn Exchange Chambers, Newport, Mon.	do.
House at Gasworks, Crindau	Newport (Mon.) Gas Company	Engineer, Gasworks, Mill-street	do.
Six Houses and Shop, St. George's-road, Barnsley	.....	Wade & Turner, Architects, 10, Pitt-street, Barnsley	do.
Paving Works, Bill Quay	Felling (Durham) U.D.C.	G. Bolam, Council Offices, Felling, R.S.O.	do.
Steel Bridge over Bridgewater Canal	Lymm U.D.C.	T. G. Lumb, Civil Engineer, 24, Birley-street, Blackpool	do.
Cast-iron Pipes	Gainsborough U.D.C.	R. W. Fraser, Engineer, Council Offices	do.
Additions to Baptist Church, Grantown, N.B.	.....	Jno. Robertson, Architect, Inverness	do.
Porter's Lodge at Hospital, Morriston, N.B.	.....	A. & W. Reid & Wittett, Architects, Elgin	do.
Offices at Gasworks	Birstall District Council	W. Middlebrook, Council Offices, Bradford-road, Birstall	do.
"Ruskin" Museum, Coniston	.....	R. Walker, Architect, Windermere	Nov. 1
Hotel, Tanshelf, Pontefract	Mr. W. Pickeragill	Tennant & Bagley & E. E. Pickeragill, Architects, Pontefract	do.
Houses (5 Contracts), Aberdeen	.....	Wilsone & Duffus, Aberdeen	do.
House, St. Athan, near Cardiff	.....	Mr. H. J. D. Parsons, Bamfylde House, Exeter	do.
Nineteen Houses, Manston, Yorks	Mr. J. Inchbold	G. W. Atkinson, Architect, 1, Mark-lane, Leeds	do.
*Hydraulic Machinery, &c.	Midland Railway	See Advertisement	Nov. 2
Additions to Board Room, Hallam-street	West Bromwich Guardians	Mr. Rollason, Architect, High-street, West Bromwich	do.
Paving Works, Council House	Handsworth (Staffs.) U.D.C.	H. Richardson, Civil Engineer, Council House	do.
Streets & Sewers, Barrow Island	.....	J. Thompson, 237, Dalton-road, Barrow-in-Furness	do.
School, near Barnsley	Barugh School Board	R. & W. Dixon, Architects, 5, Eastgate, Barnsley	do.
Electricity Works	Devonport Corporation	Borough Electrical Engineer, Devonport	do.
Additions to Sanatorium, Marsden-road	Burnley Joint Hospital Board	A. S. Sheldon, Town Hall, Burnley	Nov. 3
Coastguard Station, Dirk Cove, co. Cork	Office of Public Works	Director, Office of Works, Dublin	do.
Café, Water-street	Londonderry Temperance Council	M. A. Robinson, Civil Engineer, Richmond-street, Londonderry	do.
Sewerage Works, &c., Little Sutton, Chester	Wirral R.D.C.	Beloe & Priest, Civil Engineers, 13, Harrington-street, Liverpool.	Nov. 5
Refuse Destructor, &c.	Rhyl U.D.C.	A. A. Goodall, Surveyor, Clwyd-street, Rhyl	do.
Buildings, Woodlands-road and St. George's-road.	Glasgow Corporation	J. Lindsay, City Chambers, Glasgow	do.
Waterworks Extension, Carcluie	Ayr Town Council	J. Young, Engineer, Town Buildings, Ayr	do.
Making-up Fair Hill New-road	Larne (Ireland) U.D.C.	Town Surveyor, Town Hall, Larne	do.
Carriage House, Albert Pier	Penzance Corporation	F. Latham, Civil Engineer, Public Buildings, Penzance	do.
Boundary Walls, &c., Heath-road and Cripplegate	Halifax Corporation	Jas. Lord, Borough Engineer, Town Hall	do.
*Stone Paving	Tottenham U.D.C.	P. E. Murphy, Engineer, 712, High-road, Tottenham	Nov. 6
Refuse Destructor, Doughty-road	Grimsby Corporation	H. G. Whyatt, Civil Engineer, Town Hall	do.
Post Office, &c., Sligo	Office of Public Works	Director, Office of Works, Dublin	Nov. 8
*Dust Destructor	Walker, Northumberland U.D.C.	Handcock & Dykes, Engineers, 1, Victoria-street, S.W.	Nov. 12
Public Convenience, Harold-place	Hastings Corporation	P. H. Palmer, Civil Engineer, Town Hall	do.
*Waterloo School	Oldham School Board	See Advertisement	do.
Drainage Works, Lake-street and Others	Dartmouth U.D.C.	T. O. Veale, surveyor, Castle View, Dartmouth	Nov 14
*Isolation Hospital	Spennymoor U.D.C.	G. W. Rogers, Surveyor, Spennymoor	Nov. 19
*Engine House and Boiler House, &c.	Darlington Corporation	Borough Surveyor, Town Hall, Darlington	Nov. 22
*Pumping Engine, &c.	do.	do.	do.
Car deposit, &c., Cleveland-road	Wolverhampton Corporation	do.	do.
*Electric Lighting Plant at New Workhouse	Nottingham Guardians	J. W. Bradley, Civil Engineer, Town Hall	No date
Hotel, Main Cliffe-road, Kessingland	.....	Clerk, Poor Law Offices, Nottingham	do.
Works, &c., at Business Premises, Park-lane, Leeds	.....	G. Fitt & Co., Ltd., Architects, 1, Queen-street, Norwich	do.
Mission Hall, Clay Cross, Derbyshire	.....	Butler, Wilson & Co., Architects, 12, East-parade, Leeds	do.
Boiler House, &c., Newley, near Leeds	.....	E. Oxley, Architect, Clay Cross	do.
Iron Bridge over River Wye, High Wycombe	Lord Carrington.	G. F. Bowman, Architect, 5, Greek-street, Leeds	do.
Reservoir, Yelverton, Devon	.....	Carter, Jones & Co., Surveyors, Market Hill, Cambridge	do.
		J. Mullins & Sons, Colerne Box, Wilts.	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Liverpool Vestry	3 guineas per week	Oct. 25
*General Engineering and Surveying Assistant	Salford Corporation	120*l.* per annum	Oct. 31
*Engineer and Clerk of Works	Mutford and Lothingland U.D.C.	See Advertisement	Nov. 1
*Clerk of Works	Minehead U.D.C.	.....	Nov. 6
*Junior Architectural Draughtsman	.....	80*l.* per annum	No date
*Assistant	Cowpen U.D.C.	.....	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv. vi. viii. x. & xxi. *Public Appointments, pp.* xviii. xix. & xxi.

Leytonstone.—129 to 139 (odd), Harrow-rd., u.t. 78 yrs., g.r. 20*l.* £1,030

By Henry Hendriks (at Birmingham).

Moseley, Worcester.—Russell-rd., Shaftesbury House and Fillongley, u.t. 75½ yrs., g.r. 20*l.* 1,050
Greenland-rd., Ivy House, f. 675
Handsworth, Staffs.—Devonshire-rd., Eversley, f. 990
53 and 55, Thornhill-rd., u.t. 91 yrs., g.r. 6*l.* 2*s.* 6*d.* 860

October 16.—By J. A. Lumley, Newton, & Dowell.

Melrose, Roxburghshire.—The Estate of Ravenswood, 363 a., f. 41,000

By G. Ernest Clarke.

Walthamstow.—62, 64, and 66, Beulah-rd., f. 900
Upper Walthamstow-rd., Rostock House, u.t. 95 yrs., g.r. 7*l.*, e.r. 40*l.* 475

By Hampton & Sons.

Westbourne Park.—30, Westbourne Park Villas, u.t. 443 yrs., g.r. 7*l.* 14*s.*, e.r. 60*l.* £495
Walton-on-Thames.—Ryden's-avenue, Lyndhurst, f., r. 75*l.* 1,295

By Mansell & Rowe.

Norwood.—18, Gipsy Hill, u.t. 46 yrs., g.r. 10*s.*, r. 45*l.* 550

By Crafter, Harris & Co. (at Masons' Hall Tavern).

Streatham.—Mitcham-lane, the Streatham Park Hotel, u.t. 60 yrs., r. 100*l.* with goodwill 25,200

By J. C. Platt (at Hammersmith).

Acton.—4, 6, and 8, Berrymead-gardens, u.t. 89 yrs., g.r. 15*l.* 15*s.* 790
23 to 29 (odd), Cunnington-st., f. 1,225

Hammersmith.—29, Girdlers-rd., u.t. 65 yrs., g.r. 2*l.* £450
20, Paddenswick-rd., f., r. 45*l.* 700

October 17.—By Percy H. Clarke.

Soho.—9, Berwick-st. and cottage in rear, f., e.r. 262*l.* 3,400
Old Brompton, Kent.—Moiety of 47, High-st., f., r. 40*l.* 270

***Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.**

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 16 0	per 1,000 alongside, in river.
Rough Stocks and Grizzles	1 12 0	,, ,, ,,
Smooth Bright Facing Stocks..	2 18 0	,, ,, ,,
Shippers	2 2 0	,, ,, ,,
Flettons.....	1 10 0	,, at railway depôt.
Red Wire Cuts ..	1 15 0	,, ,, ,,
Best Fareham Red	3 11 6	,, ,, ,,
Best Red pressed Ruabon Facing.	5 5 0	,, ,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,, ,, ,,
Do., Bullnose	4 12 0	,, ,, ,,
Best Stourbridge Fire Bricks	4 4 6	,, ,, ,,
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers.....	23 0 0	,, ,, ,,
Headers	22 0 0	,, ,, ,,
Quoins, Bullnose, and Flats	17 0 0	,, ,, ,,
Double Stretchers	19 0 0	,, ,, ,,
Double Headers..	16 0 0	,, ,, ,,
One Side and two Ends	19 0 0	,, ,, ,,
Two Sides and one End	20 0 0	,, ,, ,,
Splays, Chamfered, Squints	20 0 0	,, ,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	18 0 0	,, ,, ,,
Quoins, Bullnose, and Flats	14 0 0	,, ,, ,,
Double Stretchers	15 0 0	,, ,, ,,
Double Headers..	14 0 0	,, ,, ,,
One Side and two Ends	15 0 0	,, ,, ,,
Two Sides and one End	15 0 0	,, ,, ,,
Splays, Chamfered, Squints	14 0 0	,, ,, ,,
Seconds Quality White and Dipped Salt Glazed	2 8 0	,, less than best.
	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	,, ,,
Best Portland Cement	38 0	per ton ,,
Best Ground Blue Lias Lime..	24 6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks,	32s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt
Bath ,, ...	1 7	,, ,,
Farleigh Down Bath ..	1 8	,, ,,
Beer in blocks	1 6½	,, ,,
Grinshill ,, ...	2 10	,, ,,
Brown Portland in blocks	2 2	,, ,,
Darley Dale ,,	2 1½	,, ,,
Red Corsehill ,,	2 5	,, ,,
Red Mansfield ,,	2 4½	,, ,,
Hard York ,,	2 10	,, ,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super. at rly. depôt.
,, ,, 6 in. Rubbed Ditto..	2 10½	,, ,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,, ,,
,, ,, 3 in. self-faced Ditto	0 9	,, ,,

SLATES.

in. in.	£ s. d.	
20×10 best blue Bangor..	11 5 0	per 1000 of 1200 at rly. dep.
,, best seconds ,,	10 15 0	,, ,,
16× 8 best ,,	6 2 6	,, ,,
20×10 best blue Portmadoc	10 18 0	,, ,,
16× 8 best blue Portmadoc	6 0 0	,, ,,
20×10 best Eureka unfading green.....	12 2 6	,, ,,
16× 8 ,, ,,	6 15 0	,, ,,
20×10 Permanent green	10 0 0	,, ,,
16× 8 ,, ,,	5 12 6	,, ,,

TILES.

	s. d.	
Best plain red roofing tiles..	41 6	per 1,000 at rly. depôt.
Hip and valley tiles....	3 7	per doz. ,, ,,
Best Broseley tiles	48 6	per 1,000 ,, ,,
Hip and valley tiles....	4 0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 ,, ,,
Do. ornamental Do.	60 0	,, ,, ,,
Hip tiles.....	4 0	per doz. ,, ,,
Valley tiles.....	3 9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes).	50 9	per 1,000 ,, ,,
Hip tiles	4 1	per doz. ,, ,,
Valley tiles.....	3 8	,, ,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0

PRICES CURRENT (*Continued*).

	At per standard. £ s. d.	£ s. d.
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0	,, ,, ,,
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0
JOINERS' WOOD.	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens.....	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens.....	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens.....	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in. ..	14 0 0	15 0 0
Battens.....	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,, ...	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
⅞ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6
Compound Girders ,, ,,	12 5 0	13 10 0
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	11 7 6	12 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	10 0 0	10 10 0
Staffordshire Crown Bars, good merchant quality	10 15 0	11 5 0
Staffordshire "Marked Bars" ..	13 5 0	- - -
Hoop Iron, basis price.....	11 0 0	11 10 0
,, ,, galvanised	17 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 5 0	- - -
,, ,, to 24 g.....	12 10 0	- - -
,, ,, to 26 g.....	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14 15 0	- - -
,, ,, 22 g. and 24 g.	15 5 0	- - -
,, ,, 26 g.....	16 15 0	- - -
Sheet Iron, Galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 0 0	- - -
,, ,, 22 g. and 24 g.	18 10 0	- - -
,, ,, 26 g.	20 0 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 15 0	14 10 0
,, ,, 22 g. and 24 g.	14 10 0	15 10 0
Cut nails, 3 in. to 6 in..... (Under 3 in. usual trade extras.)	11 10 0	- - -
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
Soil Pipe..	23 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	28 0 0	- - -
Silesian.....	27 10 0	- - -
COPPER—		
Strong Sheet..... per lb.	0 1 1	- - -
Thin ..... ,,	0 1 3	- - -
Copper nails ..... ,,	0 1 3	- - -
BRASS—		
Strong Sheet..... ,,	0 0 11	- - -
Thin ,, ... ,,	0 1 1	- - -

PRICES CURRENT (*Continued*).

	Per ton, in London. £ s. d.	£ s. d.
TIN—English Ingots ,,	0 1 6	- - -
SOLDER—Plumbers' ,,	0 0 8	- - -
Tinmen's ,,	0 0 10	- - -
Blowpipe ,,	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, ,, fourths.....	3d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths	5d. ,, ,,
Fluted sheet, 15 oz.	3¼d. ,, ,,
,, ,, 21 ,, ...	4¾d. ,, ,,
½ Hartley's Rolled Plate.....	3d. ,, ,,
⅜ ,, ,, ,, ...	3¼d. ,, ,,
¼ ,, ,, ,, ...	4d. ,, ,,

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes.....	per gallon	0 3 2
,, ,, ,, in barrels	,,	0 3 2
,, ,, ,, in drums	,,	0 3 4
Boiled ,, ,, in pipes.....	,,	0 3 4
,, ,, ,, in barrels	,,	0 3 5
,, ,, ,, in drums	,,	0 3 7
Turpentine, in barrels	,,	0 2 7
,, in drums.....	,,	0 2 9
Genuine Ground English White Lead ...per ton		27 10 0
Red Lead, Dry.....	,,	25 0 0
Best Linseed Oil Putty.....per cwt.		0 0 6
Stockholm Tar .....per barrel		1 5 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish or outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work.....	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0

VARNISHES, &c.

	per gallon. £ s. d.
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

C. H. (Your question is answered in the first article of this issue. It is a well-known type of construction; nothing out of the way in it.) M. & F. (Amounts should have been stated.) G. F. B. (Below our limit.) H. P. D. (Sent too late.)

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[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

SOUTH KIRKBY (Yorks).—For the erection of Club Premises, for the South Kirkby Working Men's Club. Messrs. Garside and Pennington, architects, Pontefract, Castleford, and Selby. Quantities by architects:—

*Masonry and Bricklaying.**—W. H. Illingworth, East Ordsley, near Wakefield....	£945 0 0
*Carpentry.**—E. Chadwick & Sons, Staincliffe, near Dewsbury.....	540 0 0
*Plumbing.**—Walker & Co., Heckmondwike.....	172 0 0
*Slating.**—Pickles Bros., 66, Park-lane, Leeds	74 0 0
*Plastering.**—James Shaw, Pontefract ..	88 17 6
*Painting.**—W. Thrall, Pontefract.....	25 0 0
Total.....	£1,844 17 6

BISHOP'S STORTFORD.—For the supply of broken granite (900 tons), &c., for the Urban District Council. Mr. R. S. Scott, C.E., Council Offices, Bishop's Stortford:—

	Quenast Granite. Per ton. s. d.
L. Sommerfeld, Fowkes-buildings, Great Tower-street, London*	13 6

[*See also next page.*

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CARLISLE.—For the erection of two houses, Warwick-road. Mr. H. H. Hodgkinson, architect, 9, Lowther-street, Carlisle :—

Building.—E. J. Hill*	£426 10 0
Joinery.—T. Hamilton*	160 0 0
Plastering.—D. Johnston*	91 15 0
Plumbing.—N. Forster*	80 0 0
Slating.—J. Killet*	41 10 0
Painting.—J. Dinard*	21 16 0
Ironwork.—J. Gouge*	17 0 0

[All of Carlisle.]

CROYDON.—For the erection of house, &c., Croham-avenue, for Mr. B. A. Berry. Mr. E. Douglas Hoyland, architect, 2, Walbrook, E.C. :—

T. C. Hobbs	£1,809 0	J. & C. Bowyer	£1,707 15
W. Potter	1,800 0	Newman, Ltd.*	1,640 0
J. R. Bex	1,793 0		

LANCASTER.—For the erection of furniture stores, Water-street, for Mr. J. W. Whittaker. Mr. J. Parkinson, architect, 67, Church-street, Lancaster. Quantities by the architect :—

Masonry, &c.—R. Thompson*	£1,058 10 0
Joinery.—R. Thompson*	803 10 0
Slating.—R. Hall & Son*	186 2 6
Plumbing.—Abbott & Co.*	112 0 0
Painting.—Eaton & Bulfield*	46 7 11

[All of Lancaster.]

LONDON.—For pulling down and rebuilding Nos. 7 and 8, High-street, Marylebone, for Messrs. W. & A. Curnick. Messrs. White & Page, architects, Nos. 4 and 5, Warwick-court, Gray's-inn. Quantities by Mr. Thomas Brown :—

Contract No. 1.

Granite Work to Shop Front.

A. Lee & Bros., Ltd.	£646 0
Whitehead & Sons, Ltd.	049 0
Fenning & Co.*	548 15

Contract No. 2.

Supply and Delivery of Steelwork.

Measures Bros.	£382 18 7	Dorman, Long, & Co., Ltd.	£351 0 0
Moreland & Son, Ltd.	367 0 0	Deane, Ransome, & Co., Ltd.*	349 0 0

Contract No. 3.

Builder's Work.

Lawrance & Sons	£6,973	Bush & Sons	£6,197
H. L. Holloway	6,669	Webber	6,175
Hall, Beddall, & Co.	6,620	Bywaters	6,144
Simpson & Sons	6,400	Wall & Co.*	5,667

RAUNDS (Northants).—For alterations and additions to shoe factory, for Messrs. W. Nichols & Son. Messrs. Mosley & Scrivener, architects, Fish-street, Northampton :—

R. Marriott	£1,345	T. Swindall	£1,219
F. Henson	1,260	W. H. Lovell, Rounds*	1,189
W. Beardsmore	1,247		

SALTASH.—For drainage work on the Path Fields Estate, St. Stephens-by-Saltash, for Mr. J. Bennett. Mr. Edgar M. Leest, architect, Devonport and Saltash :—

W. H. Rothery	£202 0 0	W. R. Deacon	£129 10 6
Jenkin & Son	160 0 0	Smith & Son	124 15 0
T. Shaddock	143 8 8	Taylor & Mutton*	118 0 0
Wm. Shaddock	139 12 0		

STRADBROKE (Suffolk).—For alterations to the Market Hall, for the East Suffolk County Council. Mr. H. Miller, C.E., 16, Museum-street, Ipswich :—

Bullen	£169 0	Sampson	£145 0
Etheridge	148 0	R. Butcher, Stradbroke, Eye*	127 10
Rayner	146 10		
Chandler	145 0		

WEMBLEY.—For the erection of sewage works, Alperton, for the Urban District Council. Mr. C. R. W. Chapman, Surveyor to the Council. Quantities by Mr. Chapman :—

	Section A.	Section B.
Boyer & Son	£2,980 0 0	£562 10 0
H. Haynes, Alperton	2,906 0 0	499 10 0*
J. Meston	3,431 2 4	599 9 9
S. Kavanagh	3,274 11 2	625 17 4
Langler & Pinkham	2,520 0 0	797 0 0
Clift Ford, Harlesden, N.W.	2,364 14 9*	699 0 0
A. T. Catley	2,840 0 0	—
F. W. Trimm	4,794 0 0	886 0 0
Pedrette & Co.	33,12 0 0	598 0 0
S. Saunders	3,095 0 0	840 12 0
G. Bell	3,041 0 0	544 0 0

WITTON (Birmingham).—For the construction of foundations, abutments, and piers, for a steel girder bridge over River Thame at Witton, for the trustees of Mr. James Deykin. Mr. J. E. Willcox, C.E., Union Chambers, 63, Temple-row, Birmingham :—

S. Saunders	£4,355 0 0	Barnes & Co.	£2,555 0 0
J. Mackay	3,226 2 2	J. Biggs	2,333 0 0
Holme & King	3,085 0 0	Curral, Lewis, & Martin, Birmingham*	2,329 9 3
G. Law	2,657 0 0		
T. Vale	2,645 0 0		
W. Craig	2,611 14 5		

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BRISTOL: ASHTON GATE WORKS, CORONATION-RD.

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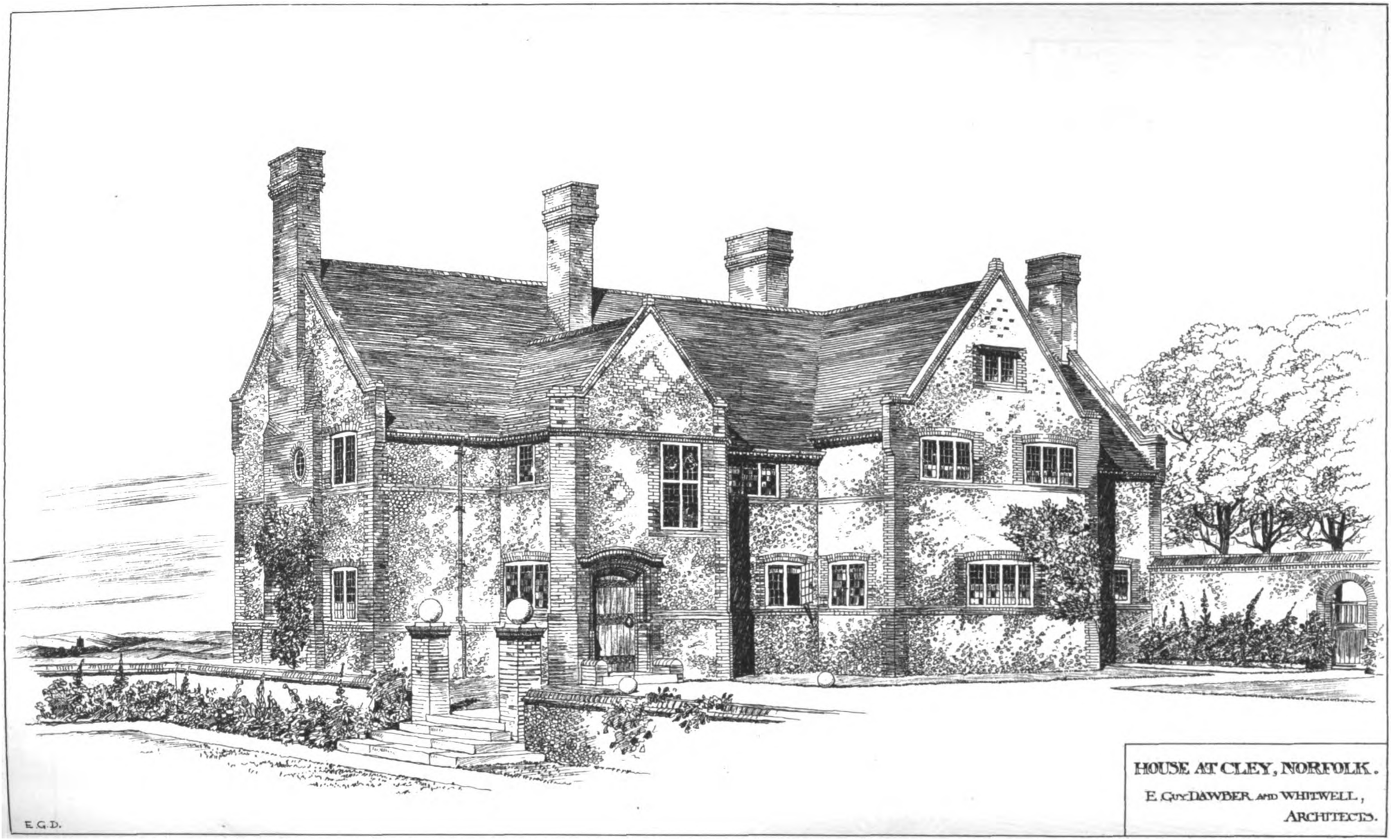

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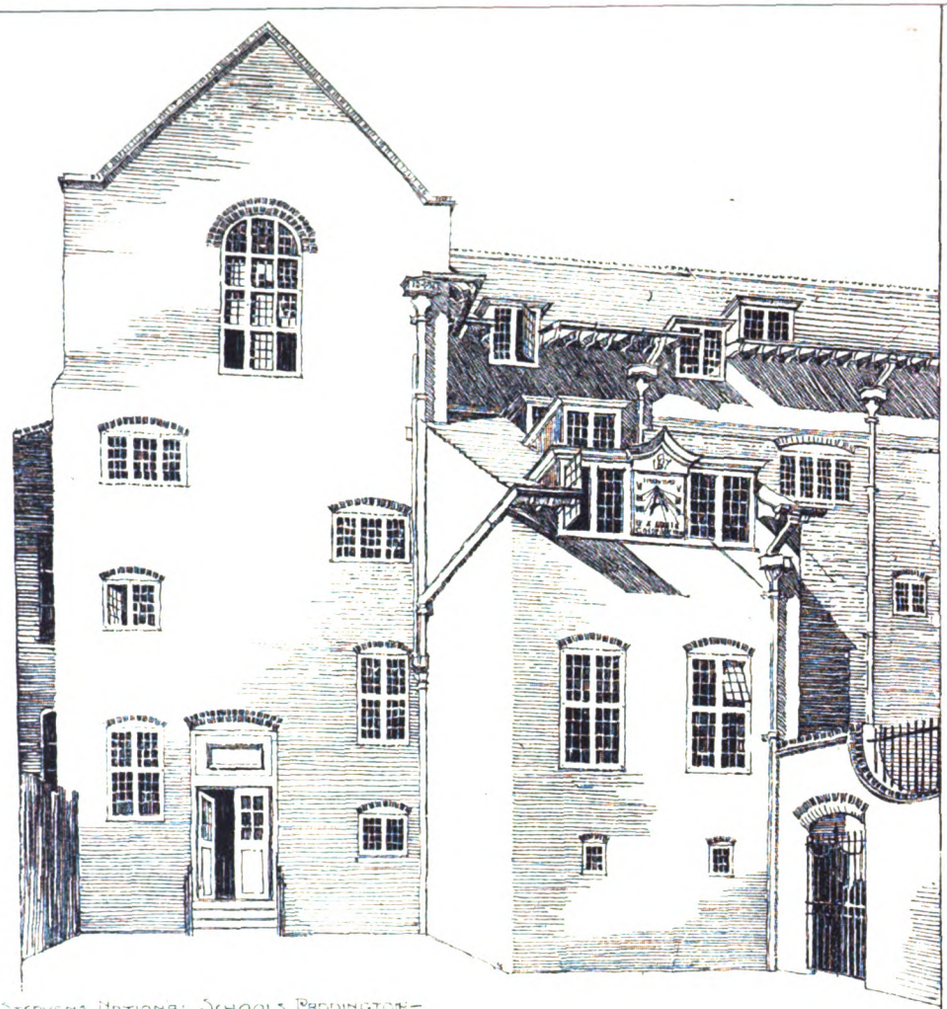
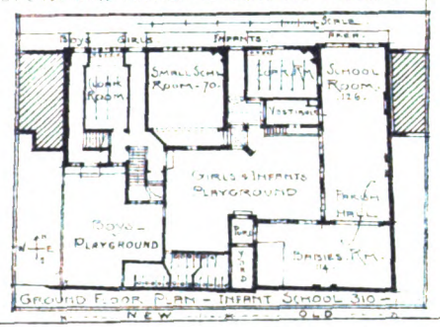


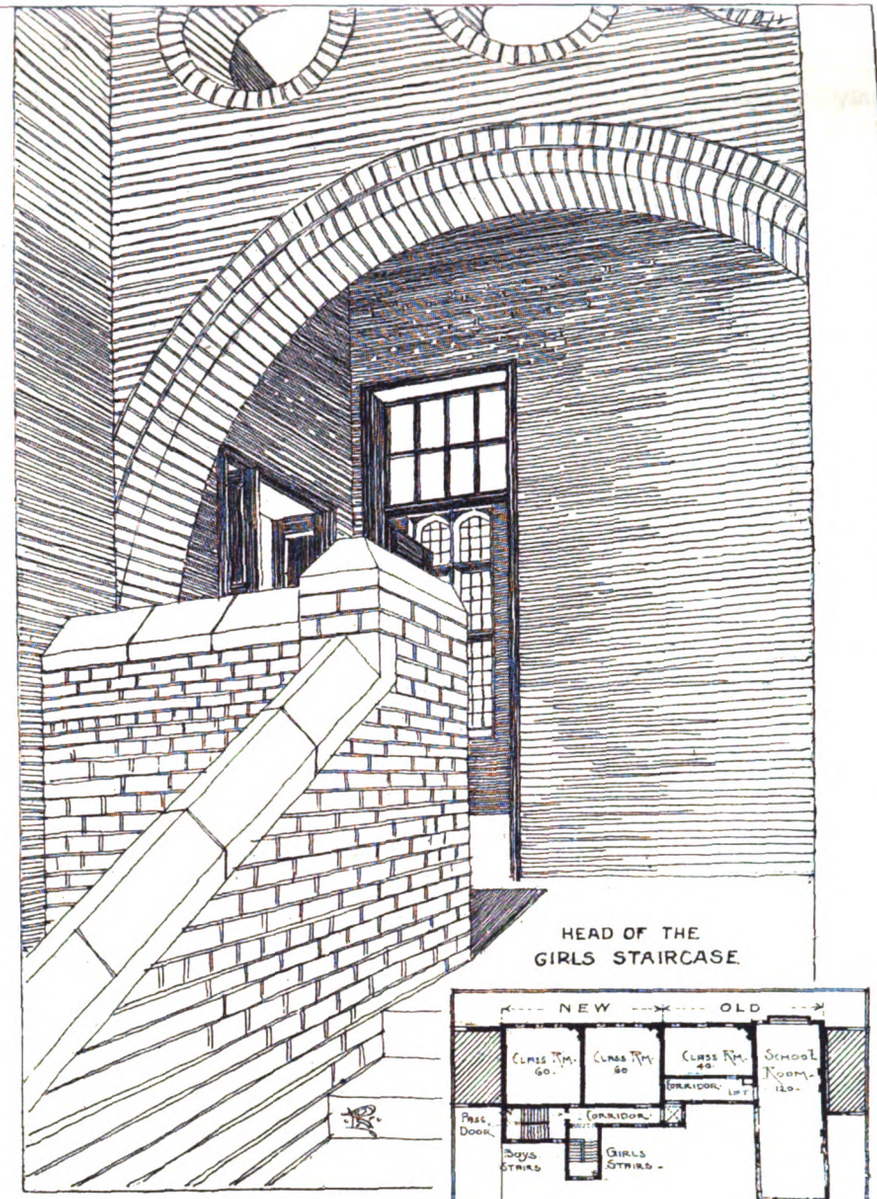
SOUTH ELEVATION.

BOYS AND GIRLS STAIRCASES.

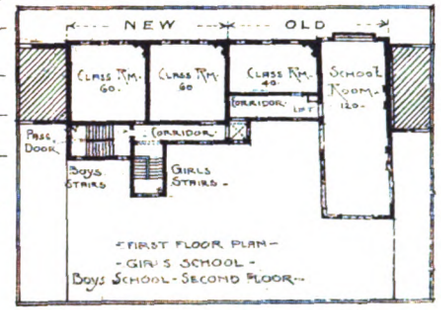
ST STEPHENS NATIONAL SCHOOLS PADDINGTON—



GROUND FLOOR PLAN - INFANT SCHOOL 310 -



HEAD OF THE GIRLS STAIRCASE



FIRST FLOOR PLAN -
- GIRLS SCHOOL -
BOYS SCHOOL - SECOND FLOOR -

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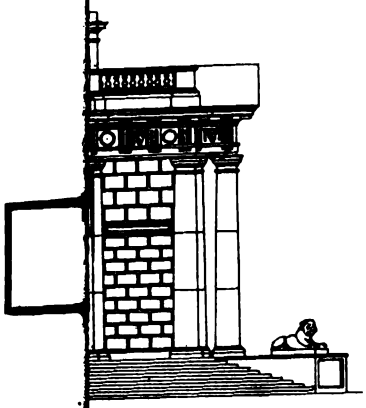

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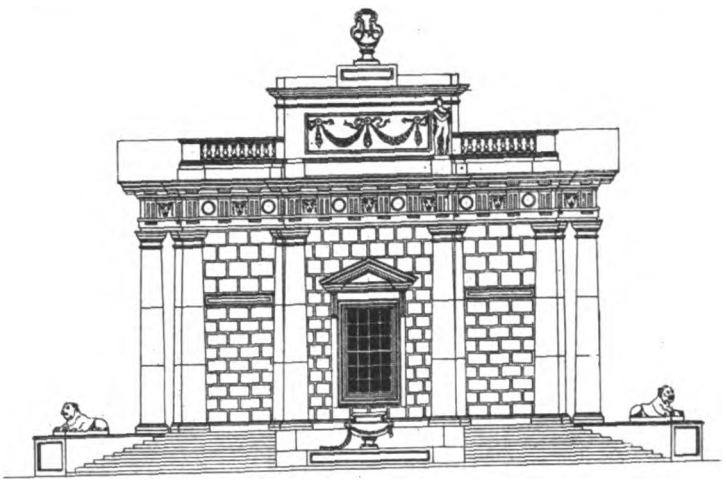

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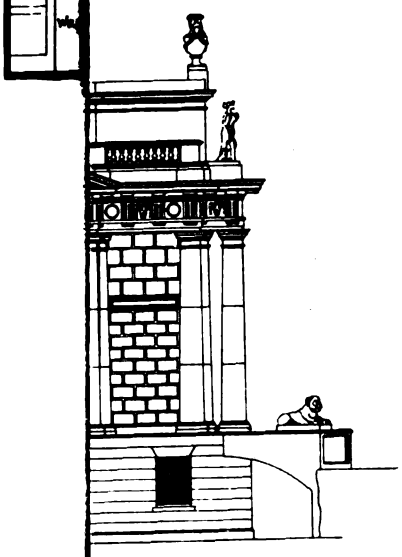

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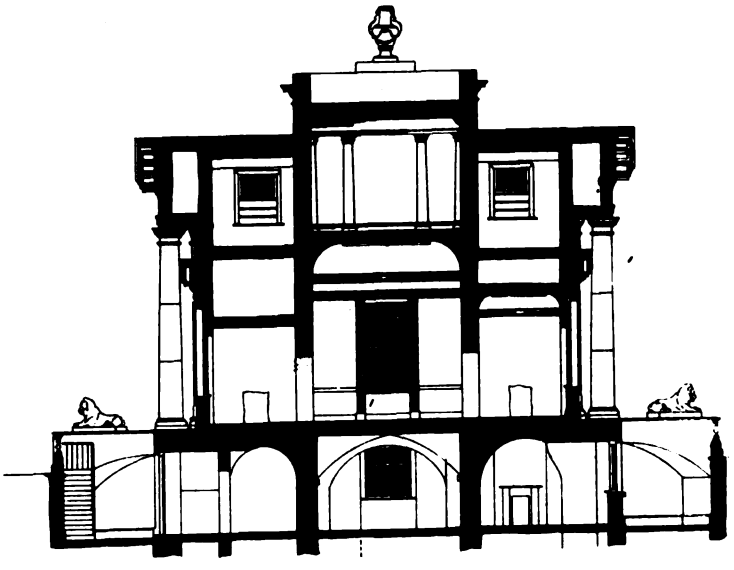


SECTIOᴹ ON LIᴹE A.B.

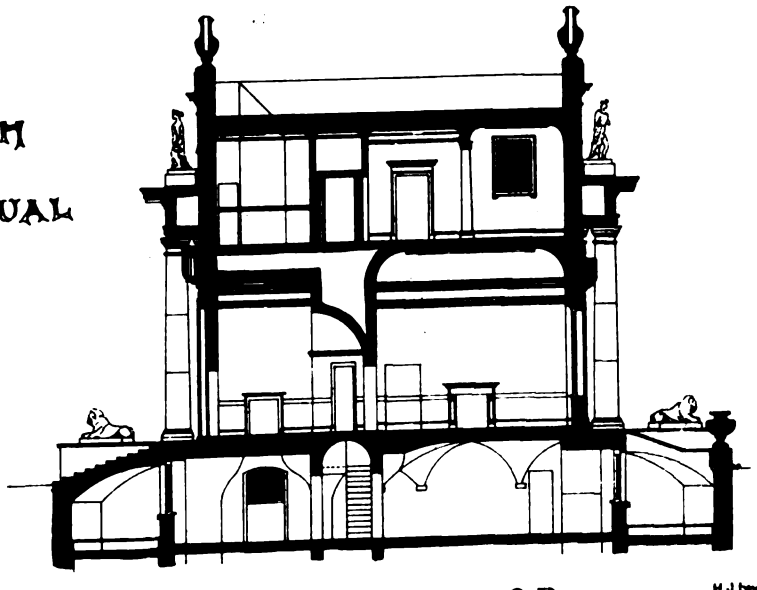
CASINE

A – CLONTARF DUBLIN

SIR WILLIAM CHAMBERS

DRAWN FROM ACTUAL

MEASUREMENTS



SECTIOᴹ ON LIᴹE C.D.

H.J. Lynch

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CHAMBERS.

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The Builder.

VOL. LXXIX., No. 3013. NOVEMBER 3, 1900.

ILLUSTRATIONS.

New Building for the Eastern Telegraph Company: Portion of Façade.—Mr. John Belcher, A.R.A., Architect.....*Extra Large Page Ink-Photo.*

Front, No. 59, Bath-street, Glasgow.—Mr. T. L. Watson, F.R.I.B.A., Architect.....*Double-Page Photo-Litho.*

St. John Baptist Church, San Remo.—Mr. R. Knill Freeman, F.R.I.B.A., Architect.....*Two Single-Page Ink-Photos.*

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The Holborn to Strand Street Designs.

THE eight designs for the crescent street which is to connect the foot of the Holborn to Strand street with the latter thoroughfare, and for the island block facing the Strand, have been on view to the public during the present week in the Gallery of the Society of Painters in Water-Colours. The architects concerned are Messrs. R. Blomfield, W. Flockhart, Ernest George, H. T. Hare, A. Mervyn Macartney, E. W. Mountford, Ernest Runtz & Co., and Leonard Stokes. The designs are not signed, and have been distinguished by numbers bestowed, not consecutively from 1 to 8, but apparently by some hap-hazard process of shaking figures out of a bag, and taking those that fell out first; the result being that the designs are numbered 17, 19, 20, 21, 23, 26, 27, and 29. What is the object of this eccentricity one cannot imagine. The names of the authors are pretty well known among those who care to know; but as long as they are not officially disclosed we shall respect their anonymity.

No one can look at the drawings without at once perceiving that the absurd fancy which the County Council seem to have had, that the eight designs might furnish a kind of fund to draw upon for street frontages to each separate property erected on the site,—A taking a bit out of one, B a bit out of another, and so on—is now rendered absolutely futile. A series of sketches for a kind of irregular Amsterdam or Nuremberg street might possibly have served that purpose. But every one of the architects has—and rightly—treated the crescent street and the Strand front as a comprehensive design, a whole and not a collection of units. Rightly, we think, because the effect of a crescent street cannot be realised (as we have said from the first) except by a uniform treatment; to break it up into irregular portions is to destroy the effect of the crescent. And the Strand portion, from its position and its definite termination at the two ends, seems equally to demand a comprehensive treatment. That being so, it is obvious that no use can be made of any one of these designs except as a whole, and that unless the 2,000*l.* expended on them by the County Council is to be entirely wasted, the only thing that can be done with them is to select one of them as the best, and carry it out in its totality. This can only be done in one of two ways; either by the County Council itself becoming landlord, and erecting and letting the property; or by rigidly tying down every tenant to take a site of defined frontage and erect his portion of the building on it in strict subordination to the general design. The first alternative would unquestionably be opposed by the majority of ratepayers, though in the long run it might perhaps be a beneficial course even in public interests; and it would certainly be laying a new and unprecedented task on the shoulders of the Council. The second system might be worked out on paper, but the question is whether tenants would be forthcoming under such conditions. But unless one or other course is adopted, these drawings are of no use, except to make a very interesting exhibition.

The designs resolve themselves mainly into the elevation of the north side of the crescent street, the elevation of the south side of the crescent street, and the elevation of the island block towards the Strand, the other side of which forms the aforesaid south side of the crescent street. The north side of the crescent street forms a long segmental curve with a wide break nearly but not exactly in the centre (the opening of the new street up to Holborn), and two smaller diagonal street openings. The south side of the crescent street forms a convex curve concentric with the other, and continuous in the centre, but broken by a smaller street opening towards each end. The Strand front forms a straight line or not, as the architects have chosen to treat it, also broken by the openings of two side streets, the lower ends of those which show in the south crescent street front. On the Strand front these occur symmetrically in regard to the centre and ends. Any centre feature in the crescent street (south side) must be placed centrally with the axis of the new street to Holborn, which (as observed) is a little out of the centre of the crescent; consequently, the axial line of the Strand front does not coincide with the axial line of the crescent front. This looks awkward on paper, but would not of course be perceived in fact, except in cases where the centre part of the block has been treated as a courtyard, with a block on the north side facing both to the courtyard and the crescent. Here the difference of axis has caused difficulties, and some clever contrivances to evade them. The instructions to architects directed that the architects should or might show a use of part of the Strand block for a public building; a thinly-veiled invitation to show how the new London County Hall might be placed there.

The two main questions to keep in mind in considering the designs seem to be, whether the architecture shown is properly "street architecture," and secondly, whether the design affords capabilities for separate letting which would be likely to make it a commercial success: the first question æsthetic, the second practical. In regard to the first, we should hardly say that the employment of a large order on the front was not proper to street architecture, and as we believe this would be the general feeling among architects nowadays, we may attribute the pretty extensive use of the order in these designs to a feeling on the part of the authors that they were rather expected to produce something that would be in keeping with Somerset House. Another point to notice is that there are two ways of regarding the problem as a matter of architectural grouping; you may either regard the crescent street as a whole, of which the north and south sides should correspond; or you may regard the Strand island as one whole, to which the north side of the crescent street forms only

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a backing. One of the architects alone, No. 20, has taken this view of the matter; so that in his design, while the south side of the crescent is treated with a dignified stone frontage in keeping with the Strand front, the north side of the crescent is treated much more plainly and for the most part in brick. This is not the best for the effect of the crescent street; still it is perfectly logical from what is evidently the author's point of view. All the others have treated the three fronts as designs of similar character.

No. 17 (to take them in the order of numbering) shows one of the most street-like designs of the set; he avoids a large order, and only employs small columns in single stories, clothed with much rustication; the design is largely dependent on the treatment of the windows, and there is a picturesque multiplicity of effect about it. The south side of the crescent shows a dome in the centre, presumably intended for that of the County Hall. The front is broken by a special feature at regular intervals, slightly projecting and marked by rusticated columns; this feature terminates however, below the balustrade, rather weakly, in a broken curved pediment with a window thrust through it. Most of the architects appear to have had a wholesome desire, as in this case, to keep the crescent skyline curve as unbroken as possible: in which we think they are right. The side streets are two-thirds blocked by colonnade screens projecting from each side and leaving only a narrow space in the centre, which practically is not convenient. As a letting property this front would be useless for shops; the doors are too few and the windows too small. The author has shown his County Hall towards the Strand, with a colonnaded portico with single columns in the middle and coupled ones at each end, which does not look very well. The centre is set back with curved wing walls at each side. The one large rustication voussoir struck into the haunch of the window arches has an awkward effect, and the general treatment of the block, from the County Hall point of view, is weak and scattered for a public building design. But the feeling for street architecture in the other fronts is very good.

No. 19 adopts a courtyard in the centre of the island block, with a curious device for getting over the difference of axis between back and front, which will be seen when we publish the plan, but is difficult to describe. The design for the south side of the crescent is very dignified, with two stories of a heavily-rusticated basement, and over part of it an order through two stories above. There is a central cupola. The side streets have an arcaded screen of three arches. The north side of the crescent is treated to harmonise with the other, but with large arched openings in the ground story for shops. The entrance to the new road is emphasised by a pavilion with a small cupola, at each angle. The Strand front shows an arcade in the centre, giving access to the courtyard. The centre block is emphasised by very graceful cupolas at its two extremities, echoed by smaller ones at the extreme ends of the composition. There is a fine unity and solidity about the whole of this design. The interior courtyard is an oblong with a colonnade inside taking a semicircular line at each end.

No. 20, to which we have already referred, shows a very interesting and harmonious design for the Strand frontage. There is a rusticated surbase with small semicircular windows in it, supporting an order running through two stories, and which is effectively stopped, at each end of the main block, by a mass of rusticated wall. The south side of the crescent shows the same order, interrupted by rusticated blocks each crowned with a low dome of very pleasing design. The end blocks are treated in a lighter and more ornate manner, with a small order in each story with arched windows between. The lofty and very graceful cupolas at the ends of the composition contrast most effectively with the more severe design of the domes in the centre portion; the whole makes a charming composition. The different treatment of the north side of the crescent has already been referred to; the strong rusticated arched ground story with shop windows, in stone, and the plain brickwork over, make a very good example of plain but not ineffective shop architecture. The angles at the entry of the new road, however, rather want emphasising. This portion is planned with a semicircle cut out of the south side of the crescent, so as to make a kind of circus with a central feature. The ground story at the east and west ends of the island block, both in the Strand and crescent fronts, is treated as an open loggia. This would look well, but it is not a convenient treatment for business premises requiring light.

No 21, though the author employs a large pilaster order, which is of stone on a brick *fond* (a method which detaches the pilasters rather too much), is nevertheless more essentially a street architecture design than most of them, and shows moreover a distinct attempt to combine usefulness with effect. The dominant idea in it is to have a succession of series of large arched openings in the ground story, suitable for shop windows, interrupted at intervals by more solidly treated blocks. The window treatment above is very simple, the windows being left almost plain. The Strand front shows a similar style of treatment, but with an order and segmental pediments at the centre and ends, a small but very graceful cupola in the centre and still smaller ones at the extremities. This design shows dormer windows rising behind the balustrade. The small amount of ornament introduced is very refined, especially the effect of the sculpture on each side of the circular windows in the upper part of pavilions. The entries to the side streets are marked by a screen with an arched centre opening and lower square-headed side openings. The detached effect of the stone pilasters on the brickwork, before referred to, is rather emphasised by the rusticated basement being also broken under them, making a set of rather too strongly marked vertical strips. But in the main this is a design with a great deal to recommend it, and comes nearer the proper object to be aimed at than most of them.

No. 23 shows an effective treatment of plan in the centre portion of the island, where there is a separate building with a courtyard behind it, and connected with the main building by a kind of wing with an arch in it for access to the courtyard, and treated as an open colonnade above. The treatment of the Strand front is very harmonious and well-balanced in general lines of composition, but regarded in detail it is a very tame Classic, with orders in which the columns are a great deal too narrow for their height; this was no doubt intentional and not an oversight, but it looks weak, and the whole design looks more like a front of a museum than street architecture. In the north side of the crescent street shops are provided for; but the remainder of the design, besides its tameness of treatment, looks unpractical for the situation; one hardly sees how it is to be turned to account.

The author of No. 26 has been strongly impressed by the vicinity of Somerset House, and treats the openings of his side streets in a manner directly borrowed from the river front of that noble building, throwing a rusticated arch in one span over the whole road and erecting an open colonnade above it. If there was to be a screen at the end of the side street (a feature which looks well but is doubtful from a hygienic and practical point of view), this was the best way to do it, as leaving the roadway totally unobstructed. On the south side of the crescent street a semicircular court is cut out of the plan opposite the end of the new road, with a colonnade across the opening of it; apparently this is intended as the entrance to the County Hall or whatever public building may be placed there. In the Strand elevation the centre block is treated in a very severe and solid manner, with rusticated walling and small windows, contrasted with a lighter and more graceful treatment of the end blocks, which are laid out for shops, with large arched windows above and below, and with a good deal of sculptural decoration. The whole makes an exceedingly fine composition, excellent both in general effect and in treatment of detail. Above the pedimented pavilions in the centre block are small cupolas, well designed in a severe and restrained style, but yet pleasing in line. The north side of the crescent is treated a good deal like the centre of the Strand portion, but with large arched openings for shop windows (the piers, as far as effect goes, would have been better rather wider), and the windows above treated very simply, the top tier forming square panels cutting into the lower member of the cornice. The angles flanking the entry to the new road are strongly emphasised by coupled columns and a pediment, with small cupolas on each side. A very fine design, shown in a very fine set of drawings.

No. 27 is a very florid design of decidedly French type, and intended in fact to import the character of Parisian street architecture into London. There is a great deal of go about it, but unfortunately it seems to have the defects of French taste without the French finish in detail. At the best, however, the Paris style seems out of place in London; and we should be sorry to see anything like this carried out on the proposed site. Its reputed author has done things so much better than this in regard to taste and originality, that we wish he had followed his own precedents rather than have gone to Paris for inspiration.

No. 29 is more roughly executed than most of them, and the drawings do not do full justice to what is in fact a very original design. The plan shows two deep bays in the centre of the south side of the crescent, the block between them facing the new road. The openings of these courts are filled in with two stories of solid rusticated walling with an open colonnade over them. On the Strand front, and generally, the

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leading idea of the design is two stories of plain horizontal rustication and an order through two stories in the upper portion, and the general line of the design broken at intervals by special features. On the second floor the windows are varied, each alternate window being a large grouped three-light one, with a balcony supported by sculptured figures. The upper windows are kept very plain. Sculpture is sketched in at a good many points in the design, roughly but with an eye for effect. The screen at the end of the side streets is so designed as to appear to carry the architectural design right across them, the skyline being merely lowered a little, and the upper portion shown with columns and a large group of sculpture between them. This looks very well, but how about light and air to the street? This design, however, is one of much originality, and it is a pity it had not the same advantages in finished drawing as some of the others, to do it justice.

Mr. Norman Shaw has been asked to advise upon the designs, but we understood that his advice is only to be private and confidential. Mr. Shaw may fairly be considered as the leading English architect of the day; whether he is the safest person to take as a guide and critic on other people's designs is another question. We should rather like to have the result of the eight architects' votes—each voting for the one he preferred next to his own. At all events we may repeat as a last word, that if anything is to be done, practically, with these designs, it can only be done by selecting one and carrying it out in its entirety.

Taking the collection as a whole, it is a very fine one, and a credit to the English architects of to-day.

NOTES.

British School at Athens.

THE Annual Meeting of the British School at Athens on Tuesday, reported in another column, must have left an impression on any one previously unacquainted with the work of the Institution, highly favourable to its character and its future prospects. Even in regard to funds, although the Report expressed some anxiety, the balance-sheet is not so depressing as might have been expected, and though 500*l.* a year is little enough for the Government of so wealthy a country to grant for explorations of such value, the renewal of this grant for five years is not to be despised, when we consider how difficult it is to extract anything at all from our Government for archæological investigations. But the success of the recent explorations in Crete is something quite beyond expectation, and vindicates the importance and value of the School, while it promises still further information on the unknown past. Archæological research seems gradually tending to turn myths into history, more or less. We may not get quite so far as was suggested by Mr. Asquith in his humorous address, and find remains which would enable anatomists to restore the skeleton of the Minotaur, or architects to give a measured drawing of the Labyrinth; but at all events we have got reason to think that "Minos, King of Crete," may have been no such mythical personage after all.

Workmen's Compensation. Contracting out.

IN commenting upon a statement made at the Miners' Federation Conference at Saltburn last week, a daily contemporary waxed very indignant over "the paltry 9*l.*" awarded to the widow of a miner who was accidentally killed in Lancashire, adding that of this sum "the workman had contributed one-half." As a matter of fact, the amount of compensation recovered by the widow (according to the report of the proceedings in the same journal) was 90*l.*, which, although considerably below the maximum sum obtainable under the Act, can hardly be described as a paltry one. The amount alluded to as being contributed by the deceased workman was really the proportion contributed under the scheme by himself and his fellow-workmen. But the delegate who mentioned this case went on to assert that employers were able to obtain certificates from the Registrar of Friendly Societies allowing them to adopt a scheme for contracting out of the Act, even when 90 per cent. of the workmen objected to it. The Registrar is quoted as contending that if only one man was in favour of the scheme he was entitled to grant the necessary certificate. This being opposed to the letter as well as the spirit of the Act, the statement is hardly credible. The certificate is only to be given after ascertaining the views of the employer and workmen, and then only subject to the scheme being "on the whole not less favourable to the general body of workmen and their dependants than the provisions of the Act." Were the statement made at the Saltburn Conference correct, it would appear that the issuing of "contracting-out" certificates was a mere farce. But the interests of the workers are very carefully safeguarded in this respect, and it is always open to them to apply for a revocation of the certificate. Upon such an application being made, the Registrar is directed to examine into the complaint, and if satisfied that good cause exists "he shall, unless the cause of complaint is removed, revoke the certificate."

The City Corporation and London Gas.

RESOLUTIONS were passed at the conference of London Local Authorities, held at the Guildhall last Wednesday, calling upon Parliament to protect gas consumers from the effects of the monopoly created by the Gas Acts of 1847 and 1860, and declaring that in the opinion of the Conference no gas company supplying the Metropolis should be allowed to charge more per 1,000 cubic feet for gas than the lowest price at which it is supplied by any one of the gas companies. Apparently the Corporation of London, the London County Council, and all the minor Local Authorities are agreed that Parliament should be approached with the object of forcing the Gas Light and Coke Company to reduce its charge for gas on the north side of the Thames to the sum charged on the south side. The high price charged north of the Thames is a constant source of irritation, but it should not be forgotten that the introduction of any drastic measure of the kind recommended would result in a heavy drop in the value of Gas Light and Coke Company shares, which have hitherto been regarded as a safe investment owing to public confidence in the security of contracts made under Government seal. Moreover, the delegates at the conference appear to have overlooked the possibility of the metropolitan gas companies agreeing to pull together for mutual benefit, and arranging that one company should not reduce its gas charges to the detriment of another.

The Heating of Railway Stations.

IT is to be hoped that the present dearness of coal, so important to railway companies, will draw the attention of railway managers to the waste of fuel caused by the system of open fireplaces in waiting-rooms and booking offices. One central heating place would warm a station of moderate size much more efficiently than does the present system. It would be interesting to know what amount of coal is consumed by the London and North-Western Railway Company, for example, at its different stations merely in warming them. Shareholders in railway companies are singularly apathetic. English railway managers and officials are quite as conservative as those who rule and direct Government offices, yet the shareholder does nothing to move the former to improvements. It is only by the pressure of the public and of shareholders that railway companies can be kept progressing. Competition has almost had its day so far as English railway companies are concerned, and improvements must be brought about by other means. Any shareholder who will urge the railway companies to adopt more efficient and more economical systems of heating stations will do good service to the public and to the pockets of shareholders.

Improvements in St. Luke's Parish, London.

THE London County Council will seek, in the course of next session, for powers to widen Central-street, St. Luke's, which leads out of Old-street into City-road, at an estimated cost of 81,250*l.*, of which amount the acquisition of property is assessed at 70,750*l.* Under their Improvements Act of 1897 (60 and 61, Vict. cap. 252) the Council obtained authority to set back the northern side of Old-street, between Central-street and Goswell-road, and also the eastern side of Goswell-road from its junction with Old-street to as far as Ludlow-street (formerly Willow-row). That work, which was begun in December, 1897, will relieve the very heavy and crowded traffic at the crossing of Goswell-road and the ends of Clerkenwell-road and Old-street, and the roadway will be widened to 60 ft. from its former width, varying from 40 ft. to 50 ft., for a distance of about 300 yards; the cost, including a new sewer and a subway for mains, &c., was estimated at 164,500*l.* Old-street forms a portion of the thoroughfare from New Oxford-street, at Hart-street, to High-street, Shoreditch, for which the late Metropolitan Board of Works obtained powers in 1872, and which was finally completed in August, 1878; the widening at the corner of Goswell-road was proposed to the Board in June, 1876, by the St. Luke's Vestry; the Local Authorities were then averse from sharing the cost of what they maintained to be a metropolitan, rather than a merely local, improvement, but now, we understand, the Vestry, or their successors, will contribute to the expense. The leases on the Ironmongers Company's property in Old-street, around the parish church, are falling in rapidly, and the demolition of many of the old houses—those in Pear Tree-street were built in 1725—is already begun. The property is of considerable extent, and it is said that the site of the church and churchyard, with two old burial grounds, were sold by the Company two hundred years ago for 900*l.* For the parish, taken out of St. Giles, Cripplegate, was built the church, having a singular obelisk-shaped

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spire, in 1732-3, after the designs of the elder Dance, who was buried there in 1768.

The Goupil Gallery.

MESSRS. BOUSSOD & VALADON have introduced us to a fine and original Scottish landscape painter who is new to us, though it appears that he has already attained repute in some Continental art centres. This is Mr. W. Mouncey, of Kirkcudbright, a painter who may be said to be of the school of Constable, and some of whose landscapes are not unworthy of a place beside that master's work. Mr. Mouncey paints landscape in a broad and free manner, giving, like Constable, the intellectual impression of the scene rather than the realistic facts. Among his small landscapes here "On the Banks of the Dee," "The River," "A Woodland Glade," "Barrhill," and "Winter," are all admirable. In the large picture of "Westminster," though the general effect is fine, we do not enjoy seeing a grand building reduced to such a complete smudge; rather too essentially a landscape-painter's view of architecture. The other large work, "Kirkcudbright," however, the town and hills as seen from the river, is altogether a noble landscape, and represents some of the highest qualities of the art.

Messrs. Tooth's Gallery.

AT Messrs. Arthur Tooth & Sons' Gallery in the Haymarket the central picture of the collection is Mrs. Normand's (Henrietta Rae) "Diana and Calisto," which was formerly, if we remember right, at the Academy; one of the largest and most elaborate but hardly one of the best of this able artist's works. The collection includes a large and fine example of Troyon, "A River Ferry-Boat—Gathering Storm;" a picture which recalls a past chapter of art, and exhibits a method of treating Nature which would hardly be accepted in these days, at least in England; but of its grand effect there can be no question. There is a small cattle picture by Rosa Bonheur, and M. Bouguereau is represented by two life-size paintings, a very charming three-quarter length of a peasant girl "From the Orchard," and an impossible painting of a nude Cupid apparently swinging from two branches of a tree (though the position of his arms is quite inconsistent with the idea of his weight being supported by them), and with his toes touching what is supposed to be the surface of water ("L'Amour sur l'Eau"), but looks like ice. The mere execution of the figure is of course very good, but we have never seen a picture which illustrated more unhappily the unreal and superficial character of Bouguereau's art. By M. J. Brunet—a name we do not remember—is a fine and pathetic little scene "In a Convent." Mr. MacWhirter's large tree with an evening sky behind it—"The Monarch"—is a fine landscape, broader in style and graver in feeling than is usual with him. There are two landscapes by Mr. H. W. B. Davis; one of Mr. Peter Graham's rock and surf subjects; some small landscapes by Corot, Daubigny, and Dupré, and one by Mr. Leader, "In a Welsh Valley" (47), which makes one wonder how an artist who can paint such an admirable and broadly handled landscape on a small scale can become so mannered and conventional on a large scale, as in other works in the same room. Mr. Blinks's admirable picture of two pointers, and Mr. Dollman's clever *genre* painting, "A Question of Compensation," both of them "line" pictures at the last Academy, are also to be seen again here; the former is perhaps one of the best dog pictures ever painted.

Mr. McLean's Gallery.

THE exhibition of pictures at Mr. McLean's Gallery in the Haymarket contains some fine landscapes, among which may be mentioned several examples of Westerbeck's landscape and sheep subjects, always much the same in motive, but always good—"Changing Pastures" (64) is perhaps the best; an exceptionally good example of Mr. Wimperis's art, "View at Coldwaltham, Sussex," equally fine as regards composition and breadth of style; two mountain and cattle subjects by Mr. Louis B. Hurt, who runs Mr. Peter Graham very close in his own line (or one of his two lines); a fine and rather unusual work by Jan Van Couver, "A Towing-path, Holland"; and a good specimen of Clays's sea-piece, for he has only one, on which slight variations are played. Among pictures in which figures predominate the most important is a fine one by M. Lhermitte, "Gleaners"; and there is Herr Muller's "Courtyard of a Mosque," remarkable for the solid treatment of the architecture, and Mr. Seymour Lucas's expressive figure of a violoncello player.

Society of Fine Arts.

THE collection of pictures by Mr. Herbert Schmalz, at the Society of Fine Arts Gallery, exhibited under the title "A Dream of Fair Women," is not, as such title might imply, a set of illustrations of Tennyson's poem, but a series of female heads, with an occasional full-length, under various titles—"Viola," "Daphne," "Mignon," "Lilian" &c., though there is not much individual character or expression in them; "Mignon," just mentioned, is one of the best, and answers pretty well to the idea of Goethe's heroine, who was not quite the sentimental person she is taken to be by those who think of her chiefly as singing "Kennst du das Land?" For most of the remainder one name would do as well as another. That there has been little careful study of physiognomy in painting them is evident from the fact that all the heads, down one side of the room at all events, have the eyebrows painted exactly alike, as if after a stock pattern. The dainty and smooth execution of flesh and costume gives them rather the look of enlarged miniature paintaings. There may be people to whom this kind of art appeals.

TURNER'S HOUSE, CHELSEA.—A memorial tablet has just been set up on the house, No. 119, Cheyne-walk, where Turner passed the closing years of his life, and wherein he died on December 19, 1851. The tablet has been modelled and cast in lead by the Guild of Handicraft after the design, and in an honorary capacity, of Mr. Walter Crane, who, we gather, has committed it to the care of the National Trust. The house, where one may yet see the iron railing that was fixed for Turner that he might paint and sketch from the roof, was threatened with demolition five years ago, but its destruction was averted, and the house has since been substantially repaired.

THE SANITARY INSPECTORS' EXAMINATION BOARD.—The next examination for certificates of qualification for appointment of sanitary inspector or inspector of nuisances, under Section 108 (2) (d) of the Public Health (London) Act, 1891, will be held in London on Tuesday, January 15, 1901, and the four following days. Particulars will be forwarded on application to the Hon. Secretary, Wm. R. E. Coles, 1, Adelaide-buildings, London Bridge, London, E.C.

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

VI.—CATALOGUE RAISONNÉ OF EXAMPLES.

(*Continued.*)

DISTRICT IV.—The Midlands, from Notts and Derbyshire on the north to the Valley of the Thames, embracing the counties of NOTTS, DERBYSHIRE, LEICESTERSHIRE, RUTLAND, NORTHANTS, BEDS, BUCKS, HERTFORDSHIRE, MIDDLESEX, and OXFORDSHIRE.

A glance at the map of the distribution of Saxon churches (*ante*, fig. 1) will show that the central part of this region is particularly well supplied with monuments. Northants contains some specially important examples, such as Brixworth, Earls Barton, Barnack, Brigstock and Wittering. The region can best be surveyed from north to south.

NOTTINGHAMSHIRE.

Carlton-in-Lindrick is the only contribution, but it is a monument of considerable interest, exhibiting both pre-Conquest and Norman features. Of the former the best is the tower arch, where the enriched capitals and plain roll arch-mouldings remind us of the corresponding features at Sompting and St. Botolphs, in Sussex.

DERBYSHIRE.

This county presents a number of churches to which plain chancel arches and narrow r.h. internally splayed loops give an early character. There may be mentioned Ault Hucknall (not seen by the writer), Caldwell, Long Eaton, Marston Montgomery, Sandiacre, Sawley, Stanton-by-Bridge, but of these none can be pronounced pre-Conquest. Sandiacre has the best claim in virtue of the antique-looking masonry of the fabric and of a triangular-headed opening above the chancel arch, but the windows and chancel arch are Norman. *Repton* is, on the other hand, an important example, presenting the only instance in the country of a columned crypt, or, as the Germans say, *Hallenkrypta*, that may claim a pre-Conquest date. The Saxon character of the crypt at Repton has been doubted, and the late J. T. Irvine considered the vaulting and columns to be Norman,* though the outer walls and their cornice are earlier. The vaulting is curiously irregular, and the caps of the twisted columns are rudely chamfered down from the square of the abacus to the round of the shaft, and enriched with a series of grooves of quite a Saxon character. They resemble, indeed, the bases of the angle shafts of the church of Kirkdale, Yorks, that dates about 1060. This rudeness of work might be compatible with a Norman origin, but the walls of the chancel above are certainly Saxon, on the evidence of their pilaster strips, and they rest partly on the vault, which must, therefore, be at least of the same date. The crypt may accordingly be reckoned late Saxon, and it is certainly of very different date from the early Christian *confessio* at Ripon, Hexham, or Brixworth. Besides the chancel, considerable portions of the eastern part of the pre-Conquest church are still standing, but have been altered internally.

LEICESTERSHIRE.

Barrow-on-Soar, which seems to have had a Saxon tower, has been rebuilt, and Tugby has no pre-Conquest marks. On the other hand, *St. Nicholas, Leicester*, is an example of great value, possessing undoubtedly Saxon windows in the north wall of the nave, that is pierced below with Norman arches of early character. The wall is about 30 ft. high. The windows in question are double-splayed r.h. openings with the heads on each face of the wall turned in two ranges of Roman bricks. The Saxon quoins are visible outside at the west end of the nave, and it is noteworthy that this stands just within, and so blocks access to, the old Roman west gate of the city familiar under the name of the "Jewry wall." This is a fact of much importance in connexion with the question of the condition of Roman cities in the Saxon age.

RUTLAND.

Market Overton has a most characteristic example of Saxon masonry in a fine tower arch preserved, as well as some fragments of Saxon

* *Derbyshire Archæological Society's Journal*, vol. v., and *Journal of Archæological Association*, 1894. The Rev. F. C. Hipkins has published a book about Repton of which the writer has only seen the edition of 1892.

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crosses, in the rebuilding of the church. The structure of it is illustrated in fig. 19, and may

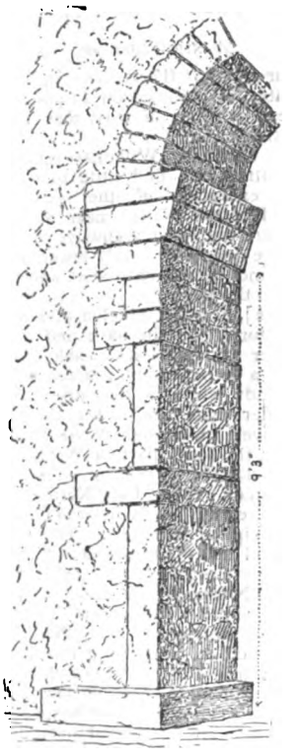

Fig. 19.—Saxon Tower Arch, Market Overton, Rutland.

be compared with the Norman structure shown *ante*, fig. 5.

NORTHAMPTONSHIRE

owes to its good building stone and other causes a remarkable possession in fine churches, and it is noteworthy that with all the mediæval activity in building of which the district was the centre, so many older structures have been preserved. Starting at the north-east corner of the county, *Peterborough* has preserved to us the unique feature of the foundations of the Saxon Abbey church, now to be seen under the central part of the existing Norman structure. It was cruciform, and probably ended square towards the east.* Not far off the noble Saxon tower of *Barnack* presents the characteristics of Saxon masonry at its best in the l. and s. quoins, pilaster strips, triangular-headed openings, &c., of the exterior, and shows, too, some admirable specimens of Saxon decorative carving. The belfry stage is later. Internally we find a tower arch, 12 ft. 9 in. in span, with remarkable imposts, and a sedile-like recess in the west wall, with niches resembling aumbries in those to north and south. (There are not *three* sedilia.) The fact that the west quoins of the original nave are visible outside the tower walls to north and south makes clear the important fact that the tower was never the nave of a church, as was the case at Barton-on-Humber, and probably Broughton, in Lincolnshire.

A few miles to the west, across the ancient Roman Ermine-street that now carries in this part the road telegraph wires to York, we discern on an upland a mile or so from its village the small but complete Saxon church of *Wittering*, with its four nave and two chancel quoins in careful l. and s. work, and its magnificent late Saxon chancel arch. No original openings are preserved. The tower is later. Wansford, on the Great North road, has no Saxon features. A few miles away, in the heart of the old Rockingham Forest, lies *Brigstock*, which has preserved its Saxon west tower and nave walls in good stonework, with some of the best existing door and window openings, some with sloping jambs. West of the tower is a circular stair-turret, after a pattern met with at Brixworth, Hough-on-the-Hill, Lincolnshire, and elsewhere. Barton-Seagrave, near Kettering, is a good specimen of early Norman work, the walling of which might pass for Saxon. Above the valley of the Nene stands the tower of *Earls Barton*, without question the most imposing Saxon monument in the country. It has lost its original tower arch, but preserves similar external features to those at Barnack, with the addition of large belfry openings, each divided by four baluster shafts set, abnormally, on the outer face of the wall. The pilaster strips are joined by round and straight-sided arches, giving a deceptive appearance of a derivation from timber work. There is a west door. The tower measures 61 ft. 6 in. to the top of the (modern) battlements and 24 ft. on its west face. The walls at the ground are 4 ft. thick. The plan is badly set out, and the south wall is a foot longer than the north. The tower stands at the foot of a moated mound that is partly within the present churchyard, but this is probably not earlier than Norman times.

Still on the edge of the valley of the Nene, but on the other side of the county town, lies *Brixworth*, a rare example of a Basilican church, dating originally from about 680, and exhibiting, besides its primitive features, Saxon work from more than one later period. It is still a spacious building, though it has lost its side aisles, and has an internal width of more than 30 ft. by a total length of 117. It has an apse (not vaulted), polygonal outside with angle buttresses similar to those at San Vitale, Ravenna, with indications of a *confessio* below; a square space cut off from the nave before the apse after a fashion observable in others of our seventh century churches; a nave about 60 ft. by 30 ft., with the old clearstory windows and openings (now blocked) between piers into the former side aisles; a square west tower, with a later Saxon opening divided by baluster shafts from its first story into the church, and a circular stair turret, later than the tower, but still of Saxon date, to the west of it. The masonry is rubble, with a large use of Roman brick irregularly laid in the arch heads. Marks of lateral buildings at the west end open up interesting archæological problems. The early Saxon date of the structure is undoubted, and there is no ground for ascribing to it a Romano-British or Roman origin. That the clearstory belongs to the original structure is shown by the form of the windows, which are not splayed, but have the Roman and early Christian form (see *ante*, fig. 6).

The south part of the county between Daventry and Towcester gives us at *Stowe-nine-Churches* a Saxon tower-arch with strip work; at *Pattishall* some l. and s. work in quoins, and a good specimen of the plain chancel-arch of Saxon date; and at *Greens Norton* a noble Saxon nave with l. and s. work at all four quoins, and remarkable height of walls, which show original work up to about 33 ft. The nave, which measured 37 ft. by 18 ft. 6 in., has been extended eastwards.

BEDFORDSHIRE.

This county, for its size, makes an important contribution to the monuments. At *St. Peter's, Bedford*, there is Saxon work in the axial tower and the chancel, and indications on the west face of the tower that would repay attention. The peculiarity here is the following. Both the aforesaid tower and the chancel have l. and s. quoins, and are doubtless contemporary, and there was some building west of the tower, the abutment of whose walls against it is visible. The chancel is wider than the tower, so that the plan does not accord with that of Barton-on-Humber, in which the tower was really the nave of the church, and was wider than the chancel. The tower opens to north by a tall elliptical arch, about 9 ft. by 5 ft. 6 in., with head rudely turned in thin slips of stone, set edgeways. This same curious form of arch occurs in the east face of the tower of Knotting, which otherwise does not seem specially early.

Clapham possesses a notable square west tower of pre-Conquest type, remarkable for its height and severe plainness. The lower stories are lighted by small loops, splayed inside and out, but the belfry stage, where the tower diminishes by a set-off, has recessed openings which have a later appearance. The Saxon character, at any rate, of the tower below the belfry is unmistakable.

Sleaton.—This interesting church has Saxon work in the lower part of the west tower, especially a south doorway, 9 ft. by 2 ft. 6 in., and double-splayed r.h. lights above to north and south, the latter preserving an original oaken board in the centre of the wall. At Turvey the only ancient indications are the tops of two old r.h. windows just above the present south arcade. They are double-splayed, but the external splay is narrow, and the features are doubtful criteria of pre-Conquest date, as the proportion and technique of the church suggest a Norman rather than Saxon origin.

BUCKINGHAMSHIRE.

Passing by Lavendon, with its plain square tower, where there are no special pre-Conquest features, we find at *Wing* the only still complete aisled basilican church of Saxon date in the country. It has a polygonal apse with crypt beneath of plan intermediate between the earlier *confessio* of Ripon and Hexham and the fully-developed *Hallenkrypta* at Repton. The nave, arcades, and part, at any rate, of the aisle walls are original. The details of an evidently original window high up in the east wall of the nave suggest a comparatively late date for the structure.

[*Iver*], in the south-east corner of the county, has the remains of two enriched r.h. windows cut into by a later arcade in the north wall of the nave. The arcade is Norman, and certainly not late in the style. The mouldings look late Saxon rather than Norman, but the way the outer ones are stopped at the top of the jambs is Norman, and it is doubtful whether Professor Freeman's view of the work as pre-Conquest is correct,* for the blocked windows seem more likely to be of the Overbury type (see *ante*,

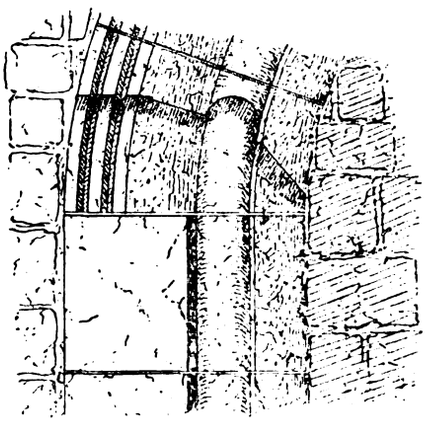

Fig. 20.—Moulding of Blocked Window, Iver, Bucks.

fig. 6) than really double splayed, as he assumed them to be (fig. 20).

HERTFORDSHIRE

gives us one example. At *St. Michael, St. Albans*, a nave, 21 ft. 4 in. wide, with walls 3 ft. 10 in. thick, shows small r.h. windows arched in Roman brick, set in the side walls, so that the top of the splay in the interior is only about 15 ft. from the ground. A nave thus low and wide has been enlarged in late Saxon or more probably early Norman times by plain arches cut through the side walls, and very irregularly set out and spaced.

MIDDLESEX.

Kingsbury is the only example; is a simple nave without chancel, the pre-Conquest origin of which is attested by well-marked l. and s. quoins at the west end. There is a r.h. south door, and no old windows.

OXFORDSHIRE.

Crowmarsh Gifford is Norman, and the same must be said of the neighbouring church (in Berkshire) of St. Leonards, Wallingford, which is most remarkable for the carving on the chancel and sanctuary arches, in which interlaced work is prominent.† At Oxford itself, Mr. Park Harrison has detected Saxon fragments in the east wall of *The Cathedral, Oxford*, while there is a more prominent example in the west tower of *St. Michael, Oxford*, which exhibits double belfry openings with mid-wall work in two stories and on all four sides, save in the upper story to east, where there has, perhaps, been an alteration. There are bulging baluster shafts in the openings, and lower down to west a double-splayed r.h. window.

At Bicester a curious triangular-headed opening in the nave wall between two arches of the arcade suggests an earlier date than that of the Norman arches adjacent to it. *Caversfield*, north of Bicester, has good specimens of the

* J. T. Irvine, in *Journal of Archæological Association*, xlvii

* *Archæological Journal*, vii., 112.

† Mr. Park Harrison considers the church a Saxon one. *Journal of Archæological Association*, xlvii.

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small r.h. double-splayed light, with mid-wall slabs, north and south of the lower stage of the tower.

Northleigh. — Here a square tower, once axial, exhibits double belfry openings on all four sides with mid-wall work. There are plain cubical cups on the bulging baluster shafts.

In the part of the county bordering on Gloucestershire we meet with the grand church of *Langford*, replete with interesting features, both architectural and sculptural, of various epochs. The axial tower has a Norman arch opening into the chancel and Norman belfry windows, but the arch from the nave is of earlier type, and in the ringing chamber on each side to north and south there are two highly interesting pre-Conquest lights. They are double-splayed with a mid-wall slab in which the perture is of the curious keyhole shape observable in some Lincolnshire towers, but, to the writer's knowledge, in no other part of the country. On the outside face of the tower there are pilaster strips, 12 in. wide, stepped where they start from the base moulding and where they join the string courses that divide the tower horizontally above.

District V. — The West Midlands from Gloucestershire to Stafford and Chester.

Turning now our steps northwards on a more westerly line through the stone-building district of

Gloucestershire,

we recognise a Saxon fabric in the nave of the fine church of the lovely village of *Bibury*, where the jambs of the chancel arch, the remains of a stone rood above, and a circular double-splayed light in the south wall of the nave are all of pre-Conquest character.

Coln Rogers, nearer to the Fosse Way, is a remarkably complete specimen of Late Saxon work. Here the nave and chancel (the west tower is later) both show unmistakable pre-Conquest features. These consist in l. and s. quoins (partly reconstructed) at the four angles of the nave, and pilaster strips, 10 in. wide, in the north and south walls of both nave and chancel, the latter of which has been lengthened eastwards a couple of feet. The chancel has a characteristic internally splayed light in the north wall and the chancel arch has its jambs and voussoirs constructed of through-stones, though the enriched imposts, with pellet ornament, might pass for Early Norman (*ante*, fig. 9).

Daglingworth is a better-known example owing to the carvings in the chancel, which have a juster claim to be reckoned Saxon than many of the similar pieces scattered up and down the country. The nave, which has l. and s. quoins, was divided by a cross-wall (now removed), an arrangement seen at Boarhunt and at South Elmham. It may be noted that western divisions of a nave, or west adjuncts thereto, occur at many periods, as at Barton-on-Humber (Saxon), Gillingham, Norfolk (Norman), and Headbourne Worthy, Hants (fifteenth century). The south doorway into the nave, 3 ft. 1 in. wide, is a Saxon feature. It has moulded imposts (*ante*, fig. 9).

Miserden, upon the Cotswold uplands, has Saxon north and south doors, the former blocked, but no other pre-Conquest sign. Fig. 21 A gives the north door.

St. Oswald's Priory, Gloucester, shows among its ruins some Saxon fragments, but the chief examples in this part of the Severn Valley are at Deerhurst. *St. Mary, Deerhurst*, gives us the almost complete fabric of a Saxon priory church, with so many features of interest from the west tower to the ruined walls of the east apse that no description can be attempted here. A large number of openings, variously treated and enriched, and an undoubtedly Saxon font, repay careful study.

Deerhurst (*Odda's Chapel*).—An inscribed stone found at Deerhurst in 1675, and preserved among the Arundel marbles at Oxford, mentions the dedication of a *regia aula* (basilica) at a date which can be fixed at April 12, 1056. This was formerly supposed to refer to the priory church of St. Mary, but in 1885 a discovery was made of a small Saxon chapel incorporated in the fabric of an old mansion now a farm-house, and it is recognised now that the inscription, which was found close to this house, refers to the chapel, which derives a special value from the circumstance. It is a small nave-and-chancel oratory, with chancel arch, the imposts of which, with their shallow and timid enrichment, are characteristic (*ante*, fig. 9). There are double-splayed r.h. windows north and south of the nave. The quoins show very slight traces of l. and s. treatment.

West of the Severn and in Herefordshire Early Norman churches are not uncommon, and several of these have been reported as Saxon. Of these Ashleworth and Upleadon (Gloucestershire), Ledbury, Eaton Bishop, Middleton-on-the-Hill, and Hatfield, near Leominster (Herefordshire), present no distinct pre-Conquest marks, though the blocked north door in the nave wall of the last-named is a primitive-looking feature. This doorway is shown in fig. 21 B in comparison

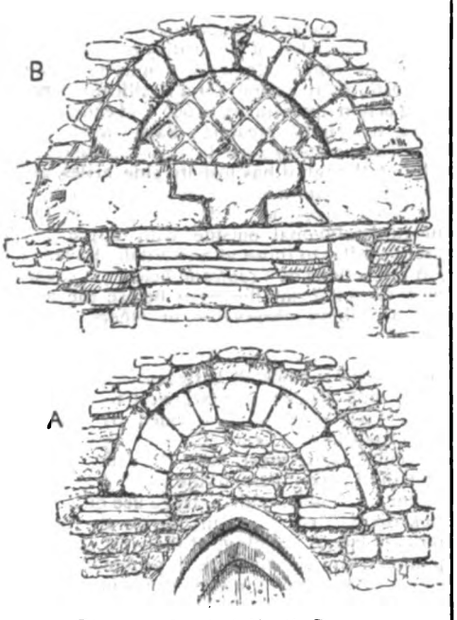

Fig. 21.—Blocked North Doors.

A. Miserden Gloucestershire (Saxon).
B. Hatfield, Herefordshire (Norman).

with the somewhat similar feature at Miserden, and the juxtaposition of the two is instructive. They both look at first sight equally rude and early, but when examined the details of A are all Saxon in type, while in B, the Hatfield example, the joggled lintel and the diamond pattern of the facing stones in the tympanum are both distinctively Norman, and the two have been therefore separated in the list. The wonderful Norman church of *Kilpeck* at the foot of its Early Norman moated mound, has preserved a bit of l. and s. work on the north side that is evidently a fragment of an earlier fabric of Saxon date.

Shropshire.*

Crossing the Teme, we are soon met near Ludlow by the well-known example of *Stanton Lacy*, famous for its well-wrought Saxon north door, with cross above it, and its pilaster strips. There is a Saxon north transept, and the north and west walls of the nave are of this date.

[*Clee St. Margaret*], one of a delightful group of hamlets in the bosom of the hills, shows in the north wall of the chancel some remarkable herring-bone work that would be unhesitatingly pronounced Norman were not similar masonry found not far off combined with Saxon features at *Diddlebury* or *Delbury*.

The much-restored Saxon work here consists chiefly in a blocked north door, similar to that of Stanton Lacy, enriched externally with strip-work, and a considerable extent of herring-bone masonry in the north-west portion of the nave and also in the western tower. There is a double-splayed window in the nave. Stottesden, with its remarkable font, has no pre-Conquest architecture, nor are indications of such to be recognised at Rushbury, or in the fine Norman church at Church Stretton.

Barrow, near Much Wenloch, presents us with a nave that is probably Early Norman, and a chancel arch and chancel of Saxon character. In the north-east corner of the chancel is a curious double-splayed light with mid-wall slab, and externally to north the mark of a pilaster strip. Beyond the Severn, at *Wroxeter*, the north wall of the nave of the church exhibits masonry so different from that of the rest of the (partly Norman) fabric, and so obviously built of Roman stones that a pre-Conquest date may fairly be ascribed to it. A blocked square-headed window carries out this impression.

Monmouthshire.

The church of [*St. Woolos, Newport*] (not seen by the writer), is reported on as possessing at its west end portions of what may be a pre-Conquest fabric.

Turning back to Worcestershire and Warwickshire, we find little to detain us, with the exception of the axial-towered church at *Wootton Wawen*, near Stratford-on-Avon, where the Saxon archways on all four sides of the (once central?) tower are well preserved, and exhibit strip-work and l. and s. treatment in the jambs.

[*Offchurch*], near Leamington, presents some curious features both in nave and chancel—in the latter r.h. lights with cable mouldings (north) and a serpent (south) carved externally over the heads, while the masonry of the nave appears older than that of the chancel and may very well be Saxon. Wyre Piddle and Overbury in the south part of Worcestershire have been claimed as Saxon. The latter is clearly Norman. It has Late Norman arcades cut through earlier walls in which are well-preserved original windows. These have a wide internal splay and also a slight external splay before the rebate for the shutter, but they are of Early Norman work, and may be compared with similar features at Ledbury in Herefordshire (*ante*, fig 6). Wyre Piddle church, close to which an interesting discovery was made of Saxon interments,* has a plain chancel arch constructed on the core and facing system, and hence Norman rather than Saxon.

There must not be passed over the fine specimen of herring-bone work at Tamworth, on the facing of the inclined plane of access to the upper part of the earthen mound crowned by its shell keep. This has been claimed as Saxon, but the masonry, like the mound itself, is really Early Norman. The work resembles that on the Norman keep at Guildford, Surrey, but is more neatly wrought.

District VI.—North of the Midlands on the western side of the country, with one exception, the writer has seen no pre-Conquest examples of architecture, though Saxon carved stones are not infrequent. Saxon work, however, exists on the interesting site of *Heysham*, near Lancaster. The present west door of the parish church seems Saxon, and this character is still more decidedly impressed on the old north door, which is preserved in the churchyard. Close above Heysham Parish Church is the ruined chapel of St. Patrick, a very elongated rectangle in plan, without a chancel. This has been claimed as Irish work, and the character of the site, which there is not space to describe, makes this ascription a very reasonable one. The principal feature of the chapel, however, a narrow south door, is of Saxon form, and in a Saxon rather than an Irish position, and it resembles that at Somerford Keynes, Wilts, shown in fig. 16 *ante*. The building is at any rate certainly pre-Conquest. With this notable exception, the whole of District VI., up to the border of Scotland, is singularly poor in the particular work with which we are here concerned, and we may turn from it with advantage to the exceptionally prolific district on the other side of the country.

LETTER FROM PARIS.

The closing of the Great Exhibition, which was to have taken place on November 5, has been put off until the 11th, and very possibly a few more days, until the 15th, may be added. The question of what is to be done with the various buildings now becomes a very urgent one, yet it appears that nothing has yet been absolutely decided as to which buildings will remain and which will be demolished at once. There is no doubt, however, that the foreign palaces in the Rue des Nations will, in any case, be pulled down almost at once, as soon as their contents have been cleared away, and the effective buildings on the Esplanade des Invalides will soon share the same fate; the question chiefly concerns the large palaces of the Champ de Mars. The Architect to the City of Paris, M. Bouvard, proposes to demolish all the constructions on the Champ de Mars and transform

* See Cranage, "The Churches of Shropshire," Wellington, 1894, &c., for a full notice of all early features in the county.

* "Associated Societies' Reports," 1838, p. 424.

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the whole of this extensive ground into a fine public park, but no decision can be arrived at until the matter has been taken up and discussed by the Paris City Council, and its consent obtained under conditions to be agreed on. The city of Paris has a great deal to say on the matter, for the following reason. The Exhibition, or the State, took over from the city, for the purposes of the present Exhibition, the Palais de l'Industrie, the Pavilion of the City of Paris, the Palaces of Fine Arts and Liberal Arts (which occupied the Champ de Mars, and were demolished to give place to the present buildings), the Galerie des Machines, and the Dome Centrale. In exchange for the Palais de l'Industrie the State handed over the new Petit Palais des Beaux-Arts, the large Palace remaining the property of the State; but nothing was given in exchange for the other buildings mentioned, and from these buildings the Municipality used to draw an annual revenue of 16,000*l.* from rentals of the various buildings to public and private shows, such as the Concours Hippique, the annual Salon, the Velodrome and concert-halls, restaurants and cafés, and other objects for which they were let. The city, therefore, requires a legitimate compensation, and will either demand a large sum down as an indemnity, or require the preservation of the present buildings and the right of employing them for letting out as before. It has, however, already been decided that the two splendid winter gardens on the river bank, opposite the Rue des Nations, will be handed over to the city to do as it likes with, either to let them remain in their present position or to re-erect them at Passy. The fate of the Galerie des Machines and the Salle des Fêtes also hangs in the balance, and is a difficult matter to decide. The Machine Gallery, which cost 5,000,000 fr. to erect, will cost nearly 1,000,000 fr. to demolish, and if this gallery goes, the Salle des Fêtes, which cost a large sum of money and served no very great purpose, will have to go also. The question of demolishing will rest to a great extent on the terms on which portions of the buildings were built, for certain portions were constructed *en location* with materials supplied by contractors for the time of the Exhibition only, and these conditions will also probably give rise to much discussion and many difficulties.

There has been considerable strife and discussion at the Ecole des Beaux-Arts during the past three weeks, when the half-yearly examinations for the admission of pupils have been taking place. The candidates for admission have been strongly putting forward their grievances regarding the manner in which their drawings and written papers are examined by the Jury whose duty it is to select those candidates thought worthy of admission to the school studies. They complain that the examination is being made more difficult each year, much more difficult than it should be for supposed beginners in the art and science of architecture, that this being so, every justice should be given to the young candidates as regards the careful examination of their drawings and papers sent in during the examination, and that such careful consideration is not given. The Jury is composed of thirty members, but it has been found that only five of the members were present this year to go through 548 drawings and papers, which work of examination was accomplished in three hours only. The candidates rightly declare that they cannot accept the decision given by such a small Jury in such a short time, and refuse to go through the second oral portion of the examination. The matter has been referred to M. Legues, the Minister of Public Instruction, but no decision has yet been made. The candidates who were accepted in the first portion of the examination have now decided to go through the second portion, but the students generally have submitted the following proposals: that no exterior mark on the drawings or papers sent in should in future reveal the names of the candidates or their professors to the members of the Jury; that all the drawings, clay modelling, &c., should be exhibited to the public in order that the general opinion may ratify the decision of the Jury and allow no opportunity for favouritism. Some of the members of the school studios have publicly condemned the action taken up by the candidates.

The fine new buildings of the Ecole Nationale des Arts et Métiers at Lille were inaugurated on the 15th inst. This building, which has taken twenty years to construct, not by reason of its size, but on account of certain difficulties and delays, was decided upon in 1880 after a competition in which fourteen towns, including Paris, were asked to put forward their claims and all the advantages and inducements they could offer. Lille, the centre of metal, wood, and textile industries, was chosen as offering the best advantages, and after a competition amongst architects, the plans and designs of Mr. Batigny, of Lille, were chosen for execution on an immense piece of ground given to the State by the town of Lille. The building is Renaissance in style, it is simple and severe, but its lines are charmingly relieved by sculpture from the hands of MM. Cordonnier, Fagel, Mabile, Darcq, and Laoust.

The Bibliothèque Nationale at Paris is at last receiving attention, and the architect, M. Pascal, is busy at the work of construction of the various additions to be raised on the extensive ground which cost the State so much money to acquire some years ago. The building for receiving and storing the collections of dailies and periodicals is nearly completed, but the chief interest lies in the proposed new large public reading-room to be built near the Rue Vivienne, a hall to be 140 ft. long by 100 ft. wide, intended to accommodate 300 readers.

The Prefect of the Seine has given his decision with regard to the second line of the Metropolitan railway, to go from the Place de l'Etoile to the Place de la Nation. This new line will be 11 kilometres long, and its cost is estimated at twenty-seven million francs.

The Commission des Habitations à Bon Marché of the Seine Department has opened a competition between landlords and architects of sanitary and economical dwellings constructed at Paris since January, 1896. The competition will close on November 30, and prizes of from 500 fr. to 4,000 fr. will be awarded to the owners of the houses selected by the jury; the architects of these houses will receive awards of silver and bronze medals.

The German Government has honoured the following gentlemen connected with the organisation of the 1900 Exhibition with various grades of the Order of the Red Eagle and the Crown:—MM. Alfred Picard, Delaunay, Belleville, Georges Berger, Henry Roujon, Bouvard, Edouard Détaille, Henri Chardon, Arago, Bonnier, Bourdon, Picou, Masson, Detourbet, Molinier, and Guyenet.

The important question of demolishing the walls of Paris is being carefully looked into, and the Minister of Finance is bringing forward a scheme for suppressing the walls to the west of Paris and annexing to Paris the suburbs of Boulogne, Neuilly, Levallois-Perret, Clichy, and Saint Ouen, with an aggregate population of 186,000 inhabitants. This scheme, as soon as it is decided upon, will provide an opportunity for important speculative operations, as the demolishing of this portion of the fortifications will bring into value an enormous quantity of ground for building purposes, worth very little at present owing to the restrictive regulations regarding building on the military zone around the walls, but destined to make an extraordinary advance in price as soon as these restrictions are taken away. Speculative builders and contractors are keeping a watchful eye on the scheme, and the owners of the ground in or near the military zone are unwilling to make letting leases of any long specified duration. The realisation of this scheme, with that of "Paris *port-de-mer*," now also on the *tapis*, will provide plenty of work for the building and other trades.

On Saturday last the Académie des Beaux-Arts proceeded to the election of a successor to the late painter Vollon. M. Dagnan-Bouveret was elected by twenty-two votes, against seven for M. Ferdinand Humbert, five for M. Cazin, two for M. François Flameng, and one for M. Lhermitte. (This was at the third *scrutin*; probably the voting was more even at the first turn.) M. Dagnan-Bouveret may still be classed among the younger generation of French artists, having been born in 1852; but he has done a great deal of work. Though a pupil of the Ecole des Beaux-Arts and of M. Gérôme, he is not a painter of Classic predilections, nor did he enter on the usual course of study at Rome. He was known at first only for a class of *genre* paintings, not of the most admirable kind, such as "Le Noce chez le Photographe"; but he soon abandoned this for a higher line of work. Among his more serious pictures are "La Bénédiction des Epoux," the well-known "Bretonnes au Pardon," the "Conscrits," and, recently, the mystical painting of the Last Supper. He has kept quite apart from any school of artists, and pursued his own independent course. He has received many official honours, including the Medal of Honour of the Salon of 1889.

The works at the Théâtre Français, which are in an advanced stage, have been carried on with increased activity the last few days, as M. Guadet, the architect, declares that in accordance with the desire of the Government the theatre is to be ready by December 29 and to be opened on the evening of that day. This, however, hardly seems possible. It may be mentioned by the way that the Government seem to have abandoned the idea of depriving the Comédie Française of the paintings it possessed before the fire, and placing them in the Louvre. The paintings and sculpture will find their place in the new theatre, including the celebrated statue of Voltaire by Houdon, which will be placed in the public foyer.

An interesting exhibition, opened with a philanthropic object, is a collection of portraits of dramatic and lyric artists. Among the 390 works in this small exhibition may be mentioned, among many of insignificant interest, a fine portrait of Talma by Delacroix, one of Mlle. Mars by Gérard, that of Regnier by Elie Delaunay, that of M. Mounet-Sully by M. Jean Paul Laurens, and that of Sarah Bernhardt by M. Gandara.

A street improvement long required is at last in the way to be carried out by the widening of the Place des Petits Pères and the Rue de la Banque, long hemmed in by a large building which has at length been demolished. The new Hôtel des Examens of the Paris Municipality, which occupies a part of the site of the old Marché Saint-Germain, has been completed. M. Dupré is the architect of the building, the red and white brickwork of which gives a little colour to the dull quarter between the Place St. Sulpice and the Boulevard Saint-Germain. Commemorative tablets near the entrance record the fact that the celebrated fair of St. Germains occupied the site till the end of the eighteenth century, and that the then new market was built there, in 1813, from the designs of MM. Blondel and Luçon.

M. Ernest Hiron, a sculptor of merit, is dead, at the age of fifty. He was a pupil of Aimé Millet and of Bastet. The death is also announced of M. Jules Perin, an antiquarian distinguished for his researches in reference to old deeds and MSS., and whose advice was much sought after by the "Vieux Paris" Committee. He was sixty-six at the time of his death, and had been for a long time a contributor to the journal *Le Bâtiment*, in which he treated with unusual ability all legal questions connected with architecture and building.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—The annual general meeting of this Institution was held on October 27 at the Westminster Palace Hotel, the retiring Chairman, Mr. Basil H. Joy, presiding. There was a large attendance of members. After the usual preliminary business, the Council's report on the work of the past year was presented and adopted. It stated that the net increase in membership had been thirty, the membership roll now numbering close on six hundred. M. Gustave Canet, of Paris, and Professor W. E. Dalby, of London, had been elected honorary members. The Institution Premium for the best paper read by members during the session has been awarded to Mr. E. W. Porter, Assoc.M.Inst.C.E., for his paper on "A Comparison of Railway Bridge Structures of Moderate Dimensions and of Methods of Determining their Working Loads." Seven meetings had been held and eleven visits paid to works, apart from the visits arranged in connexion with the summer meeting at Newcastle-upon-Tyne and Sunderland. Reference was also made in the report to the fifteenth anniversary dinner and to the conversazione. The Institution had been represented at the receptions given last June by the "Société des Ingénieurs Civils de France" in connexion with the Paris Exhibition. A list of donations to the library was appended, followed by a copy of the accounts. From the latter it was noticed that the office fund, which has been in existence for several years, makes but slow progress; it was started with the object of providing the means for opening an office and reading-room, but it would appear that some substantial contributions are needed before this can be carried into effect. This matter was subsequently discussed at the meeting very

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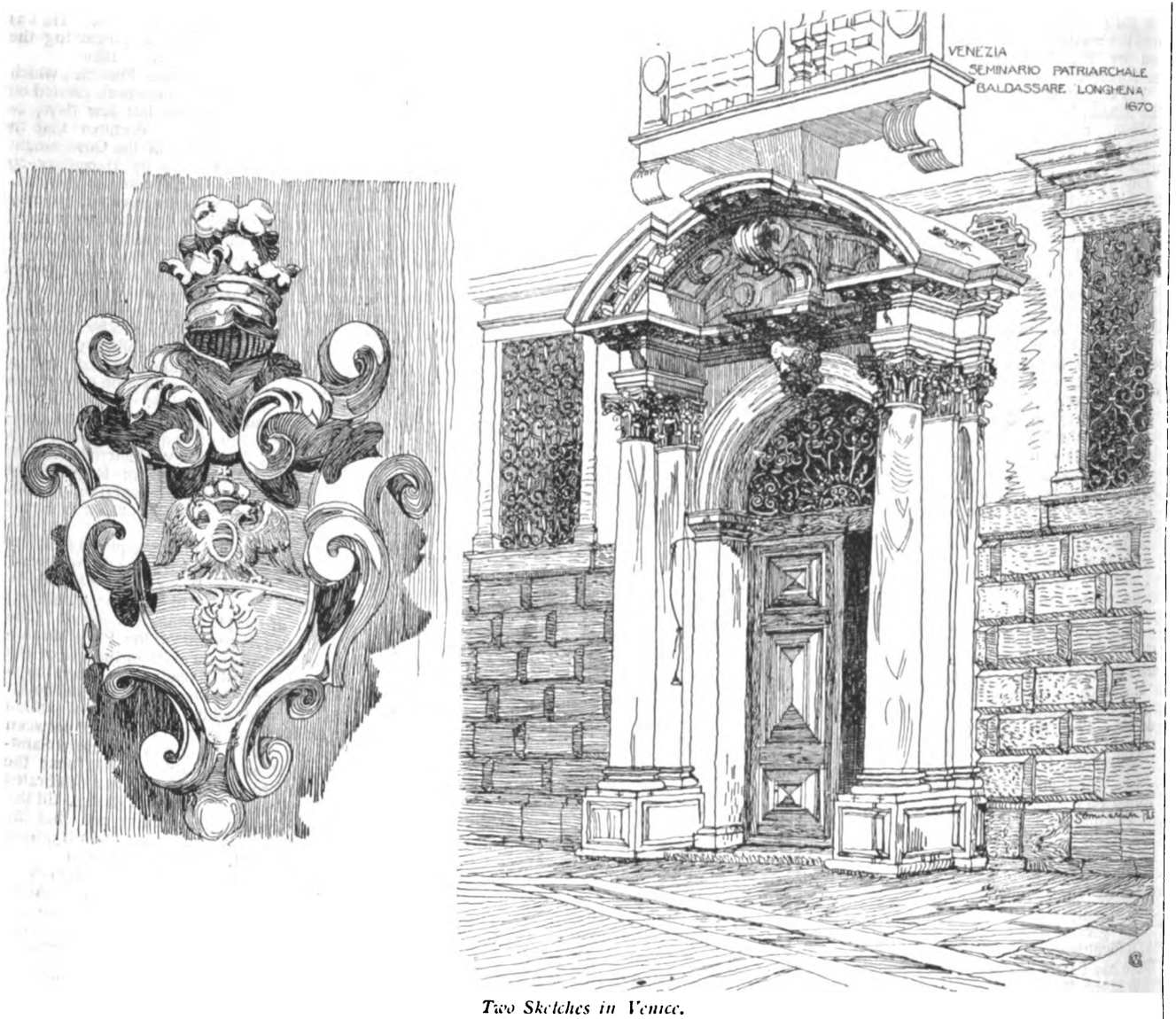

Two Sketches in Venice.

fully, and is to receive special consideration by the Council. The scrutineers reported the election of the following new officers and members of Council :—Chairman, Mr. Percival Marshall ; Vice-Chairman, Mr. Ernest King ; hon. librarian, Mr. Lewis Rugg ; hon. auditors, Messrs. Adam Hunter and A. W. Marshall ; secretary, Mr. W. T. Dunn ; members of Council, Messrs. Louis F. Awde, W. Rushworth Beckton, H. Norman Gray, and W. G. Wernham. Messrs. W. B. Keen & Co. were re-elected chartered accountants. A hearty vote of thanks was accorded the retiring officers and Council, and was acknowledged by Mr. Joy, who inducted his successor into the chair. The proceedings closed with the announcement of the visit, on November 3, to the Millbank-street station of the London Hydraulic Power Supply Company, and of the inaugural meeting of the new session, when Sir Lowthian Bell would deliver his Presidential address.

TWO SKETCHES IN VENICE.

ONE of these sketches represents one of the two doorways of the Seminario Patriarcale built by Baldassare Longhena about 1670. The doorway itself is in white marble, the plinth of the building is in rough granite with rough-cast walls above; a charming piece of colour. The coat of arms is carved from a single block of stone about 3 ft. high, surmounting a plain doorway. There are many others similar in character in Venice.

GRAMMAR SCHOOL EXTENSIONS, SOLIHULL.—At a meeting of the Governors of the Solihull United Charities recently, it was decided, subject to the sanction of the Charity Commissioners, to spend nearly 4,000*l.* on additions to the Solihull Grammar School. The extensions will include class-rooms, dormitories, laboratory, &c., and the present accommodation will be increased to 200. Plans of the proposed extension have been prepared by Mr. H. A. Chatwin, architect.

BURNLEY TECHNICAL INSTITUTE COMPETITION.

THE opponents of the competition system will find in this long-drawn-out competition another example with which to point a moral and adorn their tale. With the best intentions on the part of the promoters and assessor, the result is not satisfactory. In March of this year the "instructions," which had been carefully prepared under the advice of the assessor appointed by the Corporation—Mr. Alfred W. S. Cross, F.R.I.B.A., 58, Conduit-street, London, W.—were issued to (we believe) twelve selected architects. No premiums were offered, but each architect who submitted a design in accordance with the conditions was promised "an honorarium of twenty guineas." The author of the selected design was to be employed to carry out the work on the usual terms, unless the scheme should be abandoned or postponed beyond a certain date, in either of which events a fee of 100*l.* was to be paid him in full settlement of his claims. The accommodation demanded was on an extensive scale, and included really three schools in one, namely, a technical institute, a higher grade school, and a pupil teachers' centre. The site has a considerable slope from front to back, and this added greatly to the difficulty of producing a satisfactory plan, although in the hands of a clever man it might prove an advantage in this respect rather than otherwise. In any case, however, it must increase the cost of the building. The acceptance of any design was conditional on the possibility of obtaining from a responsible builder a tender to carry out the work "for a sum that shall not exceed the proposed expenditure by more than 10 per cent." As the proposed expenditure was only 40,000*l.*, the limit of cost was, therefore, 44,000*l*, exclusive of furnishing.

Ten designs were received in this first competition, but not one of them could, in the opinion of the assessor, be carried out for the stipulated sum, while the cost of some of them was estimated by him to be more than double the proposed expenditure. The ten designs are now exhibited at the Town Hall, Burnley, and it is clear that, notwithstanding the statements of the authors of these designs, the cost would in every case exceed the stipulated amount. The competitors are not entirely to blame for this. The fact is that the Corporation wanted too much for its money, and this is proved by the issue of instructions for a second competition, in which less accommodation was required, although the proposed expenditure remained the same.

Three designs were selected by the assessor as being, on the whole, the best of those submitted—namely, No. 3, by Mr. J. W. Beaumont, Manchester ; No. 5, by Mr. W. A. Quarmby, Burnley ; and No. 7, by Mr. Thomas Bell, Burnley. In all these the buildings are arranged in the form of a hollow rectangle, with a central hall in the middle dividing the quadrangle into two courts ; but while Mr. Beaumont has placed his weaving and spinning departments in a basement extending under the central hall and the two courts, Mr. Quarmby and Mr. Bell have placed them in a separate building of one story behind the main building. The latter arrangement is better, although more costly ; the lighting under Mr. Beaumont's arrangement would be far from satisfactory. Of the three designs we should certainly consider Mr. Bell's entitled to the first place. Its architectural character, of the fashionable English Renaissance type, is good, though not distinguished, the location of the departments on different floors has been carefully considered, and the plans are fairly compact. Mr. Quarmby has adopted a freely-treated Renaissance of Spanish Plateresque character, and must be congratulated on having produced a clever design, which is well shown by a pen-and-ink perspective done (if we mistake not) by a well-known hand. Mr. Beaumont has studied

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economy in his elevations, and his design has little to recommend it; the perspective, however, scarcely does it justice.

Of the other designs, No. 1, by Mr. G. R. Rawcliffe, of Burnley, does not call for comment; but No. 2, by Mr. J. Mitchell Bottomley, of Leeds and Middlesbrough, has some good points, the cloakrooms being well arranged and the elevations not without merit, but the building has a large frontage and would be costly. No. 4, by Messrs. Woodhouse & Willoughby, of Manchester, has the same general arrangement as the three selected designs, but is not so compact; the area covered by the main building measures about 250 ft. by 150 ft., which is considerably in excess of the area covered by any of three selected designs. The weaving and spinning departments, as in Mr. Beaumont's design, are arranged under the central hall and the two courts. The exterior is of pleasing character, in the authors' usual style, and is shown by an extremely able perspective—a wash-drawing in Indian ink. Messrs. Briggs & Wolstenholme (No. 6) have produced a good exterior design, but the planning is not satisfactory, many of the corridors being badly lighted and the rooms not being arranged to the greatest advantage. As far as external design is concerned, Mr. W. H. Thorp, of Leeds (No. 8), deserved, perhaps, the first place in the competition, but the planning is much less satisfactory. Messrs. Stones & Stones, of Blackburn and Darwen (No. 9), show a building with a frontage of 300 ft., as against the 220 ft. of Mr. Bell's design; the front has an imposing appearance, with its three stories and attic, but the design is clearly out of court on account of its cost. Design No. 10, by Messrs. Cheers & Smith, of Blackburn and London, has a somewhat straggling plan with dark corridors, and an exterior of coarse Renaissance type with extraordinary parapets to the two low towers.

The assessor's report on the designs placed the Committee of the Corporation in a difficulty. Not one of the designs could be carried out for the stipulated sum or within a reasonable amount in excess of it, and not one of them was, in the opinion of the Committee, equal in plan to the draft scheme which Mr. Cross had prepared before the issue of instructions to the competing architects. The Committee under the circumstances would have been pleased, we understand, to end the matter by accepting Mr. Cross's scheme and employing him to carry it out, but this course Mr. Cross very properly declined to accept, as it is contrary to professional etiquette. The facts of the case were submitted to the Council of the Institute of Architects, and the result was that Mr. Cross was asked to complete his plans of the several floors, reducing the accommodation to some extent, and that the three architects whose designs were considered the best in the first competition were invited to prepare elevations, sections, and a perspective, showing the external treatment they would recommend for Mr. Cross's plans. In other words, a second competition was instituted for external treatment only.

This way out of the difficulty, as might have been expected, has not proved altogether satisfactory. It was only fair to the authors of the three best designs in the first competition that they should be invited to the second, but as the second competition was for external treatment only, surely the authors of the best exteriors submitted in the first competition ought also to have been invited, even if they did not receive the same remuneration as that given to Messrs. Bell, Quarmby, and Beaumont. Mr. Thorp ought certainly to have been invited, as well as Messrs. Briggs and Wolstenholme and Messrs. Woodhouse and Willoughby, whose elevations were all better than those of one, at least, of the selected designs.

In the second competition the three selected architects have all adopted the same style of treatment which characterised their first designs, but while Mr. Beaumont has done better, Mr. Quarmby and Mr. Bell have been less successful. The unnecessarily lofty second story (without windows) which Mr. Quarmby has adopted has marred his second design very considerably, and Mr. Bell has simplified his design, so that, although not without a certain dignity, it is not far removed from the commonplace.

The Corporation of Burnley and the assessor deserve the thanks of the profession for having acted throughout this difficult competition in a perfectly honourable manner, and we heartily sympathise with them in their disappointment that the result has not been so successful as their efforts deserved.

THE ARCHITECTURAL ASSOCIATION.

FRENCH AND ENGLISH CATHEDRALS.

THE second ordinary general meeting for this session of the Architectural Association was held at No. 9, Conduit-street, Regent-street, on Friday evening last week, Mr. W. H. Seth-Smith, President, in the chair.

The minutes of the last meeting having been read and confirmed, the following gentlemen were elected as members of the Association, *i.e.*, Messrs. J. D. Robertson; W. A. Hodges; J. F. Schneider; D. W. Stewart; David Seth-Smith; H. Black; N. F. Barwell; T. R. Bridson; J. S. Brocklesby; J. O. Cook; I. S. Davies; W. W. Ellison; J. B. Fulton; G. Gould; R. H. Greig; H. C. Hollis; H. R. Houchin; J. R. Sykes; J. H. Waterworth; R. F. Wheatly; A. E. Bullock; P. R. Berry; G. Bune; H. W. Cathie; H. Collis; G. F. B. Daniell; C. René Harrison; D. B. Hedderwick; W. B. Hellard; F. Hibbard; D. M. Rees; W. A. S. Pettit; H. F. Murrell; A. F. Murray; H. S. Morran; H. Kenchington; W. B. Jemmett; D. B. Hart; R. G. Elwes; D. W. Crawford; A. S. Millar; C. S. Goodwin; G. Walker; L. Rawles; L. T. Moore; F. J. Sherrin; R. J. Howard; S. B. Wates; E. G. Theakston; R. E. Stewardson; I. T. Sifton; E. F. Reynolds; G. Unsworth; T. L. Walker; T. W. Watkins; H. J. Wyeth; A. E. R. Gill; A. B. D. Langl; A. E. Hyams; and H. Hyams.

The Chairman said he desired to propose a cordial vote of thanks to Mr. G. B. Carvill, Hon. Secretary, who undertook the management of the conversazione which took place the previous Friday in the King's Hall, Holborn Restaurant. As they knew, their Hon. Secretary took infinite pains to make such entertainments a success, and the one just given was a great success.

Mr. Carvill, having briefly acknowledged the vote of thanks, announced that a meeting of the Discussion Section will be held on November 2, when Mr. H. Rose will read a paper on "Church Bells."

Mr. Francis Bond, M.A., then read the following paper on "French and English Cathedrals," illustrated by a large number of lantern slides:—

"An Englishman, just returned from Boulogne, was asked what were his salient impressions of France. Two things, he said, filled him with astonishment. One was that the children in the streets spoke French; the other that the soldiers had red trousers and blue tunics, thus reversing the laws of nature. It is from this insular, not from any cosmopolitan point of view, that I approach the subject of the French cathedrals; some of the French cathedrals, for there are a great many. It is possible to be on fairly intimate terms with all the English cathedrals, of which there are no more than thirty-four, even including those churches which have been elevated to the rank of cathedrals in the present reign. In France, on the other hand, it is impossible to be even on bowing terms with the churches which are at present, or which have been, of cathedral rank. The south-east of France swarms with little cathedrals; even their names will be unfamiliar to many, such as Castres, Cavaillon, Dax. I have even had to explain sometimes where Séez is. Obviously, our survey must be limited to but a few of this vast number.

Let us look in imagination, first at the English cathedrals, and secondly at the more important of their sisters in France. I think I may take it that anyone who has visited and studied our English cathedrals does not afterwards mix them up in his memory; he can always keep each picture distinct; that is, the English cathedrals have the quality of distinction and individuality. For example, we never confuse with one another designs, though on closely analogous lines, such as those of the choirs of Beverley, Lincoln, Ely, Southwell, Worcester, and Salisbury. In the same way the *tout ensemble* of the interior of Ely stands out apart sharply and clearly from that of the interior of Lincoln or Gloucester, or York. Yet more individual are the exteriors. Exeter reminds us of nothing else; nor does Lincoln or Lichfield, or Canterbury, or Wells. Now this is by no means the case in France; or at any rate, not to the same extent. Here are two interiors; one is the choir of Amiens, the other the nave of Auxerre. The differences between the two designs are so slight, that, without care and thought, it is really difficult to remember which is which. And this is so with a great number of churches in the style of the *Ile de France*. Three years ago I spent a month among them; and I must confess to finding them somewhat monotonous and uninteresting. The fact is they were all to a large extent versions of Amiens. In Amiens every problem of French Gothic had been solved consummately. In no way could Amiens be bettered; and so this—the greatest of all the great works of the French Gothic—inspired, dictated, and controlled the great mass of Gothic design even to the furthest ends of the country. So, when I reached St. Quentin, Chalons-sur-Marne, Troyes, Nevers, Auxerre, Tours, Rouen, Clermont-Ferrand, Limoges, Toulouse, Narbonne, I was constantly finding myself in the presence of something which I had seen before. Evidently, about 1220, the thought of the best builders throughout Northern France flowed in the direction of the Amiens design; and the ideas which produced Amiens produced, or were soon to produce, similar work throughout the length and breadth of the country. In England, fortunately or unfortunately, we never had an Amiens. We never had one final summing up in one building of the best in our English Gothic. Wells choir had been an enormous advance about 1175. St. Hugh's design at Lincoln fifteen years later, though he came from Witham, near Wells, is in no way based on that of Wells. His choir, in turn, was a vast advance, yet no copy was made of it. There was never in England a superior person like Amiens to set the fasnion. Not only English Gothic was non-French, but cathedral after cathedral went on its own sweet way, copying nobody. For that very reason, small as many of our cathedrals are, they are for their number—at any rate, as far as my opinion goes—more interesting than the cathedrals of the style of the Ile de France.

On the other hand, we must admit that there are French cathedrals which have enormous individuality. Nothing was built like Chartres before it; nothing has been built like it since. Rheims, too, stands out alone. Then there is a group of three cathedrals with double aisles of unequal height; Bourges was built first, being commenced about 1190; Beauvais and Le Mans were improved versions of Bourges. Le Mans, had it been completed, would, I think, have eclipsed even Amiens. Then there is a fine group of Transitional Churches which have marked individuality — Paris, Sens, Senlis, Noyon, Soissons, and Laon; to which we may add the noble choirs of St. Remi and Notre Dame of Chalons-sur-Marne. Travel yet farther from Paris, and new and strange, yet beautiful varieties of Gothic will be found. The lovely 'Norman patois' is seen in the choirs of the Abbaye-aux-hommes and Bayeux; at Séez and Coutances; delightful links between the Ile de France and England. Travel far west; and in the choir of the Cathedral of Chalons-sur-Saône, at Sémur and Notre Dame de Cluny will be found another Gothic, bold, vigorous, and independent. Nor will the achievements of what the French call Plantagenet Gothic, designs wrought in English realms, not by English brains, ever fail to leave sharp and distinct recollections of lovely work, from St. Serge at Angers to the magnificent cathedral of Poitiers, commenced about the year 1162 by our English Queen Eleanor. Going down south, an Englishman finds himself confronted more and more with churches strange, novel, and interesting. Some of them, like Toulouse and Bordeaux, have an aisled choir and an aisleless nave—a combination magnificently successful at Bordeaux. At last, at Albi, aisles disappear altogether; the whole cathedral becomes one continuous hall; stupendously impressive. If there is monotony in the Gothic of the Ile de France, there is none when its limits have been crossed. There is absolutely nothing in English Gothic to parallel these immense differences of French design. To the faithful who have learnt their Amiens, Poitiers and Albi are a bolt from the blue.

Another important difference is that the French cathedral in those districts which the tourist is most likely to visit is wholly Gothic. The exceptions are very few. At Nevers a western apse of the eleventh century survives, in striking contact with a thirteenth century Gothic cathedral. At Beauvais the fall of the central spire preserved from rebuilding an archaic nave of the tenth or eleventh century;

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and Romanesque sub-structures remain at Bayeux and Chalons-sur-Saône. But out of our thirty-four English cathedrals, Peterborough and Durham are still mainly Romanesque; while large masses of Romanesque work remain incorporated in Bristol, Canterbury, Carlisle, Chester, Chichester, Ely, Exeter, Gloucester, Hereford, Lincoln, Norwich, Oxford, Ripon, Rochester, St. Albans, Southwell, Winchester, and Worcester. So that of our older cathedrals only Lichfield, Salisbury, Wells, and York are purely Gothic buildings. An extraordinarily clean sweep was made in the thirteenth century of what Romanesque there was in the Domaine Royale; and its corresponding abundance in the English cathedrals forms one of the most striking points of difference between the mediæval architecture of the two countries.

If we look at the two sets of cathedrals chronologically we shall find equally marked differences. In England each period is fully represented by important cathedral work. In France it is not so. The period of Transitional or Rudimentary Gothic is well represented in England at Oxford, Ripon, Canterbury, and Chichester; in France, by the cathedrals of Paris, Laon, Sens, Soissons, Noyon, Senlis, and to some extent by Chartres. Our lancet and geometrical work is represented by the great group of Gothic cathedrals of the Ile de France type. Our Tudor work ran on simultaneously with the French Flamboyant. In the preceding period much grand work was done at Bristol, Carlisle, Chester, Ely, Lichfield, Lincoln, Oxford, St. Albans, Wells, Worcester, Gloucester, Canterbury, and York. In many parts of France work stops almost wholly from about 1328 to 1440, when the French were engaged in the most calamitous intestine conflicts, and for a hundred years were at war with ourselves. This period of anarchy, warfare, famine, and plague was no fit seed-ground for architecture. The tale of those days is told quite clearly in many a French cathedral. You see quite distinctly where the works were suddenly stopped in the fourteenth century. You see where they were resumed late in the fifteenth century. When they were resumed, however, a great change had come over the spirit of Gothic architecture. In the natural course of things the choir, with some exceptions, for instance Amiens, had been built first. Then the nave was completed. (At Clermont, Limoges, and Moulins the naves were only finished in the present century, that of Narbonne still remains a skeleton.) As a rule, it was just when nave and choir had been finished that war, civil and foreign, stopped the work. In most cases the transepts had been left to complete later; and so it is that we have the constant juxtaposition in a French cathedral of an Early Gothic nave and choir with a flamboyant transept. In fact, this may be regarded as the normal type of a French Gothic cathedral. It is seen at Paris, Sens, St. Remi, Amiens, Limoges, Beauvais, Auxerre, Troyes, Senlis, Séez. Very magnificent these flamboyant transepts are. Whatever be the failings of Late Gothic, we cannot afford to despise the composition of such transepts as those of Beauvais and Limoges any more than that of such spires of our own as Coventry and Louth, of equally late date.

Externally the French Cathedral is, above all, a town church. It rises out of the huxtering of the *place* or the squalor of the narrow lane. In front perhaps is a sahara of dust, as at Amiens, Auxerre, Paris, Rouen. From no point of view can the grouping of the whole of its masses be seen. Nowhere in France is there such a comprehensive view as that from the north-east of Salisbury or Lincoln. It is seen only in parcels. Sens, for example, has an arid space in front; to the north it is blocked by private houses; to the south by the Archbishop's palace; to the east by the Grande Seminaire. Peeps and glimpses only can be got of transepts, choir, nave, and apse. A general view is impossible.

It is a surprise to see the south side of Bourges rising out of the emerald sward. The peaceful close and elms of Salisbury, the pools and springs of Lichfield and Wells, the wooded slopes and river of Durham, the encircling precincts of ancient canons' houses embowered in foliage and creepers, are all wanting in France. In France we see the bare picture; in England we see it framed. In England such Cathedrals as Canterbury, Durham, Ely, Lichfield, Lincoln, St. Albans, Wells, York, nobly dominate the town and landscape. With us the houses are low, and give the Cathedral value; in France they are much loftier, and strangle the great building in their close confines. Indeed, the real greatness of the building is often quite unrecognisable from outside. Mr. Garbett in his 'Principles of Design' quotes an eminent authority who honestly thought Salisbury larger than Amiens. His error was pardonable. Following the south side of Amiens one sees three things only—the nave, the transept, and the apsidal choir. Following the north side of Salisbury one sees nave, porch, nave, great transept, choir, eastern transept, choir, retro choir, Lady Chapel. This bold handling of the masses infinitely increases the apparent magnitude of an English Cathedral; nor must one forget the gulfs and abysses of shadow in the deeply-recessed flanks of such Cathedrals as Lincoln and Salisbury, to which it gives rise. Especially is this the case where the plan with double transepts has been adopted. It is a strange fact that this, the archiepiscopal plan, appeared first in France; at Cluny and its daughter abbey, Souvigny. It found no favour in its own country, but its adoption in England gave us the finest exteriors we possess.

A French Cathedral is essentially a town church; the English Cathedral dwelt in a *rus in urbe*. To these delightful closes and precincts yet another charm is added in their cloisters. Cloisters were natural in cathedrals which, like Gloucester or Bristol, were served by Benedictine monks or by Augustinian canons. So beautiful an accessory, however, was the monastic cloister that it was added as an *objet de luxe* at Chichester, Exeter, Hereford, Lincoln, Salisbury, and Wells; all served by secular canons. In Northern France, on the other hand, cathedral cloisters are far less common. Among better known examples may be mentioned those of Rouen, Laon, Noyon. In England, too, we elaborated first at Worcester a circular chapter-house, and out of this developed the polygonal form. These polygonal chapter-houses, of which so many glorious examples remain, *e.g.*, at Southwell and Wells, have been described as the greatest triumphs of our mediæval architecture. I do not remember to have seen one of them in France.

Where the exterior can be seen, it is seen to be hugely tall; its outlines however, especially as one looks eastward towards the apse, are cut up in the most perplexing and vexatious manner by a forest of stone stays—permanent stone scaffolding—the flying buttresses. One's reason tells one that each has its special function, but the eye does not brook to be dictated to by the reason. After the tangled intricacies of such an apse as that of Amiens or Nevers, the eye rests with deep content on the simplicity of the north side of York.

We have seen how porch and eastern transept break up the monotony of the long flanks of our English cathedrals. The French cathedral also, as first designed, had grand shadow effects in the bays between the buttresses; buttresses which owing to the greater height and span of the vaults within, were of much greater projection than our own. Unfortunately these effects too were sacrificed almost everywhere. The walls of the nave-aisles were pierced through, and chapels were inserted from buttress to buttress. The buttresses practically disappeared as a factor of the exterior; and the flanks of the nave presented one shadowless monotony. This may be seen at Paris, Laon, Nevers, Dreux, Amiens, Autun, almost everywhere. We have had but one nave treated in this disastrous fashion; that of Chichester.

Another disability which afflicted the French designer was that the interior being all in all to him, and the sublimity of the interior being dependent mainly on its altitude, the external roof which covered his vault was so enormously lofty that no towers which could be set upon it were adequate to dominate its masses, unless they were positively gigantic in height. It was only by carrying up spires to the vast altitudes of those of Cologne or Strasbourg that such an exterior could be brought together into unity. In some cases, as at Chartres and Coutances, the attempt was made, and successfully. At Beauvais it was attempted; but the central spire, 510 ft. high, collapsed. At Amiens, the *chef d'œuvre* of all the French cathedrals, the failure of the exterior is supreme. Over the crossing was erected a spire of wood; though 357 ft. high, it has the effect merely of a pinnacle. As for the western towers of Amiens, though effective from the west, they are from all other points of view absurdly inadequate. In England, vaulting ambition did not overleap itself.

The Lincoln people kept their roof so low that the three towers have a superb effect. What must Lincoln have been like when it had its three spires as well? the central spire 525 ft. high, a mark far out at sea!

Not only in the elevation of his vaults, but in the composition of his tower-groups, the Frenchman had ambitions amazing to the Englishman. The Englishman never got further than translating into Gothic the Abbaye-aux-hommes. The Frenchman essayed to translate into Gothic the tower-groups of Cluny. Laon was designed for seven towers, Chartres for eight. No such groups were ever completed. And so French Gothic is, to a woeful extent, a study of unfinished exteriors—unfinished where groups had been designed of seven, eight, or nine towers; unfinished often where, as at Amiens, three steeples only had been planned. We see something of what was designed in the tower-groups of Laon, and in a simpler form at Autun, Semur, and Notre Dame de l'Epine, Chalons; or, with intermixtures of modern work, in the Cathedral and St. Ouen, Rouen, in Bayeux, and, above all, in Contances, the finest tower-group in France. Taking the French exteriors as a whole, one is left rather well content with English Gothic.

But if we turn to the grand façades to north, south, and west we have little, I am afraid, which will bear comparison. A few of our transept-façades, *e.g.*, those of Beverley and Lincoln and the north transept of York, have no superiors anywhere. (It is strange that we have no façade of first rank after the middle of the thirteenth century.) As has been pointed out, the final and most elaborate effort of French Gothic was made in the completion of transepts. What can be more accomplished than the composition of the north transept of Limoges? How commonplace it would have been in the hands of our contemporary English masons! If, on the other hand, we turn to the west, the French façade immeasurably surpasses anything of ours, Peterborough excepted, which is *hors concours*, being unique. In France they wanted to display statuary, but the grand façade does not sink to the level of an open-air reredos, as at Lincoln, Salisbury, and Wells. Nor can I conceive any French architect so lost to dignity and self-respect as to let his cathedral sink away westward to the ground after the parochial fashion of Winchester, Norwich, Chester, Gloucester, and Worcester. Sometimes, but rarely, he built two symmetrical spires, as at Séez, Angers, Bayeux, Coutances; or two unsymmetrical ones, as at Chartres. Sometimes he built a pair of western towers, as at Paris, Rheims, Bourges, Noyon, Tours, Laon. It is possible that these also were intended to carry spires. (The addition of spires is needed to counterbalance the heaviness and undue horizontality of the present façade of Notre Dame, Paris.) If he could not complete two western towers, at any rate he built one, as at Auxerre, Soissons, Limoges, Troyes, Albi. If he did not get his tower at the west, then, as at Exeter, it finds place at the end of the transept, *e.g.*, at Bordeaux, Le Mans, Nevers. Of our west fronts, that of York is most on French lines and the most successful, always excepting Peterborough. The evolution of the French grand façade from Senlis through Notre Dame to its perfect consummation in Rheims is a fascinating subject which I must pass over.

In such a great façade the central idea is that it is none other than the portal of the House of God Himself. Here there are none of those 'holes for rats and mice,' as some one unkindly described the west doorways of Wells. These vast cavernous portals, studded with legendary imagery, are the glory of the French façade. The triple portals of Paris, Auxerre, Amiens, Rheims, will be familiar to many of you; while at Bourges the western entrances are no less than five in number. It is true that the comparative insignificance of the western entrances to our cathedrals is to some extent redeemed by lateral porches breaking most effectively the lines of our long low ministers, such as the north porches of Southwell, Hereford, Salisbury, Wells, and Worcester, the south porch of Canterbury, and the Galilee porches of Ely and Lincoln. But France, also, has noble examples of lateral porches—the lovely hawthorn porch of Bourges; the statued porches of Chartres; and the superb flamboyant

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porches added to Louviers and Albi, the latter incomparable among the works of the Later Gothic. On the whole, as regards the façades of naves and transepts alike, we must bow to the superiority of the French.

When we pass within all is changed. We step into vast spaces of height incalculable; so overwhelming in their impression on the senses that it seems inconceivable that they should have been designed by the pigmy man who walks beneath. Nowhere does one so feel at once the insignificance and the greatness of man; he is overwhelmed by his own work. It is not to the beautiful but to the sublime that the genius of France has attained. Her Gothic cathedrals stand apart on a higher plane than all the other works of man; they are the supreme artistic achievement of our race. At Lincoln the choir is 74 ft. high beneath the vault; at Amiens it is 140 ft.; Beauvais is nearly 154 ft. (one Lincoln choir might well be superposed on another inside Beauvais). It is true that our English cathedrals have the best of it in length. Winchester is 56 ft. longer than Amiens, and very beautiful effects are produced by the long-drawn succession of arch after arch rapidly passing out of count. In fact we may say Frenchmen and Englishmen alike, in building a house for Him Who is without length of days, sought to produce the impression of infinity—in England by suggesting infinite length, in France by suggesting infinite height. Ours was the easier task. And this impression of interminable distance was aided yet again by the numerous screens, often carrying organs, which crossed the church; of which two remain at Ottery St. Mary's, while greater churches had three or more. How greatly an interior is foreshortened by the want of a substantial screen is seen at Tewkesbury. At Gloucester and at Exeter the organ-bearing screens add enormously to the apparent length of the church. Screens have been swept away from the French cathedrals almost universally. Their length, already inadequate to our English eyes in proportion to the greater span and greater height of the central nave is grievously curtailed. A beautiful example remains at Notre Dame de l'Epine, near Chalons-sur-Marne. A sumptuous flamboyant screen is the glory of the Church of the Madeleine at Troyes. The Renaissance screen of Limoges Cathedral still survives, but is thrust back against the western wall. Albi alone retains in all its integrity the whole of its screen and choir-enclosure.

What, perhaps, strikes an Englishman most is the homogeneity of the whole internal design of nave and choir. He has been accustomed to nothing of this, except, perchance, at Salisbury. To him a cathedral means a hybrid, a mongrel building—a collection of scraps and patches. It is a revelation to see a harmonious whole, like that of Paris or Amiens or Bourges or Rheims or Chartres, or Poitiers, Laon, Soissons, Noyon, Tours, Troyes, Coutances, Séez. At Chichester, for instance, he has seen one design in the nave, a second in the retro-choir, a third in the porches, several designs in the nave chapels, one in the south transept, and another in the north. Equally mixed up and discordant are Rochester, Hereford, and St. Albans. York has one design for the transept, another for the nave and choir. Canterbury choir is absolutely disconnected from and independent of nave and transepts, and so on with the rest, Salisbury only excepted.

This, which is the greatest blot æsthetically in our English cathedrals, is archæologically their greatest charm. When one has seen one bay of the nave of Salisbury or Amiens one knows what to expect in each of the rest; there are to be no surprises, no novelties. In such a cathedral, too, as Amiens or Salisbury there are few archæological problems to unravel, few nuts to crack; the constructional history of the cathedral tells itself clearly and unmistakably. But a man must think much and often, and even then he will require Mr. St. John Hope's assistance, to ascertain how Rochester Cathedral grew. I remember finding Wakefield and Ripon cathedrals more interesting than stately York. Here and there, like the Frenchmen, we were iconoclasts. At Lichfield, Salisbury, Wells, and York the builders cleared away every scrap of Romanesque from the face of the earth. But everywhere else they left masses of Romanesque work standing. Often we have a Romanesque nave with a Gothic choir, as at Southwell; sometimes Romanesque below and Gothic above, as in the choir of Hereford; sometimes blocks of gaunt Romanesque protruding still from Gothic surroundings, as at St. Albans. Parallels may be found in France, but they are rare. Toulouse has a Gothic choir, but never succeeded in rebuilding its twelfth-century hall nave. The Romanesque nave of Le Mans was thought too good to be pulled down. Gothic is superposed on Romanesqne at Bayeux, at Chalons-sur-Saône, and at the abbeys of Souvigny and Brioude. But, on the whole, we may say that English cathedral architecture is generally a study of contrasts; that of France a study of harmonies.

If we turn to the internal elevation we shall find a marked difference between the French and the English treatment. The English cathedrals are low; the loftiest vaulted cathedral, Salisbury, is 85 ft. high. They sink downward till 74 ft. is reached in Lincoln choir, and 70 ft. in Exeter. This conditions the English elevation. For an effective interior the piers and pier arches must be lofty. But where the vaults are low there is no room for lofty piers and arches. The piers have to be short and squat, as at Wells and Lichfield. What a change to turn from these to the acute, soaring arches of Amiens, Clermont, and Narbonne! Both in France and England the internal elevation usually consists of three members, the pier arcade, triforium, and clearstory. The French disposition of these—which is seen at Westminster and Beverley—is to give half the height to the pier arcade and of the other half to assign one-third to the triforium and two-thirds to the clearstory. Some such proportions prevail almost everywhere in France. In England the proportions are seldom good. The clearstory, as a rule, is too low and the triforium too lofty.

The greatest difference, however, as regards proportion is the relation of height to span. With us, except at Westminster, Norwich, and Beverley, the height is usually only about twice the span. In France, though the central aisles are much wider than our own, they are usually three times as high as they are broad. It is beyond question that in the matter of proportion English Gothic erred; and proportion, as some one has said, is the life-blood of architecture.

As I have said, we were often inclined to sacrifice the clearstory to the triforium. The fact is, there was in England a very genuine love for the triforium, and a great and well-founded belief in its capacities for artistic development. The French, I think, at no time set much store by it. In great churches, such as Chartres, Limoges, and the choir of Auxerre, the triforium is of a very simple character. Our rich triforia, such as those of Chichester retro-choir, Lichfield, Lincoln, Salisbury, Worcester, Westminster, Beverley, and York, are the exception in France. The elaborate triforium of Séez is one of the proofs of the presence of English influence in the design of that beautiful little cathedral; and when it does occur it is seldom a blind story proper. As a rule, as in Amiens nave, it is blocked up behind by a solid wall. In this way the Frenchman deliberately gets rid of the pits of shadow and gloom which lie at the back of the arcades of such an open triforium as that of Lincoln presbytery. Frequently, after the middle of the thirteenth century he lowers the aisle roofs and glazes his triforium, as in Amiens choir, Clermont-Ferrand, and St. Ouen, Rouen. But this is no gain. The clearstory at Clermont-Ferrand is quite tall enough without having a triforium added to it. One instinctively desiderates a three-story elevation; the Frenchman has reduced it to an elevation of two stories. In twelfth-century Gothic an elevation of four stories had not been uncommon. It is seen at Laon, Soissons, and Noyon, and survives in part in Paris. It is seen in transition in Rouen Cathedral and in the fine Church of Eu. The extra story is gained by vaulting the aisle in two stories instead of one. The additional story has the effect of increasing the apparent height of the church. The objection to it was that it curtailed the pier arcade and clearstory.

Looking east or west, unity is the mark of the French design. The French cathedral is a house at one with itself. This is largely due to the absence of a central tower and of the obstructive piers on which such a tower rests. Our exteriors owe much to the central towers; our interiors are ruined by them. Canterbury nave and choir are as much disconnected as if they were in separate counties; it is not one but two Canterbury Cathedrals. It is rarely so in Northern France, except in Normandy and Burgundy. The beautiful church of Sémur is constricted into a mere tunnel, in order to allow of a stone central spire. At Bourges, at Bazas, and Nevers even the transept was omitted; at Albi the aisles were omitted as well. Nothing was allowed to stop the uninterrupted flow of the main lines of the church from west to east.

In plan the French cathedral attaches more closely to the type of Hereford, Exeter, Winchester, Salisbury, and Wells than to the simple parallelograms of Lincoln and York. It is indeed from the east end of Wells only that we can form any conception of the mysterious, intricate, everchanging vistas and perspectives which fascinate one in a French chevet. The eastern glass walls of Lincoln and York are plain prose indeed to the poetry of the eastern endings of the French cathedrals. And when it is remembered that some of the French cathedrals have double aisles to their nave, and that nearly all have their aisles flanked by continuous chapels, it will be seen that there is a romance about the progress up a French cathedral from portal to altar which is here unknown. If, however, we have not the seven chapels of the chevet of Amiens, the eleven of Orléans, the seven of Le Mans, we have by compensation the eastern transept—a most picturesque substitute. And while we are speaking of transepts it is worth noting that the English transept has usually an aisle on the eastern side only, on which side alone altared chapels were practicable. Beverley and Salisbury are examples. Even in religious art the Englishman was ever practical and economical. I do not recollect these lopsided transepts in France.

As regards detail, I think we may say that the Englishman sometimes bestowed on his detail a loving care which is not always found on the other side of the Channel. The Frenchman's mouldings are few and bold. The outline of the pier arches is not marked, as with us, by an emphatic hood-mould. His piers, on plan, are simple in comparison with those of Wells, Lichfield, and Exeter. But the Englishman, as soon as he had begun to learn the new lesson of Gothic, burst at once into an intricacy of delicate, refined mouldings such as the Frenchmen never dreamed of. Take a first-class example from either country—the cloister of Mt. St. Michel and the Beverley staircase—and you will see the difference. In statuary our case is hopeless. I can show you nothing to compare with the statue of the Virgin in the group of the Annunciation, which stands in the central doorway of the façade of Rheims. In foliated capitals nothing, perhaps, was ever done so good as the twelfth-century capitals of Sens, Laon, Soissons—truly architectural in treatment. In later days marvels of foliage were produced—conventional foliage of the highest beauty at Wells and Lichfield; naturalistic work in the Chapter House of Southwell. With the latter we may compare the fine capitals of Notre Dame, Cluny, and the superb example from the nave of Rheims. Honours may be said to be divided.

'It is not so above.' Look at the vault. What a poor, thin, ineffective culmination and climax for the riches below! Think of the vaults of the naves of Lincoln and Lichfield, of Norwich, Tewkesbury, and Winchester, and, above all, of that of Exeter, fastening down and tying the whole building together, like the banded lid of some ancient strong-box. Particularly lamentable is the absence in France of the longitudinal ridge-rib; more than anything else this binds together a cathedral's disconnected bays and enforces unity. Examples of it do occur, e.g., at Souvigny and St. Riquier, but they are rare. The reason, I think, is not far to seek. The French, to lessen the thrusts, always inclined to build their vaults domical. Introduce a ridge-rib and it will be found to wabble up and down in a most distressful manner, as, indeed, it does in the great transept of Lincoln and in Southwell choir. Only at the very end, when it was too late, did the French repent, as at Abbeville and St. Riquier, of their failure to develop the vault.

And so we get back to our normal attitude of complacency. We do not get the 'grand Nature' in our English cathedrals. They are human and lovable; foreign travel does not spoil one for them; one ever comes back to the sweet loveliness of Lichfield and Wells and Exeter with renewed delight. Amiens, Clermont, Narbonne are something more than human; it is awe, admiration, almost terror they excite; they seem superhuman; not built for mortal men by mortal men. There is nothing overwhelming or overpowering in the

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ancient churches any more than in the scenery of England; it is a little country, a peaceful, restful country; no Alps;

> 'No grand Nature;
> All the fields
> Are tied up fast with hedges, nosegay-like;
> The hills are crumpled plains; the plains pastures;
> And if you seek for any wilderness,
> You find at best a park.'

The English cathedrals were made for England.'

The Chairman said they were very much indebted to Mr. Bond for his extremely interesting paper, which had been prepared and read under trying circumstances. Mr. Bond had been very unwell for some time past, but he had made a great effort to fulfil his engagement, and they were very much obliged to him.

Mr. E. S. Prior said that Mr. Bond had shown an acquaintance with both English and French Cathedrals, which all of them must envy. Moreover, he had treated the subject of the great churches of both countries with a sympathy and kindliness which made criticism almost misplaced. Mr. Bond deserved to have converted them to his views, but as no doubt he expected them to be not quite persuaded, he (the speaker), as a bit of a heretic, would raise a point or two. Mr. Bond had been very happy in not defining English and French cathedrals, but offering them in one lot, as it were, without prejudice. The view had been—he would not say superficial, but photographic, in that Mr. Bond had let his hearers apply their mental camera to what were only superficially cathedrals. The definition had been "let cathedral equal large church," and while he (the speaker) would not quarrel with that definition, he thought it was carried too far when the lecturer spoke of the "Archiepiscopal plan" of Cluny Abbey. As a matter of fact, the plan of Cluny was distinctly monastic. Mr. Bond had said that "cathedrals like Gloucester or Bristol" were served by Benedictine monks or by Augustinian canons. But that was an error, for both monks and canons had gone from Gloucester and Bristol when the buildings became cathedrals. They might call this a small matter, but when it came to a comparison between French and English cathedrals, Mr. Bond made the point that in view of the French façades the poorness of the western termination of English cathedrals was shown in such cathedrals as Winchester, Norwich, Worcester, Chester, and Gloucester. Now, the last two were not cathedrals, and the others were primarily monks' churches. The monks had the chief hand in building them, and being parts of conventaul buildings, they could not be put upon the same plane as French cathedrals, which were built as entities and not as part of monastic establishments. The French cathedral was the Bishop's seat in an established town—the crown of its honour—and got its impetus of building from civic traditions and communistic aspirations. There could be no real comparison between the English and French cathedrals which did not take note of the peculiar fact that half of the English cathedrals were not this, but originally monastic churches. So, in claiming superiority for the west end of the French cathedrals, comparison should have been with the really secular churches of England, such as Hereford, Wells, Salisbury, Lincoln, Lichfield, Exeter, York, in all of which evidence or the existence of a western façade would be found. Mr. Bond's argument fell away when it is seen that the secular cathedrals of England had their western façades in their degree not inferior to the French. It was the monastic church builders who in certain cases did not think of the western front, since their church was part of a conventual building. Perhaps he was doing Mr. Bond an injustice in thinking that he had a prejudice against Wells Cathedral. The front of Wells was wider than any continental façade except Rouen, and there was also this to be said, viz, that those great cavernous porches in the French buildings, which were magnificent in themselves, were rather dark for the display of sculpture, and in the English climate that drawback would be still further emphasised. At Wells this had been avoided, and the cathedral front nobly fulfilled its purpose of sculpture presentation, and, moreover, it had the "grand nature" in building. True, Professor Freeman had called it a towel-horse, but then Ruskin had called King's College Chapel a cradle! What little things great men could say! Mr. Bond was still more abusive to poor Wells, for had not he likened its proud front, with its array of storied imagery, to a modern architect's reredos? As to the title French, Mr. Bond had again taken a wide definition. At the time the French cathedrals were building, they were built in a comparatively limited area, viz., the Ile de France, though there were a few outside that area. But with those exceptions it was just as logical to speak of cathedrals like Poitiers, Bordeaux, and Albi as French as it would be to call Spanish, German, and Italian churches French because the dominion of France at one time extended all over those countries. Still, he agreed that there was a great extension of the true French style after the year 1250, that, however, not only in the neighbouring districts of France, but widely in other countries too—in Spain, Germany, Sweden, and some said Cyprus. But could Mr. Bond explain how this was managed?—by what means there came sudden wide diffusion of the French style, copies of Amiens which Mr. Bond had indicated as rather deadly dull? He (the speaker) had his theory, which was that it came by the architect, who just at that time appeared—the man who designed drawings capable of conveyance for the purpose of copying style. When the designer of drawings appeared then architecture languished. As to figure sculpture, Mr. Bond had dealt with our English work also in a photographic way. It was quite true that if, remembering what one had seen in France, one went to Lichfield, Winchester, Canterbury, and Salisbury, one might be ready to admit that the case of English sculpture was "hopeless;" but it was unfair to the thirteenth-century sculptors that they should be charged with the foolish things put into our cathedrals by nineteenth-century "restorers." It should be remembered that there were to be seen fragments of real and beautiful thirteenth-century figure sculpture, *e.g.*, at Wells, at Lincoln, and until recently at Oxford; and proof of the existence of excellent figure sculpture work was to be seen in the Eleanor Bronzes, Westminster Abbey. Could it be said, with such fragments before them, that the case of English thirteenth-century sculpture was hopeless? In his opinion the answer was an emphatic No. He very much enjoyed Mr. Bond's remarks about the really great French Gothic churches, and of such magnificent works as Chartres and Notre Dame; Mr. Bond put it extremely well when he said that they convicted us of man's insignificance and man's greatness. But was that "grand nature" of building to be found solely and entirely in France? Was there none of it in England? He had been in Durham Cathedral, and in the nave of that building he thought the noble nature of building was as magnificently displayed as it was anywhere this side of Egypt. The transept of Hexham Abbey, now unfortunately in the hands of restorers—could they say that in this was no grand nature of building? And in many Yorkshire façades, which had been mentioned, or partly mentioned, by Mr. Bond, such as Guisborough, Ripon, and Selby, that grand nature of building was to be found. It was not only a matter of scale; it was displayed in those comparatively small works. They were gods that built so, yet were they only workmen!

Mr. Hugh Stannus, in proposing a vote of thanks, said he was entirely at one with Mr. Prior as to the greatness of the nave of Durham Cathedral, but he gathered that Mr. Bond was dealing with Gothic and not Romanesque, and therefore presumably he did not touch on Durham with the fulness he would have done had he been dealing with Romanesque work.

Mr. Alexander Wood seconded the vote of thanks, and said he would like to refer to the really very interesting contrast between the square ends of cathedrals in this country and the apsidal terminations in France. There were exceptions, of course, and in this country there were Romanesque apses just as there were in Normandy; but in the Early English period in this country we got almost universally the apse cut off and a square end instead. No doubt, as Mr. Bond had said, the apse was a most artistic feature of French churches. The builders in this country undoubtedly had the idea of an apsidal termination in their minds. At Durham the Chapter House had been very much altered, but there was an oblong chapter-house which once terminated in an apse, and at Worcester there was the circular chapter-house. In this country our churches were mostly monastic, and we had abbey-churches of equal importance to the cathedrals, as at Bury St. Edmunds, St. Albans, and others, which were outside the cathedral limits.

Mr. Arthur S. Flower said that, with reference to the supposed inferiority of English doorways, he should like to hear more on the question of why English people seemed to have got a preference for lateral entrances rather than for what might be called axial entrances. The prejudice, or feeling, or whatever it was, seemed to extend all through our parish churches, as well as our cathedrals and abbey churches. Whatever doors there were, the south or north door was usually the most important one. He had heard the idea expressed that it was a Teutonic racial peculiarity to enter by the side of the building and not by the west end, and that the western entrance was a Keltic arrangement, and was favoured by the Normans, but was dropped out—just as the apse was brought in for a time and was dropped out again. But there was a good deal we did not understand as to the reason why side entrances were more important in English and German churches than in French ones.

The Chairman, in putting the vote of thanks to the meeting, said it was a remarkable feat that in the course of an hour they should have had such an able comparison between English and French churches so fully and so beautifully illustrated. The Association had recently had presented to it a beautiful set of exterior and interior views of English cathedrals, and it would be of immense advantage to students if they could get a similar set of French churches. He should like to emphasise Mr. Bond's remarks about Albi Cathedral. There was an extraordinary originality about that wonderful brick building, and its magnificent screen so full of Spanish feeling. Any student who had an opportunity should not fail to visit that building as well as Limoges and Abbeville. He was interested in Mr. Bond's remarks about the independence of character shown in our English cathedrals. That national characteristic was as prominent to-day, and perhaps they had a little too much of it. Mr. Bond had referred to two other characteristics of English work, viz., an absence of a sense of proportion and a want of logic. As to logic, he (the speaker) was rather glad if our want of it had resulted in the production of such beautiful interiors and mouldings as English cathedrals exhibited. English taste, as expressed in the richness of detail and in our mouldings, was a point in which English cathedrals certainly scored. Mr. Bond referred to the relative proportions of the nave, arcade, triforium, and clearstory in French and English cathedrals in disparagement of the latter, but he (the speaker) was so thoroughly English as to think that the proportions between these parts of some of our cathedrals were better than those of France. It was quite true that the French buildings showed a sublimity and dignity which could only be attained by height, though in regard to proportion of the parts he thought the English buildings superior. Mr. Bond's criticism of the triforium was very just; we lost somewhat in the extreme contrast between the triforia and clearstories to be seen in some of our cathedrals. The deep, cavernous, and richly-moulded triforia were a painful contrast to the light clearstory above, as in Lincoln, for instance. Most people would agree that screens across a church, if not too obstructive, did lend distance to an interior; it was like a beautiful hill in the middle distance in a landscape, but if carried too far it obstructed the vista and quite defeated the object in view. In the vote of thanks he felt they should include Mr. Osborne Smith for so kindly and ably working the lantern that night.

The vote of thanks having been heartily agreed to,

Mr. Prior, on the invitation of Mr. Bond, made some additional remarks as to side porches in English churches. He said that it was largely due to the tradition of the Saxon church. The Saxon church was a chamber church, with projections or porches from the side as well as from the west end. But these porches were not only traditional in plan; they were necessary for the services and legalities of village life, and so they appeared in our monastic churches because the naves of many were parish churches. Again, the English climate was more inclement than the French, and when westerly gales were blow-

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ing, the north or south would be more sheltered than the west, and so side entrances had in this country a practical purpose. Since in our monastic cathedrals there were ceremonies connected with the west end, it might often have been due to the inclemency of the English spring that a porch was put on the south side, as at Canterbury and Sherborne, in order to get away from the elements. A curious document existed which bore out that view. A dedication ceremony took place at Durham and the monks got wet; shortly afterwards the Galilee was put up as a shelter.

Mr. Bond said he desired to express his thanks to Mr. Osborne Smith for the manner in which he had worked the lantern that evening. On the subject of proportion he had not given sufficient heed to his words in saying that it was a matter of taste. Mr. Aston Webb recently quoted to the Association School of Design the late Mr. Pearson's remarks as to churches, mentioned in the Life of the late Archbishop Benson. The architect said that when one went into a church one should ask oneself not "Is it grand, is it magnificent, is it splendidly built?" but "Does it send you on your knees?" Our low English cathedrals did not produce that same overwhelming impression, nor did they embody the same worship as the French buildings with their great height, and on that ground he thought the French cathedrals were superior. It was quite true, as Mr. Prior had said, that he had not confined himself to cathedrals; where he could better illustrate his views he had gone to collegiate churches. Mr. Prior had decidedly made a point in saying that he (the speaker) should, in a strict comparison, have properly excluded all the monastic cathedrals of England, viz., that he should have contrasted with the French cathedrals which were secular the English cathedrals which were secular. It was not the Gothic cathedrals abroad that made the best impression on one; not even Amiens did. From more than one point of view Gothic was a decadence from Romanesque. As to transepts, they were added to provide more chapel room, but there was another reason, viz., the mania that existed for central towers. As to the square termination of our cathedrals, he had read Mr. Prior's book, and the question of the square east end was one of the points upon which he disagreed with the author. The square east end was said to be due to the Kentish missionaries, as all their churches had square ends. In Anglo-Saxon times there was the apse, but the Anglo-Saxon east end was square, and it might be taken as a survival of Saxon tradition. The tradition of the Western world was against the square end, and the apse for a time became almost universal. Then came in that band of Christian missionaries, the Cistercians who, coming with a tradition from Egypt of square east ends, revived what had been the practice in Anglo-Saxon times. The whole matter was extremely problematical. As to the origin of chapterhouses, Mr. Wood had given an interesting theory. Another theory equally ill-substantiated was that it was derived from the ancient baptistry, which in the early Christian church was almost universally circular. As to lateral porches, Mr. Prior seemed to think they were to shelter people from the weather, but, as he had pointed out in the paper, the porches were mostly on the north side, whereas if one wanted to put them on the lee side they would be on the south. On the average they were on the north side, and the reason for that, in his opinion, was that the village or town was more often on the north side. He agreed with Mr. Prior's other reasons, for, no doubt, these big porches were used for purposes of ritual, which were half-religious and half-secular—marriage and the payment of tithes, for instance. It was in some difference between mediæval English ritual and that prevailing abroad that one must seek for the origin of our great southern porches and our small western ones.

The Chairman announced that the next meeting would be held on November 9, when a paper would be read by Mr. L. L. Macassey on the "Legal Position of the Architect."

The meeting then terminated.

TECHNICAL INSTITUTE AND MUSEUM, WEST HAM.—The Technical Institute and Free Library at West Ham, which was destroyed by fire in October last year, was opened after re-construction on the 18th ult. A museum in connexion with the Essex Field Club, and which has been built adjoining the Technical Institute, was opened on the same day. The architect was Mr. S. B. Russell.

THE ARCHITECTURAL ASSOCIATION CONVERSAZIONE.*

THE Annual Conversazione took place on Friday, October 19, at the King's Hall, Holborn. The members and guests were received by the President and Mrs. Seth-Smith.

The exhibitions of the allied trades were not so numerous as on some of the previous occasions, but on the other hand, entertainments both learned and light were given on a larger scale.

The students' prize drawings of the past session were on view; these only represented the drawings placed in the various divisions, the studentship, and the classes of design, but they formed a goodly number, and, taken with the water-colour class studies, it may be assumed that the total amount of work completed by the students working in the Association is considerable, and speaks well for the success of all the departments of study. Exhibits of textile fabrics were shown by Mr. Alfred Stalman, among which were many interesting productions by the Canterbury weavers.

Mr. F. E. E. Schenck who, on a previous occasion, exhibited modelling for Mr. H. T. Hare's buildings, was represented by two circular plaques representing "Ironwork" and "Agriculture" for the Stafford Municipal Buildings, and six figure sketches for the Oxford Town Hall.

Mr. L. A. Shuffrey, generally associated with interior decorations, showed some new wall-paper designs.

A display of various tiles and pottery by Messrs. De Morgan introduced a bright piece of colouring at the end of the hall.

Mr. Nathaniel Hitch, the carver of many well-known church fittings, exhibited photographs of some of his executed work.

A collection of framed photographs, principally of old work, kindly sent by Messrs. S. B. Bolas & Co., formed a welcome addition to the decoration of the hall.

An interesting case of specimens of bookbinding by the students of the London County Council Central School of Arts and Crafts was much appreciated.

A *conversazione* is never complete without photographs taken by their own members, and in this respect the Architectural Association Camera Club had on view some good views principally taken during the last excursion.

During the evening Mr. Richard Kerr, assisted by Miss Kerr, gave demonstrations of wireless telegraphy and X rays, and at intervals they also performed Nikola Teslas's high voltage experiments. The lighter part of the entertainment was provided by the "Follies" Pierrot singers under the direction of Mr. H. G. Pelissier. The incidental music was given by the Bijou orchestra. The Conversazione was, as usual, very largely attended.

* Unavoidably postponed from last week.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council took place on Tuesday afternoon in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loans.—The Finance Committee recommended and it was agreed to lend Bermondsey Vestry 21,000*l.* for dust destructor and electric light installation; the Bethnal Green Vestry 8,750*l.* for paving works; the Clerkenwell Vestry 4,270*l.* for paving works; the Plumstead Vestry 650*l.* for the purchase of a site for a storeyard; the Poplar District Board 25,000*l.* for electric light installation and 640*l.* for the erection of a boundary wall; the St. George-the-Martyr, Southwark, Vestry 1,710*l.* for sewer works; the Hackney Vestry 3,980*l.* for baths and washhouses; the Holborn Guardians 3,370*l.* for alterations to laundry and provision of machinery, &c.

Clerk of the Council.—The General Purposes Committee reported that eighty applications were received for the office of Clerk to the Council, vacant by the resignation of Mr. Stewart. The committee recommended the appointment of Mr. Gomme, at present the head of the Statistical Department of the Council, to be the new Clerk.

The recommendation was adopted.

Tramways.—It was agreed "that the Council do make application, in the next Session of Parliament, for powers for the construction of tramways for electrical traction, between the present terminus of the London County Council tramways at High-street, Tooting, to the county boundary at Waterfall Bridge."

Battersea Bridge Buildings.—The Housing of the Working Classes Committee recommended, and it was agreed, that the estimate of 15,900*l.* submitted by the Finance Committee in respect of the erection of Battersea Bridge buildings be approved; that the work be executed by the Council without the intervention of a contractor; and that the plans, specification, bills of quantities, and estimate of 14,720*l.* be referred to the Manager of Works for that purpose.

Winter Garden at the London Hippodrome.—It was recommended by the Theatres and Music Halls Committee that the Council inform Mr. F. Matcham that they had no objection to the utilisation of a piece of ground at the side of the London Hippodrome for the purpose of a small winter garden.

Mr. M'Dougall moved that the recommendation be referred back. He said he did not quite know what a winter garden was, but he thought it was distinctly against the regulations of the Council that any premises should be licensed which did not have a direct view of the stage.

Mr. Purchese seconded the reference back.

The amendment was defeated, and the recommendation carried.

Mare-street, Hackney, Improvement.—The Improvements Committee recommended, and it was agreed, that in connection with the provision of accommodation for persons of the labouring class to be displaced by the Mare-street, Hackney, improvement, the Council do acquire for 2,350*l.* the site in London Fields, Hackney.

Metropolitan Sewers and Drains Bill.—The Parliamentary Committee reported as follows, the recommendation being agreed to.

"The object of this Bill was to amend the definition of the word *drain* in the Metropolis Local Management Acts, with a view to casting upon property owners the liability, which has been held to fall now on local authorities, of maintaining and repairing certain conduits constructed or altered without the sanction of the local authority or the late metropolitan commissioners of sewers to take the drainage of more than one building. The matter, which affects the local authorities and not the Council, was originally brought up to the Council on February 12, 1895, on representations made by such authorities. There appears to be considerable opposition to the Bill in Parliament, and, without troubling the Council in detail with the various efforts we have made, without success, during five sessions of Parliament, to carry out the wishes of the local authorities, we have to say that we feel unable to recommend the Council to take any further action. It will, of course, be open to the new borough councils, should they so desire, to themselves promote such a Bill, which, as we have said, deals entirely with matters of local concern. We, accordingly, recommend—That the local authorities be informed that the Council does not propose to take any further action with regard to the Metropolitan Sewers and Drains Bill."

Holborn to Strand.—Architectural Features.—On the reception of the report by the Improvements Committee, Mr. Leon asked if it was possible to have small clay models of the different elevations of the buildings to be erected fronting on the Strand and on the Crescent-road.

Dr. Longstaff: I will make the suggestion to the Committee.

Theatres, &c.—On the recommendation of the Theatres and Music-halls Committee the following applications were agreed to on certain conditions:—

Cinematograph-house proposed to be erected on the concrete flat outside the back wall of the stage at the Alhambra Palace (Mr. J. G. Buckle for the Directors).

Heating the New Grand Hall, Clapham Junction (Messrs. Hancock & Dykes for Mr. E. Munt).

Imperial Hall, Grovevale, Goose Green, East Dulwich (Mr. J. W. Brooker for the Hall Finance Syndicate, Limited).

Bar, Morton's Theatre, Greenwich (Mr. A. Roberts for Mr. A. Carlton).

Parish Hall, Sewardstone-road, Bethnal Green (Mr. E. Hoole for the Rev. J. E. Watts).

Application under the 1894 Building Act.—The Building Act Committee recommended and it was agreed, that the Council, in the exercise of its powers under Sections 13, 22, and 41 of the London Building Act, 1894, do not consent to the erection of a block of residential flats on the south-west side of Park-walk, Chelsea, at the corner of Chapel-street,

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to the lines, and with the open space at the rear, as shown on the plans submitted with the application of Mr. C. W. Stephens.

The Council, having transacted other business, adjourned.

Illustrations.

EASTERN TELEGRAPH COMPANY'S OFFICES: PORTION OF FAÇADE.

WE have already published the complete elevation of this building; we now give the enlarged drawing of a portion of the façade, which forms a kind of detail elevation.

The archway will be filled with a bronze and glass screen and doors. The figures in the spandrels are intended to represent electricity in connexion with telegraphy. The figures above the first floor represent the East and other countries.

The drawing, which was exhibited at the Royal Academy this year, is to be regarded as a preliminary study, and the design has since been revised and remodelled.

Mr. John Belcher, A.R.A., is the architect.

FRONT No. 59, BATH-STREET, GLASGOW.

THIS design forms the front of a house in Glasgow, and the drawing was exhibited at the last Royal Academy. It is a fine effective design in the upper portion, the only defect of which is that it seems to require a rather more powerful and massive treatment in the ground story, to form a base for the upper part of the design.

The architect is Mr. T. L. Watson of Glasgow, who informs us that he duly addressed to us, in response to our usual request to the architects of buildings about to be illustrated in our pages, a plan and description of the building; but up to the time of going to press these have not come to hand, probably owing to some of that irregularity or carelessness in the London Post Office which has caused so much comment during the last few months. We regret that the loss of his communication should have prevented his design appearing with the advantage of his own description and the addition of a plan.

ST. JOHN BAPTIST'S CHURCH, SAN REMO.

THE rebuilding of St. John Baptist's Church, San Remo, is now in progress, the former church having been destroyed by fire last year. The new church is being erected on a site, the position of which is considered more suitable than the old one. Heating chamber and mortuary are provided in the basement. The work has been let to local contractors, Messrs. Sappia & Vernassa, and local materials will as far as possible be used. The stone for the dressings is blue, from Bordighera, and Millesimo stone, and the walling of mixed blue and brown coursed wallstone. The roofs will be covered with tiles of the district of approved colour, and the tower roof with English north-country green slates.

The ceilings will be wagon shaped, boarded with moulded ribs. The floors, generally, will be of wood blocks, but the chancel floor, steps, and screen walls, will be of marble.

The glazing will be with lead lights of English manufacture. The plan of the building is arranged with a nave and chancel of equal width, north and south aisles, with vestry in the south. The organ loft is in the tower, but the organist will sit with the choir. The principal entrance is by the south porch, but there are three others, one of which is specially arranged for admitting invalids in bath chairs. It is intended to use local chestnut-wood for panelling the walls, screens, and other internal finishings.

The works are being carried out from the designs and under the direction of Mr. R. Knill Freeman, architect, of Manchester and Bolton, and Signor Gastaldi, of San Remo, has been appointed local superintendent of work.

The church will provide accommodation for about 275 people, and the plan is arranged with a view to future extension.

It is hoped that with favourable circumstances the new church may be ready for use next Easter.

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—A general meeting of the members took place at the Grosvenor Hotel on Tuesday evening, the 23rd ult., the President, Mr. Fred. Batchelor, being in the chair. Mr. R. M. Butler proposed, and Mr. T. Coleman seconded, the following resolution, which was unanimously adopted:—"That we, the members of the Architectural Association of Ireland, offer our sincere congratulations to Sir Thomas Drew on his election to the Presidential chair of the Royal Hibernian Academy. We recognise that in this appointment the architectural profession in Ireland has received a high honour, and we wish the Royal Hibernian Academy much prosperity under its new President." Mr. R. M. Butler then read a paper descriptive of "Architectural Association Excursions," in which he gave instructive accounts of the architectural features met with on the annual excursions both of the Irish and English Architectural Associations, interspersed with anecdotes of the mishaps and fortunes of the participants in the excursions. Mr. Walter Doolin, in proposing a vote of thanks to the lecturer, gave an account of the 1872 excursion of the London Association, in which he joined. Mr. Hudinan seconded the vote of thanks, and Messrs. Coleman, Allberry, Lynes, and Bradbury joined in the discussion which followed. A good collection of lantern slides illustrative of the paper was displayed by Mr. T. E. Hudinan.

BRITISH SCHOOL AT ATHENS.

THE annual meeting of the British School at Athens was held on Tuesday afternoon at the rooms of the Society of Antiquaries, the Right Hon. H. H. Asquith, M.P., in the chair.

The Hon. Secretary, Mr. G. A. Macmillan, read the Report of the Managing Committee, from which we extract the following passages:—

"Although the number of students has been less than in some previous years, the work of the School under the direction in Crete of the Director of the School, Mr. Hogarth, and in Athens of the Assistant-Director, Mr. Bosanquet (who, as mentioned in last year's Report, was appointed to take charge of the School in Athens while the Director was absent in Crete), has been profitably carried on. There were six students in all. Of these, Mr. J. C. Lawson, now Fellow of Pembroke College, Cambridge, came out for a second session as Craven Student; and Mr. F. B. Welch, of Magdalen College, Oxford, came out for a second session as Craven Fellow. The four new students were Mr. J. H. Hopkinson, of University College, Oxford, who came out with the Craven Fellowship; Mr. S. C. Kaines-Smith, of Magdalene College, Cambridge, who held the Cambridge Studentship offered by the Managing Committee; Miss O. C. Kohler, of Girton College, Cambridge; and Mr. D. Theodore Fyfe, who was appointed by the Committee to the Architectural Studentship.

Mr. Lawson continued to devote his attention to the folk-lore and traditional beliefs of the Greek people. . . . Mr. Welch, after completing in Athens his work on the minor antiquities found at Phylakopi, went in February to Crete with Mr. Arthur Evans, worked in the Museum at Candia, and travelled in the interior. Later, he was called to Palestine to report on the Ægean pottery found in the excavations of the Palestine Exploration Fund, and practically established the fact that not only Cypriote, but genuine Mycenæan vases were freely imported by the cities of the Philistine seaboard. In May Mr. Welch returned to Crete and watched the latter part of Mr. Hogarth's and Mr. Evans' excavations.

Mr. Hopkinson devoted his attention mainly to the history of vase-painting, but from February onwards took opportunities of travelling in the interior and in the islands.

Mr. Kaines-Smith and Miss Köhler worked chiefly in Athens, the latter attending the lectures of Dr. Dörpfeld and Dr. Wilhelm, while Mr. Kaines-Smith, after working at the relationship between certain types of engraved gems and the grave-stelæ, made various expeditions in Greece with members of the British and American schools.

Mr. Fyfe, who was appointed Architectural Student, has thoroughly justified the choice of the Committee by his admirable work in Crete, where he not only made the plans and surveys which lay within his special province, but also showed marked artistic talent in his water-colour drawings of the frescoes found by Mr. Evans.

The only excavations undertaken by the School this session were those in Crete, which were prospectively referred to in last year's report. Mr. Hogarth has worked with great success on the site of the town of Knôsos, and later in the cave at Psychro, which has been hitherto identified, as it now appears with reason, with the far-famed Dictæan Cave. At Knôsos, although a careful and systematic probing of the whole surface of the hill did not, as Mr. Hogarth anticipated, reveal the earliest cemeteries, yet the discoveries made were such as to justify amply the labour and expense of the undertaking. A series of primitive houses were found which contained masses of pre-Mycenæan and Mycenæan pottery. Many of the vases of the ware known as 'Kamaraes' were unique in shape and ornament, and represent a great advance on previous knowledge. Further evidence of the existence of Pillar worship in the period of Mycenæan culture was also forthcoming. Good Mycenæan painted vases and objects in bronze were found in some of the chambers, and later two unrifled graves in a cemetery of late Mycenæan and early Geometric period yielded many vases, as well as objects in gold, bronze, iron, and paste unlike anything previously found. The excavation of the Dictæan cave took place in May, and was rewarded by remarkable discoveries. Not only was there in the upper part of the cave abundant evidence of its sacrificial use, in the form of votive objects ranging from the late Kamaraes epoch to the later Geometric, but in the lowest depths of the cavern, where a subterranean pool extends among stalactite formations, the water-borne earth was found to be full of bronze statuettes, implements, weapons, gems, and articles of personal adornment, while even the natural niches in the stalactite formations were in many cases stocked with votive axes, blades, needles, and so forth. 'The frequent occurrence of the double Carian axe,' writes Mr. Hogarth, 'proves that we have here to do with the Cretan Zeus of the Labrys, and no question remains that in the Altar and Temenos, the votive niches, the 700 bronze objects, the multitude of vases (nearly 600 unused cups of one type alone were found), the libation-tables in stone, the implements in bone and iron, we have abundant evidence as to the cult practised in one of the earliest and most holy of Cretan sanctuaries.' A full preliminary account of these excavations will be published in the School Annual. The work will be continued in the coming session.

A passing reference must be made here to the brilliant discoveries made at the same time by Mr. Arthur Evans, working with the aid of the Cretan Exploration Fund, on another part of the site of Knôsos, where he was fortunate enough to light upon the remains of a great prehistoric palace which it does not seem fanciful to connect with the name of Minos. The most remarkable finds were a series of wall-paintings which are practically unique in the history of early Ægean art, and upwards of 1,000 inscribed tablets, in various forms of script, partly hieroglyphic and partly in signs of an alphabetic character, which form a most important addition to the seals previously found by Mr. Evans in other parts of the island, and cannot fail, when they have been properly studied, to throw welcome light upon the early history of writing. All friends of the British School must congratulate their distinguished associate, Mr. Evans, upon the results of his first season's work (in which he has been assisted by a former student, Mr. Duncan Mackenzie, as well as by the school architect, Mr. Fyfe), and express the hope that another season may prove as fruitful. . . .

The Committee is glad to be able to announce that the monograph on St. Luke's Monastery at Stiris, in Phocis, which represents the first instalment of the valuable studies on Byzantine Architecture in Greece made some years ago by two students of the School, Mr. R. W. Schultz and Mr. Sidney Barnsley, will shortly be published by Messrs. Macmillan & Co. Although the work has been unexpectedly delayed, it cannot be doubted that this volume, richly illustrated both with coloured plates and numerous sketches in black and white, will be welcome to all students of art and architecture. . . .

Mr. Hogarth, who was appointed Director of the School in 1897 for a period of three years, now retires from office, and the Committee take this opportunity of expressing their gratitude for the zeal and energy he has shown in fulfilling the duties of his office, particularly in the department of excavation, for which he was so well qualified by previous experience. He has completed the work at Phylakopi, in Melos, initiated by his predecessor, Mr. Cecil Smith; and has also conducted successful excavations on the site of Naucratis and, as has already been stated in this Report, on two sites in the island of Crete. In the hope that his valuable services may still be at the disposal of the School, he is to-day nominated as a member of the Committee.

Mr. R. Carr Bosanquet, a former student of the School, who has held the post of assistant director, with full charge of the work in Athens, during the past session, has now been appointed director. The Committee consider themselves most fortunate in having induced Mr. Bosanquet to accept an appointment, for which his thorough training in archæology, his long connexion with the School, and his zeal for its interests so eminently qualify him. They are confident that under his rule the School will not only maintain but improve its already high position among the foreign institutes in Athens.

The valued hon. secretary of the School, Mr. William Loring, who has done such splendid service since his appointment in 1897, informed the Committee early in January that he had volunteered for

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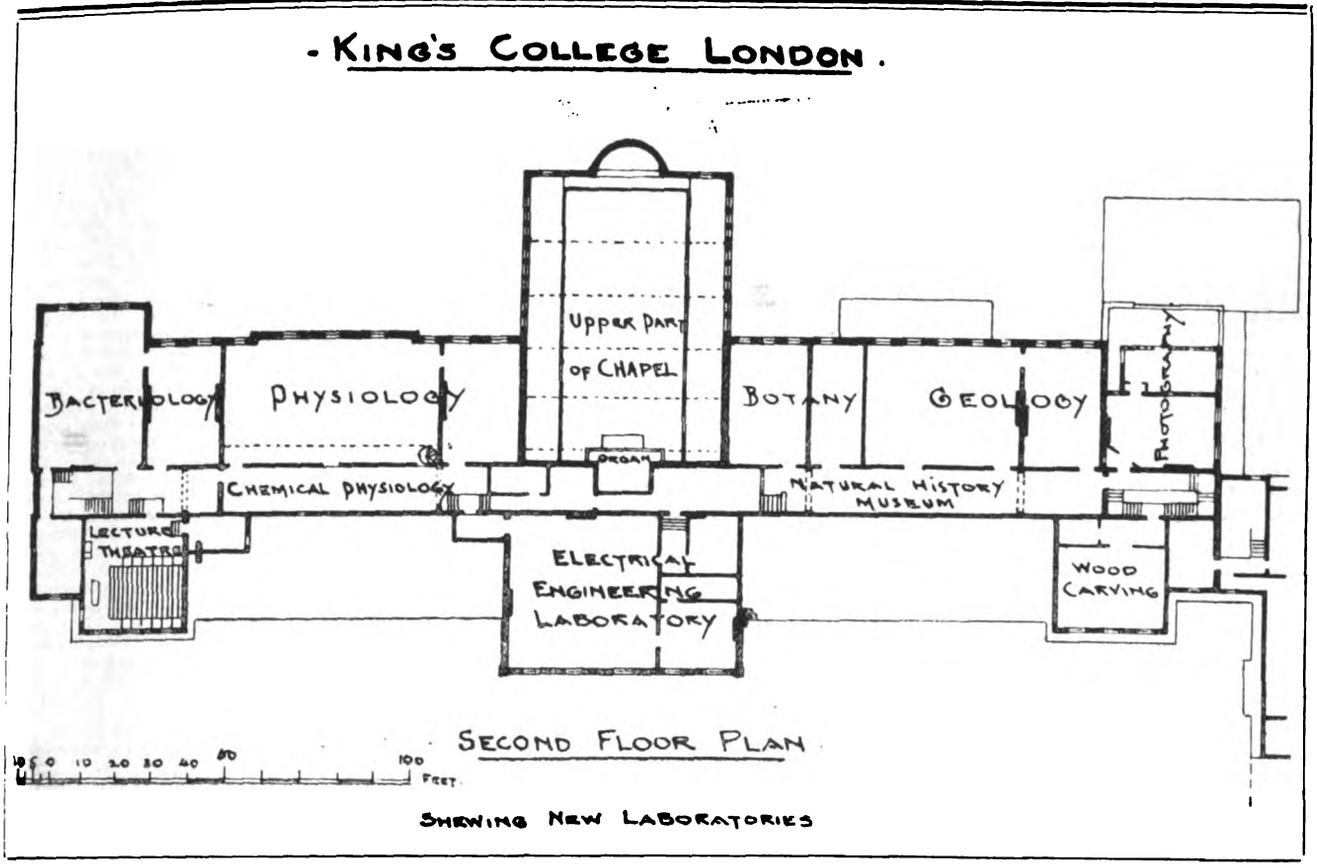

service in South Africa, and he soon afterwards left the country with one of the Scottish companies of Imperial Yeomanry. Fortunately the former hon. secretary, Mr. Macmillan, was able to resume his old post temporarily during Mr. Loring's absence, and it is hoped that at any rate before the end of the year Mr. Loring will be back in England and will again take up the work. His re-election as hon. secretary for the ensuing session is accordingly proposed to-day. . . .

In last year's Report reference was made to a project for establishing a British School at Rome. It had originally been intended to hold a public meeting in the autumn or spring and to make a joint appeal on behalf of both Schools. The occurrence of the South African war, however, and the large demands made upon public generosity both for War Funds and for the Indian Famine Fund, seemed to be so adverse to the probable success of such an appeal that it was decided to postpone it. Considerable progress, nevertheless, was made in drafting a scheme for the School at Rome, and an attempt was made privately to raise funds to enable it to be started this autumn on however small a scale, but the effort has met with only limited success. In spite of this discouragement a very competent director has been provisionally appointed in the person of Mr. Gordon Rushforth, of Oriel College, Oxford, who knows Rome thoroughly and has shown expert knowledge alike in the field of Latin epigraphy and of Italian art. Mr. Rushforth will probably go to Rome before Christmas, prepared to direct the studies of such students as may present themselves, and it is hoped that in the course of the next few months it may be found possible to raise, whether in the form of donations or of annual subscriptions, sufficient funds to give the experiment a fair trial. The matter is commended to the generous support of all friends of the School at Athens, the members of which would certainly derive no small advantage from the existence of a similar School in Rome."

The Report goes on to say that the Committee had experienced some anxiety as to the finances of the School, but they were glad to be able to state that the Government grant of 500*l.* a year had been renewed for five years longer. The Prince of Wales has continued an annual subscription of 25*l.*, and Dr. Ludwig Mond one of 100*l.* Some unforeseen expense has been occasioned by the necessity for entirely re-roofing the building of the School at Athens, in consequence of serious defects which have appeared recently. The Report concludes :—

"In conclusion, the Committee feel that they may congratulate subscribers both on the present position and future prospects of the school. In the fifteen years which have now elapsed since its foundation it has, in spite of difficulties and discouragements, steadily gained ground. The past year has brought with it an important and quite unforeseen accession to the library which forms so indispensable a part of its educational apparatus. This side of the school work will be steadily kept in view by the new director, who, in consultation with his predecessor, has already drafted some very valuable suggestions for the guidance of students both in preparing for and turning to the best account the time they may spend in Greece. In the field of excavation, which forms so useful an adjunct to the work done in museums or in the lecture-room, the results of the past session seem to promise discoveries in Crete which may even surpass in interest those already put to the School in Athens, in Cyprus, in Melos, and in Naucratis. The relations of the School with the other foreign institutes in Athens continue to be of the most cordial character. If only the financial support hitherto forthcoming both from public and private sources is well maintained, its friends may hope that in the new century upon which we are so soon to enter the British School at Athens may, with its sister School at Rome, before long achieve the position of a permanent national institution, to which its promoters have always looked forward with unfailing confidence."

The Chairman, in moving the adoption of the Report, commented on the great change in the point of view in scholarship from twenty or thirty years ago, when details of philology mainly occupied the minds of scholars, while in the present day far more attention was given to the possible results to be obtained from the right understanding of the remains of ancient buildings, pottery, ornaments, &c. Perhaps there had been a lack of the sense of proportion among both classes of scholars. But the zeal of successive directors, the skill and assiduity of explorers, and the continuous infusion of the best blood of each academic generation, were matters on which the British School at Athens had cause to congratulate itself.

Dr. R. L. Cust seconded the resolution, which was carried unanimously.

Mr. Hogarth, the retiring Director of the school, gave a short account of the session's labours, and spoke of the recent discoveries at Crete as having quite surpassed even the expectations he had held out last year. The most important result, however, which they might hope for from Crete, was that they could obtain from it some additional information as to the race of cultured people who unquestionably preceded the period of Hellenic culture — whence they developed and what became of them; for it was now an established belief that Hellenic culture was not preceded by barbarism, but by another culture belonging to an older race. It was too early to say that the question had been answered by Crete; but they had already much light. It remained now to find the early tombs, and clear the lower stratum of the palace at Knossos, and to learn more of the earliest Cretan race.

ADDITIONS TO KING'S COLLEGE, LONDON.

LORD LISTER visited King's College on Tuesday last, the 30th ult., and opened the new scientific laboratories, which form part of a comprehensive scheme of extension and improvement in the teaching accommodation of the college, resolved upon last year by the council. The architectural, biological, anatomical, and mechanical departments have all benefited by the new works. An additional floor has been placed in the south wing on which the geological, comparative anatomy and botanical departments are situated. The second story of the north wing, comprising the physiological and bacteriological departments, has been reconstructed and many other improvements effected.

The rooms recently provided for the architectural department include a large room about 60 ft. by 30 ft., used both for lectures and for instruction in drawing. It is provided with accommodation on the ground floor enabling forty students to draw, or sixty to attend lectures, and there is further drawing accommodation in the gallery for twenty more students. The alteration has not improved the lighting of the large room, for whereas it was, we are informed, originally lighted from the roof, the roof has now disappeared, and the whole of the architectural department is built over. It has been relighted at the side, however, by the insertion of large windows, and it is lighted also by electric light, whilst a powerful electric lantern is provided for lecturing purposes. The scheme includes the lining of the ground floor with cases containing specimens of building materials, models of structures and joints, together with diagrams and drawings. A small library-room and a room for the professor are attached. The studio, which is entered from the gallery level of the large lecture-room, is designed to provide, with some seats in the gallery, accommodation for about fourteen students. It is furnished with a collection of casts of architectural interest, and on the opposite side of the lecture-room there is a small room available either as lecture-room or studio.

The additional story in the south wing, providing accommodation for the geological, &c., departments, is very well lighted. The general geological laboratory and lecture-room provides room for fifty students. Arrangements are made for the exhibition of slides by the aid of an electric lantern. Attached to this department is a research laboratory, which is fitted up with tables, benches, &c., in a manner similar to the large laboratory. The new botanical laboratories consist of two rooms—the general laboratory for elementary work, and the research laboratory for advanced work and private research The larger laboratory provides table accommodation for twenty-four students, and the smaller for twelve students. Along both sides of a corridor outside the botanical and geological departments a small museum of natural history has been formed. On the same floor the departments of physiology and bacteriology are situated; these are not altogether new, but they have been entirely remodelled, resulting in the establishment of another physiological

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laboratory. In the physics department a new dark room has been constructed, and a room set apart for magnetic work.

The additions to the building have cost about 10,000*l.*; but together with the apparatus, fittings, &c., an expenditure of 20,000*l.* is estimated. The architects are Messrs. Banister Fletcher & Sons; and the equipment, fittings, &c., have been under the supervision of Mr. Walter Smith. C.E., Secretary of the College.

Correspondence.

To the Editor of THE BUILDER.

LONDON BRIDGE.

SIR,—When I saw the announcement of the consideration as to widening London Bridge, I thought of writing to you at once; but, on second thoughts, I felt sure you would observe the statement, and refer to it yourself. With every word of your article many engineers, as well as architects and artists, will surely agree. If a numerously-signed protest would be of use, would you not receive the names of those wishing to prevent the disfigurement of so noble a work? London, for its vast size, has very few monumental works that entirely satisfy and delight the cultivated sense; most of them have defects in themselves or disadvantages in their environment to counteract what beauty and dignity they possess; but from every point of view London Bridge is worthy of its position. It does not need widening; the Tower Bridge has effectually relieved its vehicular traffic, and the footpaths would always be adequate if groups of idlers were not allowed to obstruct them while watching the steamers on the east side. What the City Authorities really need to do is to expedite the repairing of the roadway, when it has to be repaired, and to obstruct the traffic as little and for as short a time as may be. During a considerable portion of the current year the bridge has been "up" in one place or other for various purposes, and these things could be managed much better.

E. DURANT CECIL.

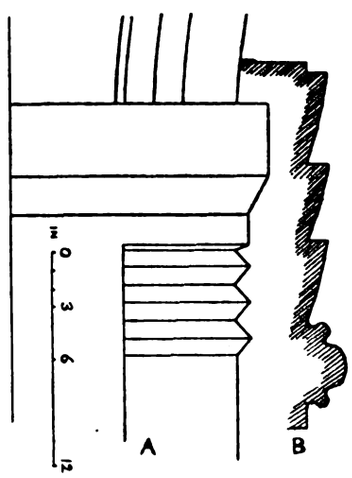
*** Certainly we should be happy to publish, as our correspondent suggests, a protest with influential signatures protesting against any interference with London Bridge.—ED.

THE STATISTICS OF SAXON CHURCHES.

SIR,—On Kingsbury Church, Middlesex, there is a note in the present issue. As the well-marked long-and-short work in the two western quoins goes with a thin wall (on north and south about 2 ft. 5 in.; more on the west), and is not accompanied by any contradictory evidence, I have accepted it as pointing to a Saxon date. Does Mr. St. John Hope know of any twelfth-century church with long-and-short quoins of this character? In respect to the shafts at Lanchester and Chollerton, I feel confident that both Mr. St. John Hope and Mr. Fox would recognise them as Roman if they examined them in connection with the abundant Roman stonework of the district. There is, however, proof positive in the existence at the Roman station of Cilernum (Chesters), on the North Tyne, of a broken shaft which agrees with them exactly in diameter and handling. The shafts are all within about an inch of 5 ft. in circumference in every part, and most of them are nearly 8 ft. high. There are five in each of the churches named, and they correspond in each case with ordinary built-up mediæval supports in the opposite arcade. They are in most cases roughly tooled, I surmise as a key for plaster, but the surface of some has been worked over in later times. These marks of handling occur all over the shafts and are not confined to the lower part, which would be the case had the mediæval mason worked this down to the size of the upper diameter. Why he should do this is difficult to see, for mediæval practice did not reject tapering shafts, which are abundant in Early German Romanesque. I do not see any escape from the conclusion that they are Roman, and like the Reculver shafts had neither tapering nor entasis.

The latter columns present, no doubt, a difficult archæological problem, which, it is to be hoped, time will enable us to solve. The argument in Mr. Fox's letter, at the best, would only remove the difficulty a little further back. He believes them to be "Saxon imitations of Roman work," and yet his whole letter aims at proving how very un-Roman they are. Neither in base, shaft, necking, nor capital are they allowed to resemble even distantly Roman work, while *ex hypothesi* they are imitated from it. On Mr. Fox's showing they must have been modelled on some form of Roman column hitherto unrepresented on Romano-British sites. As regards tapering and entasis, such abnormal patterns actually exist in the North, and though the Reculver columns are unlike the known Roman remains in the southern and Midland districts of England, the new evidence which may some day enable us to fix them is as likely to turn up from the Roman as from the Saxon side. Here come in the questions of scale and execution. The former is considerable, the latter accurate and workmanlike; both points are against, though, of course, they do not preclude, a Saxon origin. The drums are gauged very truly and excellently fitted, the mouldings on the neck run with precision, and the lower bead undercut, the cable ornament is not more Saxon than Roman. The monuments cannot well be Gallic importations, as Merovingian work at the time would show more of the florid Gallo-Roman ornamentation.

A word may be added about the capitals. Mr. Fox says that he does not know anything in Roman capitals in this country "so clumsy as this attempt to fit a square capital to a circular shaft." Of course the attempt in itself involves nothing clumsy, as it is what all makers of Classical caps have had to essay, and I cannot agree with him that this particular solution of the problem is a bad one. The caps are too low for the shafts and this spoils their appearance, but the scheme is a reasonable one. It is that of a cube with the lower corners rounded off, each of the sides swelling out into a curve so that the base approaches a circle in plan. This entasis on the sides is divided horizontally into three, and is cut away just below the top, which is in plan a square, though not a true one. A shallow cut runs horizontally at the bottom and the top of each division. I must point out that I did not adopt the theory that the caps ever actually carried attachments in bronze, for there are no rivet holes or marks of metal discolouration, but suggested that they "were intended to receive" such enrichments, which I still think a plausible explanation of their form. The accompanying drawing to scale of the jamb at Stopham,



A. Stopham, Sussex: Jamb of South Door.
B. Section of Cap from Reculver (same scale).

which I happen to have by me, will show that there is practically no resemblance here to the Reculver work.

On the subject of Repton, I have not had an opportunity of seeing the recent edition of Mr. Hipkins' book, referred to by Mr. C. B. Hutchinson. The plan quoted by him seems to differ markedly from that of the late Mr. J. T. Irvine, adopted by Mr. Micklethwaite in the *Archæological Journal*, vol. liii. My doubt as to the Saxon plan led to my use of the cautious "may," which your correspondent reproachfully italicises, and it will be of great value if this plan can be finally settled.

G. BALDWIN BROWN.

SIR,—May I answer Mr. W. H. St. John Hope's query concerning the monolithic columns in the arcades of the churches at Chollerton and Lanchester? They are clearly not of the same date as the capitals and arches they carry, but, of course, are not necessarily Roman because monolithic. I will briefly state the facts of the two cases.

Lanchester Church is three-quarters of a mile from a large Roman station on the line of Watling-street, and Chollerton Church is 2¼ miles, by road, from the station Cilurnum, now Chesters, on the line of the Roman wall. At both these stations were large buildings with colonnades of some magnitude, as testified by the remains on the spot. Lanchester Church has nave arcades of four bays on either side, of one date, c. 1180. The arches and capitals are the same in each arcade. The columns on the south side are built up in courses, and are clearly of the date of the arches. Those on the north are monoliths and are made up under the capitals with short pieces which vary in length, to bring the whole column to the length of those on the south side. The diameters of the abaci are the same on both sides, but the monoliths being somewhat smaller than the built-up columns opposite to them, the neck moulds are less to adapt the capitals to a column of lesser diameter. The result is an overhanging appearance to these caps. I spent some time in Lanchester Church on August 17 in company with other archæologists, and we noted a most distinct entasis in the monoliths. I did not test them for taper, unfortunately, but they have the appearance of having been dressed off at the tops to get a good bed for the lengthening pieces, and this will have obliterated the taper to some extent.

The case of Chollerton is not quite so decided, as the two arcades of the nave are not contemporary. The supposed Roman monoliths are in the south arcade which dates from c. 1200. The north arcade is much later. As at Lanchester, the monoliths look too thin for the capitals they carry. They show signs of having had the entasis dressed off. They are stone from base to cap, and are not lengthened as at Lanchester. The responds are monoliths let into the walls half their diameter, and not built up in courses. I have not tested them for taper. I will take an early opportunity of measuring up the arcades in both churches, so that the exact facts may be put before your readers.

I cannot endorse the suggestion made by Professor Baldwin Brown that these columns are re-used material from St. Wilfrid's Church at Hexham (p. 307). There can be no doubt that Wilfrid's church was used by the Austin Canons till they began their new church, hence the dates of the various works are against the supposition. Again Corstopitum was a much nearer and far more prolific source from which dressed stone could be got than either Chesters or Lanchester. Both Eddius and Prior Richard describe Wilfrid's columns as being finely polished—a description which could not apply to the roughly dressed monoliths at Chollerton and Lanchester.

I know of no other instances of monolithic columns in main arcades which are likely to be Roman work re-used. CHARLES C. HODGES.

SIR,—None of your correspondents have referred to the surroundings of the Reculver pillars when still standing complete up to July, 1809. The whole of the thirteenth and fourteenth century masonry easily fell before hammer and axe; but the triple chancel arch, eastern apse, &c., required gunpowder, and the first charge was inserted in the right-hand arch looking east, which enabled one pillar to be felled; and in this condition this part remained for about ten years, as the plates in Deeble and Ireland's books both testify; the latter shows an abacus and the nature of the base, *round* which, *not beneath*, exists a red-coloured Roman concrete pavement. This pavement was so hard that Mr. Pridden in 1788 was unable, even with assistance, to obtain a specimen.

A single square-headed fifteenth century clear-story window existed on the south side. A triplet lighted the east end of the extended chancel beyond the Roman apse.

After 1825 the Trinity Corporation, who had purchased the church in 1809 (too late to interdict injury to the whole church), stopped any further free quarry going on. Both pillars had, however, by that date been acquired by a relative of mine, who took them to Canterbury, where in an orchard they were rediscovered in 1861. They are of coarse oolite. From Pridden's slight sketch, and an examination of the mouldings of the tower arches, and measurements of the (Canterbury) pillars, as well as an inspection of Buck's view of the exterior which is before me, a perfect restoration of the interior might be published.

JOHN FRANCIS GRAYLING.

Sittingbourne.

P.S.—The first Hilborough Church was built, about 1815, of the old materials easily moved.

ARCHITECTURAL EDUCATION.

SIR,—As Mr. W. Howard Seth-Smith in his presidential address to the Architectural Association is reported in your columns to have said, "with the exception of the Victoria University at Liverpool, I believe King's College is the only institution in this country which has an architectural day school," will you kindly allow me to explain regarding the day classes in Architecture held in this College?

When this College was founded in 1886, by the amalgamation of others previously existing a

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diploma in architecture with the title of associate of the College (A.G.T.C.) was instituted as one of the eleven courses of study in the day classes. Building construction and other science subjects were taught in day classes with varying success till 1895, when definite day classes in architecture, including drawing, architecture, and construction, were started, but the largest enrolment has been eleven students and this was last session.

The complete course is a three years one. but in the second and third years the student spends nearly all his time in the study of purely architectural subjects, and he may enrol for these classes alone without taking the first year's course, which is in general science, but includes drawing.

The students who have attended since 1895 have mostly taken the second year's course, which consists of one hundred lectures on architecture and construction, these being delivered daily from 10 till 11 a.m., and a course of studio instruction in drawing from 11 till 12.30, but the students continue to work in the studio till 5 p.m.

I believe that the Colleges of Architecture in America all began in connexion with Engineering Colleges, and as these have succeeded I do not see why the Architectural departments in the University and Technical colleges of this country should not also succeed in due time. But the establishment of the day classes he proposes will undoubtedly greatly help day-class architectural education throughout the country, and I most heartily wish success to the scheme. CHARLES GOURLAY.

Glasgow and West of Scotland Technical College.

BOOKS RECEIVED.

LAND SURVEYING AND LEVELLING. By Arthur T. Walmisley, M.Inst.C.E., F.S.I., F.K.C.Lond., Hon. Assoc.R.I.B.A. 7s. 6d. (D. Fourdrinier, *Builder* Office.)

FIELD WORK AND INSTRUMENTS. By Arthur T. Walmisley, M.Inst.C.E., F.S.I., F.K.C.Lond., Hon. Assoc.R.I.B.A. 6s. (D. Fourdrinier, *Builder* Office.)

STRUCTURAL IRON AND STEEL. By W. N. Twelvetrees, M.I.M.E. 7s. (D. Fourdrinier, *Builder* Office.)

STRESSES AND STRAINS: Their Calculation and that of their Resistances, by Formulæ and Graphic Methods. By Frederic Richard Farrow, F.R.I.B.A 5s. (D. Fourdrinier, *Builder* Office.)

ROAD MAKING AND MAINTENANCE. By Thomas Aitken, A.M.Inst.C.E. (C. Griffin & Co.)

TWENTIETH ANNUAL REPORT OF THE LOCAL GOVERNMENT BOARD. (Eyre & Spottiswoode.)

FIFTEEN STUDIES IN BOOKKEEPING. By Walter W. Snailum. (Cambridge University Press.)

THE PRACTICAL ENGINEER POCKET BOOK FOR 1901. Price 1s. 6d. (Technical Publishing Company, Manchester.)

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

16. DIFFUSION—REFLECTION—ARC LIGHTING—ARC LAMP MECHANISMS—CARBON RESISTANCE—DISTRIBUTING GLOBES—ENCLOSED ARCS—STREET LIGHTING.

IN lighting by artificial methods there are two general rules that have always to be borne in mind if the best and most economical results are to be secured. The first rule is that the light should be as diffused as possible, and the second is always to make the best use of any available reflecting surfaces. The important part played by diffused light in every day illumination indoors is not generally realised. Very often the amount of diffused light in a room is three or four times as important as the direct rays from the illuminating source. Daylight, again, whilst due to the sun in the first place, has, as a rule, suffered many reflections from clouds, walls, &c., before the rays are finally absorbed. In order that the electric arc may be used for lighting it is necessary to surround it by a large diffusing globe. The intense brilliancy of the ends of the carbons irritates the retina of the eye and causes the iris to close up. Now the eye judges the intensity of an illumination not only by the intrinsic brilliancy of the source of light, but also by the number of rays falling on the retina. Hence anything that causes the iris to contract and cut out some of the rays that would otherwise reach the retina detracts from the illumination. Similarly anything that makes the light more diffused and pleasanter to the eye increases the illumination: for example, if the globe of an arc lamp absorbs 30 per cent. of the light generated; yet if the effect of putting it on is to make the diameter of the iris expand 20 per cent., and so increase the area of the pupil of the eye by 40 per cent., then the effect of putting on the globe is to increase the apparent illumination.

The unit used by the English electrician to measure illumination is the candle-foot, and is the illumination produced by a standard candle at the distance of 1 ft. The maximum illumination produced on the ground by an arc lamp 20 ft. high is only about half a candle-foot, whilst the illumination of the ground on a bright summer's day is about 30 candle-feet, yet the illumination in the latter case is quite pleasant to the eye.

The value of reflecting surfaces as an aid to illumination is shown by putting first a sheet of white paper directly behind the flame of a standard candle and then a piece of dark cloth, and measuring the candle-power of the light sent out in the two cases. In the first case the candle-power will be more than doubled, in the latter case it will not be appreciably affected. If we had put a good reflecting mirror instead of the white paper the candle-power would have been 1·8. The reason why white paper reflects more light perpendicularly to its surface than a mirror is because the mirror reflects light equally in all directions, whilst a diffusive reflector like the sheet of paper sends most of the light off normally. It follows that by means of ordinary or diffusive reflectors we can considerably increase the intensity of light in any required direction. If an arc lamp be placed near a clean whitewashed wall its efficiency will be greatly increased.

We saw in the last lesson how an electric arc could be maintained between two carbons. As the carbons are in the open air they are gradually consumed away, and some mechanism has to be invented in order to keep them always at the proper distance apart if the arc is to be utilised for permanent lighting purposes. A great many different principles have been employed in the mechanisms for the regulation of arc lamps, but they may be divided into five classes. In the first class the regulation is effected by the strength of the current. If the current gets too strong the carbons are pulled farther apart by an electro-magnetic arrangement, and if too weak then they come closer together. This class then regulates for constant current in the arc. In the second class a shunt coil made of fine wire and having a high resistance is placed across the arc. If the electric pressure at its terminals is too high then the carbons are brought closer together, and conversely, when the electric pressure falls they are separated farther apart. The second class acts so that the pressure which maintains the arc is always the same. Continental lamps are generally made on one or other of these principles. They do not require much copper, and are consequently cheap to make, but the regulation is not very good.

In the third class of lamps a differential action takes place. We have two coils of wire, one in series with the main current and the other as a shunt across the carbons. The series coil acts so as to open the arc whilst the shunt coil tends to close it. These two actions are balanced, and so, in the steady state, we have the ratio of the difference of pressure to the current, that is, the apparent resistance of the arc kept constant. As the regulating force is the difference between the actions of the shunt and series coil, each of them has to be more powerful than when a shunt coil alone is used, and hence the amount of wire required for a differential lamp is more than twice that required for a shunt lamp. The two principal makers in this country make differential lamps, which regulate extremely well. The two coils are placed vertically and pull at opposite ends of a balanced lever. Any irregularities in the pressure of the supply or in the resistance of the arc caused by impurities in the carbon make very little difference in the light sent out. The "feeding" of the carbons together is done by either a clutch or a brake-wheel mechanism. The clutch mechanism is used in the Brush arc lamp. The lever when it rises catches the underside of a washer and raises the carbon. This mechanism acts well at first, but when the lamp is old the "feed" movements are apt to take place jerkily. Brake mechanism is most generally employed in this country; the lever acts on a brake wheel, which is kept protected from the vapours given off by the arc, and hence can easily be maintained in good working order.

The fourth class of arc lamps is one that would regulate so as to keep the power absorbed by the arc constant. Theoretically, of course, this is the proper principle to adopt, as we want the light given out to be absolutely steady. A practical arc lamp of this class has not yet been constructed, although the invention does not seem to present any great difficulties.

In the fifth class may be grouped those lamps which feed the carbons together by a fixed amount every minute or half-minute, or which keep them at a fixed distance apart. In the latter division is the Jablochkoff candle. It consists simply of two pencils of carbon insulated from one another. The arc starts across the top and gradually consumes them; a candle 10 in. long would last about two hours. In order that the carbons should be consumed at the same rate it is necessary to use alternating current.

The Patent Office contains an extraordinary record of ingenuity of inventors with reference to the improvements in the mechanism of arc lamps. Differential clock gear, pulleys and weights, water, mercury, compressed air, mechanical and magnetic friction, electric motors, &c., have all been proposed, and numbers of lamps have been made on these principles. Where very large arc lamps are necessary, as in naval searchlights, electric motors are often used to control the mechanism variations in the speed of the motor screwing the carbons nearer together or farther apart as wanted.

The resistance of the carbons used in ordinary arc lamps which have diameters varying from 8 to 15 mms. varies from 0·14 to 0·25 ohm per foot. These carbons can be used with currents varying from 8 to 25 amperes. Although the resistance of the carbons is not high, yet as we sometimes have as many as fifty arc lamps in series the power expended in overcoming this resistance is appreciable. The resistance of 100 ft. of carbon rod taking 20 amperes would be 15 ohms; the loss of pressure in the carbons would be 300 volts, and the power expended in them would be $(20)^2 \cdot 15$ *i.e.* 6 kilowatts, or slightly more than 8-h.-p. Hence when all the lamps have been newly trimmed the pressure required is about 250 volts more than when the carbons are nearly all used up. In America carbons plated with copper are generally used. The copper plating increases their life by about 30 per cent. and diminishes their resistance very considerably. In Europe, however, bare carbons are nearly always employed, as they give a steadier light.

In direct current arc lamps the positive carbon used has often a larger diameter than the negative carbon. This improves the light sent out, as less is blocked by the lower carbon. In addition, the positive carbon is often cored. Cored carbons have a slightly higher resistance than solid carbons of the same diameter, and burn away more rapidly. Some lamps, however, burn in an unsatisfactory manner when both carbons are solid. In alternating current circuits both the carbons are nearly always cored.

Recently a considerable amount of attention has been given to the design of distributing globes for arc lamps. Mr. A. P. Trotter invented several years ago his "dioptric lantern," which had ten panes of glass covered with prismatic corrugations, the angles of which had all been carefully calculated, so that the best possible distributing effect was produced. Unfortunately it was very expensive, and was rather clumsy in appearance, and so was never extensively used. The Frédureau and Holoplane globes have been designed on very similar principles, and can be made in all shapes and sizes. The Holophane globes that are used with street lamps are spherical in shape. On the exterior are horizontal prismatic ribs, and in the interior are vertical flutings. The light is thoroughly diffused by the flutings, and then suitably distributed by the external prismatic circles. The Frédureau globe is very similar to the Holophane, but has no flutings in the interior. When inside a Frédureau globe the arc presents the appearance of a bright band of light, but inside a Holophane the whole globe appears all over equally bright. Owing to the excellent diffusion of the light, the mean illumination is increased by the use of these globes, and so current can be saved, this saving more than compensating for the increase in the initial cost. The only drawback to the use of prismatic globes is the difficulty of keeping them clean. They get dirty very rapidly, and to get them clean washing and scrubbing are necessary, merely wiping them with a dry cloth has very little effect. This adds to their expense, for a trimmer can attend to fifty or sixty arc lamps a day when smooth globes are used, but only about half that number when the globes are corrugated.

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Some interesting experiments were made in Berlin a few years ago on the luminous intensity of the electric arc when surrounded by various globes. Without a globe the horizontal intensity of the light from the arc was only 196 c.-p., it then increased rapidly, being 1,150 c.-p. at 20 deg. below the horizontal, and attained its maximum value of 2,014 c.-p. at 42 deg. It then decreased very rapidly. The mean spherical candle-power of the arc was calculated to be 1,228 without the globe. With the globes the distribution of the light was quite different, as the following table shows:—

	Horizontal c.p.	Maximum c.p.	Mean c.p.
Globe No. 1	419	970	740
„ No. 2	519	1,093	777
„ No. 3	497	713	590

Hence the horizontal candle-power was greatly increased, but the mean candle-power was diminished very considerably. By the aid of reflectors, however, the loss can be diminished. It is safe to assume that at least 30 per cent. of the light generated is absorbed by the globe.

During the last few years enclosed arc lamps have become very popular. In these lamps the arc is burned in a practically closed chamber, with the result that it is surrounded by inert gases, the oxygen being consumed and fresh air is prevented from having access to it. The effect of this is that the carbons burn blunt or square at the ends, a much longer arc can be maintained, and hence we can use a higher voltage. In the first enclosed lamps made great difficulty was experienced owing to a brown deposit appearing on the surface of the inner enclosing globe. This was remedied by only using the best carbons obtainable. The inner globe must be made of very thin glass owing to the great heat to which it is subjected. It absorbs a certain proportion of the light, but as it also helps to diffuse, we can use a fairly clear outer globe. Sometimes the inner globe is given a yellowish tint so as to counteract the large number of violet rays proceeding from the lengthy arc. The result of the almost complete exclusion of oxygen is that the life of the carbons is considerably prolonged. They often last from 150 to 200 hours, and hence the lamp requires very little attention. A white deposit appears on the inner globe during the run and hence the candle-power falls slightly off towards the end of the run. This deposit can easily be removed by a dry duster and this ought always to be done when the lamp is recarboned.

The best known type of enclosed arc lamp is the Jandus lamp, which can be used singly on 110-volt circuits. If we use open arc lamps we have to run two in series, each taking about 45 volts, and having a resistance taking 20 volts in series with them. One Jandus lamp can be put straight on to a 110-volt circuit. In the lamp cover is a resistance coil taking 30 volts, and the other 80 volts are utilised in the arc. This is a great convenience for small shopkeepers and others who only want one arc lamp. The character of the light sent out by the enclosed arc makes it very desirable as a substitute for daylight in certain cases. In drapers' shops, for example, it is found possible by its means to match various shades of cloth, a result which could be attained with no certainty by means of glow lamps. The following test shows, however, that the luminous efficiency is little better than that given by ordinary glow lamps. Professor Elihu Thomson found that the mean spherical candle-power of an enclosed arc with clear inner and no outer globe, after running for 102 hours was 196. As it was taking 4·75 amperes, and the voltage between the carbons was 80, the arc was giving an illumination of 196 candles, at an expenditure of 380 watts, or 1·94 watts per candle. This gives the efficiency of the arc, but the efficiency of the lamp is less than this, owing to the power wasted in the resistance coil, and hence it would not be safe to assume that an enclosed arc lamp had an efficiency higher than two watts per candle—a result which is not very different from that attained with high-efficiency glow lamps.

With enclosed arc lamps it is necessary that the caps of the inner globe should fit closely so as to prevent leakage of air and consequent rapid consumption of the carbons. For the same reason a cracked inner globe ought always to be replaced as soon as possible. Fire insurance companies recommend enclosed lamps in preference to open ones as the fire risk is obviously less.

Arc lighting dynamos were the first successful dynamos made, and so there are still many central stations where the arc lamps in the streets are connected in series with a Brush or a Thomson-Houston arc lighter.

In many modern stations separate plant for the arc lamps is not used. If the pressure of supply be high pressure continuous at 1,000 or 2,000 volts sent to sub-stations, then the arc lamp circuits can be connected straight on to the high tension bus bars, each circuit containing twenty or forty arc lamps. If the pressure of supply be alternating, then methods involving transformers can be used, and if the pressure of supply be low pressure continuous, then the lamps can be run four or five in series across the outers of the three-wire system of supply.

In many streets in this country and abroad the arcs are arranged zig-zag alternately on both sides of the street. The method is not so effective as putting the lamps opposite one another, but it is more economical. In this country a favourite system is to put the lamps in refuges down the centre of the street. In the Fifth Avenue at New York, in addition to rows of arc lamps down each side of the street exactly opposite one another, there is a row down the centre, each lamp of this row being at the centre of the rectangle formed by four neighbouring side lamps. This "quincunx" arrangement is also used in several of the streets in Paris, and is very effective.

It has now become customary to divide the arc lamps in a street into two separate circuits, so as to minimise the risk of a total extinction of the light by a fault occurring when the traffic is heavy. At midnight one of these circuits is usually turned off, so as to economise expense. In some places, instead of turning off half the arc lamps, they turn them all off at midnight, and switch on two 32 c.-p. glow lamps fixed on each arc standard instead. As an arc lamp usually takes about 500 watts and the two glow lamps take about 200, this latter method is slightly more economical of power than the method of turning out half the arc lamps, but it is very doubtful whether, taking everything into account, it is a real economy, as it makes the wiring more complicated, and the light given out is considerably less.

The Board of Trade Regulations insist that arc lamps must be placed at least 10 ft. from the ground. For good distribution it is found that the height should be much higher than this. When the column is on the pavement the heights usually chosen are between 18 ft. and 20 ft., and when the lamp is on a refuge in the centre of the road, heights of 23 ft. to 25 ft. are generally used. It seems unlikely that heights above 30 ft. will ever be used, owing to the great absorption of the light that would take place in misty or foggy weather. Hence the numerous schemes for lighting cities by means of powerful arcs placed on lighthouses are impracticable.

GENERAL BUILDING NEWS.

NEW CHURCH, FLOOKBURGH, LANCASHIRE.—On the 20th ult. the Bishop of Carlisle consecrated the Church of St. John the Baptist, Flookburgh. The church, which has cost about 11,000*l.*, takes the place of an old chapel-at-ease erected in 1777. The new church is Transitional in style, built of stone from a quarry on the Holker estate. The architects were Messrs. Paley & Austin. The organ is by Messrs. Brindley & Foster, Sheffield, and the four bells were cast by Messrs. Taylor, of Loughborough.

ENLARGEMENT OF ST. MARY'S CHURCH, PLAISTOW, E.—A north transept, which has been added to this church, was consecrated recently. The addition gives accommodation for about 114 seats. The building work was carried out by Mr. T. D. Graty, of Bromley, the architects having been Messrs. Wadmore, Wadmore, & Mallett. The windows of the transept have been filled with stained glass by Messrs. Ward & Hughes. Other improvements to the church include the re-seating of the nave, the work being executed by Messrs. Hammer & Co., and the installation of the electric light by the Bromley Electric Light & Power Co.

UNITED PRESBYTERIAN CHURCH, DUNDEE.—The memorial stone of the new building which the congregation of the Wishart U.P. Church, Dundee, are erecting in King-street was laid recently. The architect of the new building is Mr. T. M. Cappon, Dundee. The plan is arranged in one large nave, side aisle, and transept, with an end gallery next King-street. In one end of the bays of the transept is placed the organ chamber and choir gallery. The pulpit and platform are placed on the south wall in an apse, and are lighted by a window on each side. Large traceried windows placed in the nave and transept run up into the roof above the wall-head to secure better light. The church is entered from King-street level by two doors, and the entrance to the gallery and the halls beneath is by the door under the tower. The halls accommodate 350, and have session and managers' rooms, ladies' and gentlemen's cloakrooms, lavatories, &c. The church accommodates 700. A subsidiary staircase is situated in the west transept leading to the vestry and choir gallery, also making a connexion with the halls below, and special exit to the Cowgate. The mason work is being executed by Mr. Laing; joiner work by Mr. T. C. Stocks; plumber work by Messrs. J. Crighton & Sons; slater work by Mr. William Brand; and the plaster work by Mr. M. Lawless.

RESTORATION OF WYVERSTONE CHURCH, SUFFOLK.—Wyverstone Church was recently re-opened for public worship after renovation. The chief item in the work has been the repair of the roof of the nave. The old brick floors have been renewed in local paving ware, worked to a pattern in two colours. Temporary stalls have been placed in the chancel, and the church thoroughly cleaned and recoloured. The work has been executed under the supervision of Mr. E. F. Bisshopp, of Ipswich, architect and diocesan surveyor, with Mr. Harry Nunn, of Walsham-le-Willows, as builder.

CENTRAL BOARD SCHOOL, MANCHESTER.—The new Central Higher Grade Board School at Manchester, which was opened recently, is situated in Whitworth-street. The building is of brick with terra-cotta facings, and consists of a basement, ground floor, and three upper floors. The school provides accommodation for 1,450 scholars. The basement contains the dining-room accommodation, the rooms for teaching cookery and laundry-work, a gymnasium, and a manual instruction room. The ground floor is occupied by a central hall and classrooms for girls, rooms for the teachers, &c. On the next floor are a central hall for the boys and the school of science, the boys' classrooms, the headmaster's room, and rooms for a commercial evening school. On the second floor are classrooms for drawing, teachers' rooms, cloakrooms, and the caretaker's residence; while on the top floor are chemical and physical laboratories, two lecture theatres, science master's room, balance-room, library, store-rooms, &c. The architects were Messrs. Potts, Son, & Hennings.

PUBLIC LIBRARY, FALKIRK.—This building is about to be erected on a central site in Hope-street, from the plans of Messrs. M'Arthy & Watson, Edinburgh. The principal or street floor of the building contains the reading-room, lending library, reference library, librarian's-room, &c. The upper floor contains the recreation-room (which can also be used for lectures, &c.), lecturer's retiring-room, &c. The reading-room is 51 ft. 6 in. by 29 ft. Immediately behind this apartment, and to the back of the building, is placed the lending library, 39 ft. by 37 ft. Provision is made for accommodating 16,000 volumes. The reference library, which measures 25 ft. by 20 ft., is placed to the west of the lending library, the tables being so arranged that all readers will face the attendant. Accommodation is provided for 5,000 volumes, all accessible without the use of ladders. The recreation-room, which measures 51 ft. by 39 ft., provides for sixty-four readers, besides ample space for games.

BATHS, POPLAR.—On the 25th ult. new baths, which are situated in Glengall-road, Millwall, and have been erected at the instance of the Vestry of All Saints, Poplar, were opened. The site of the new baths has a frontage of 110 ft. to the Glengall-road, and a total depth of 230 ft., the area being about half an acre, and, as the new building has a frontage of 80 ft., there is room for a walking-way 10 ft. wide on the west side, and for a cartway 20 ft. wide on the east side of the buildings. There are seven entrances. From a main corridor in the centre of the building doors open into the various departments. In addition to the large swimming-bath, there are men's second-class private baths for twenty-six, men's first-class for nine, and women's baths for five, or forty slipper-baths in all. The pond of the swimming-bath is 75 ft. long by 35 ft. wide, with water 3 ft. 6 in. deep at the south end, and 6 ft. 6 in. at the deepest part. Wooden dressing boxes, with dwarf doors in front, run round the bath on the level of the platform, and there is a gallery on all sides. The cost of the baths will be about 10,400*l.* The architects were Messrs. J. & S. Flint Clarkson.

YORKSHIRE HOME FOR INCURABLES, HARROGATE.—The foundation-stone of a new building for the Yorkshire Home for Chronic and Incurable Diseases was laid on the 24th ult. by the Right Hon. J. Lloyd Wharton, M.P., on a site near Harlow Moor, Harrogate. The new home will have about fifty beds, and there will be opportunity of extending the premises to meet the cases of 150 persons when requirements and means allow. Its cost is put at 15,000*l.* The new building will have a frontage of 157 ft. to Cornwall-road, and so it to a side road. The ground floor accommodation comprises large day rooms for patients of both sexes (thirty-five females and fifteen males), dining-room, boardroom, waiting-room, bathrooms, and wards of varying sizes, and a winter garden. More wards and bathrooms are planned for the first floor, together with nurses' rooms and asphalt airing flats

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opening into the corridors by wide doors. The kitchen, scullery, store, operating-room, isolation ward, and maids' rooms will be on the second floor, while the basement will contain the laundry and boiler-house. Mr. T. E. Marshall, of Harrogate, is the architect, and Messrs. W. Nicholson & Co., of Leeds, are the principal contractors.

SCHOOLS OF SCIENCE AND ART, WESTON-SUPER-MARE.—The new Schools of Science and Art, in Lower Church-road, Weston-super-Mare, have been completed. The style of building is Renaissance. The ground story is carried out with local limestone and freestone dressings. The upper stories are carried out in freestone backed with brickwork, and have pilasters with moulded bases, carved capitals, and faïence panels, also niches for statuary. The pedestals and frieze have also faïence panels. The ground-floor arrangement consists of a large entrance hall, lecture-room, chemical laboratory, three trade technical rooms, committee-room, and offices. The first floor consists of a carving and modelling room, a life-study room, a master's room, an elementary room, and an advanced room, the two latter 60 ft. by 20 ft. each. The top floor has a room for lectures and demonstrations in cookery, with ranges, gas apparatus, &c., also caretaker's apartments. The contractors for the first portion were Messrs. Thos. Palmer & Son, under Messrs. Price & Wooler, architects, all of the same town; and for the completion, Mr. Henry W. Pollard, of Bridgwater, under Mr. Hans F. Price, architect, of Weston-super-Mare. The carver was Mr. J. P. Steele, of Kingsdown, Bristol.

BOARD SCHOOLS, STAFFORD.—Two Board schools, each to accommodate 190 infants, were opened at Stafford recently. One school is in North-street and the other at the Corporation-street school. The architects were Messrs. N. Joyce and H. T. Sandy. Messrs. Adams & Pemberton were the contractors, and Mr. H. Fortnum was the clerk of works.

LABOURERS' COTTAGES, BIRMINGHAM.—In the recently-completed labourers' cottages erected in Milk-street, the Estates Committee of the Birmingham Corporation seem to have good reason, says the *Birmingham Gazette*, for believing they have solved the problem of the "bottom cost" of dwellings of the particular class aimed at by the provisions of the Housing of the Working Classes Act, 1890. Calculated upon the basis of living rooms only, the cost works out at something like 62*l.* per room, but if the sculleries, &c., are included the cost is reduced to 45*l.* per room inclusive. It was under the provisions of the Act quoted that the Corporation some time ago became possessed of a substantial area of Milk-street, which was covered by some of the worst class of insanitary dwellings in the city. The site has a frontage to Milk-street of 294 ft., and to Little Anne-street of 185 ft., and upon this area they have erected fifty-six labourers' cottages and five artisans' dwellings, which, with those already built in Ryder-street and Lawrence-street, bring the total number of such dwellings now in the possession of the Corporation up to 164. The labourers' cottages, as distinct from the artisans' dwellings, are built on two stories, each house being self-contained, with living-room, bedroom, and the necessary offices on the same floor. Those on the upper story are fronted by a balcony with iron palings, and are approached by a stone staircase 4 ft. 6 ft. wide. Twenty-four of the cottages have each one living-room, averaging 13 ft. by 14 ft. and 8 ft. 6 in. high, and bedroom averaging 12 ft. 2 in. by 9 ft. 6 in.; the remaining thirty-two houses having a living-room 13 ft. 4 in. by 14 ft., one bedroom 8 ft. 2 in. by 14 ft., and an additional bedroom 9 ft. by 9 ft., all of the same height, 8 ft. 6 in. Each tenement has its own scullery, food pantry (with distinct ventilation by means of air bricks), and other necessary accommodation, and the houses in the upper story are fitted with dust-shoots, so that there is no necessity to leave the dwelling for ordinary household work. Each tenement is divided by a 9 in. brick wall, the walls between the living-room and the bedroom being constructed of 4½ in. brickwork. This scheme is maintained throughout with the exception of the five artisans' dwellings, which have each two bedrooms, the division walls of which are either of plaster and metal lathing, or lath and plaster. The cottages front on Milk-street and Little Anne-street, whilst at the rear is a large open space, 30 ft. wide, paved with blue bricks, which may be used as a playground for the children, or for any other purpose which the tenants may desire. Good grates and ovens are provided in every house, and the necessary fittings have been put in so that penny-in-the-slot gas meters may be used. Each house has its own closet, with flushing cistern; the sewers are ventilated. There is a concrete foundation under all the walls. They have been erected by Messrs. B. Whitehouse & Sons, to the designs of Mr. J. Tart, the manager of the estates department. The cost of the site was 6,000*l.*, and the buildings, including sewers, drains, roads, concrete foundations, &c, 10,100*l.* The houses let at an average rate of 1*s.* 6*d.* per week per living room, and the gross annual income is estimated at 659*l.* 2*s.*, from which there will be the customary one-third allowance for rates, water, and voids and repairs.

NEW WING, SEAMEN'S HOSPITAL, &C.—The branch hospital in the Royal Victoria and Albert Dock, which was built in 1890, provided accommodation for fifteen patients. To this has now been added a new wing with two large wards and private rooms which increases the accommodation to fifty beds. The two principal wards in the new wing contain eighteen beds each, and are 87 ft. by 28 ft. in area, and 13 ft. 6 in. in height, giving 1,827 cubic feet to each bed. There is a complete system of cross ventilation throughout. There is a window between every bed and the general effect is one of light and cleanliness. Each bed is lighted by a separate electric-lamp, and at every other bed there is a wall plug fixed both for hand light and for use when it is desired to apply galvanic treatment. Over each bed, instead of the old-fashioned medicine shelf and board for case papers, is a plate glass shelf supported on gun metal brackets at a convenient height from the floor; attached to these brackets are brass hooks, upon which are hung the case papers. Nearly all the medical and surgical fittings in the wards are of brass and plate glass. In the centre of each ward stands a brass and glass medicine and poison cupboard, on indiarubber tyred castors. The tables are also of brass and glass, as are the wash-hand stands for the staff and the lotion stands. The lockers are of dull oak, and so constructed as to form a seat, a bed table and a locker. On the top there is an opal slab, which can be removed for cleaning, and at the back a small shelf to hold the patient's porringer, a book, &c. There is also a towel rail at the back. The lockers move upon free-running castors. The wards are furnished with Lawson Tait patent spring bedsteads, 27 in. high from the floor. In the surgical wards the heads of the bedsteads can be raised and lowered for the administration of anæsthetics. Mackintosh cupboards of a new and improved design stand in the wards. These are made of teak and have rails which pull out from the centre; when not in use the whole is covered with a cretonne curtain which is periodically removed and washed. The top is tiled and forms a useful table. The wards are heated by Teale's patent stoves. Each ward is provided with a coal bunker in teak and brass, the top of which can be used as a table. These are mounted on free-running wheels, and thus can be moved with the greatest ease. The floors of the new wing are entirely in terrazzo, the principal colours being white and red. There are no angles to the wards, all corners being rounded off. The hospital is provided for the first time with a lift, 7 ft. by 4 ft. 6 in., which runs from the basement to the top story, where is also a new operating theatre. This is lined throughout with glass, and so is the sterilising-room adjoining. The sinks, basins, &c., are of porcelain, and stand out from the wall, being fitted in each case with hot and cold water, which is turned on and off by the foot. All the pipes supplying the basins, &c.. are of copper, and run about one inch off the wall. At the foot of the operating table is a steam towel warmer. The sanitary arrangements are in a detached tower at the end of the wards and consist of the usual offices, including bathroom and specially arranged sink. The new Nurses Home is provided with a general sitting-room, and with a separate bedroom for each nurse. The buildings of the London School of Tropical Medicine stand in the grounds of the Branch Hospital. This situation, though inconvenient in some respects, has the pre-eminent advantage that it is close to a point where ships in large numbers are constantly arriving from all parts of the tropics. This allows of the immediate transfer of the sick from the ships, and thus gives opportunities for the study of cases of tropical diseases in their acute stages. The school buildings consist of laboratories with accommodation for resident students and quarters for a resident medical superintendent and tutor. On the ground floor are three large well-lighted laboratories, a common-room for the staff, kitchens, and other offices. On the first floor are the medical tutor's office and rooms, and bedrooms for students. On the second floor is a library with a museum. The laboratories are well lighted, and fully equipped with the latest appliances for scientific research. There are properly fitted tables for about twenty workers. The buildings are from designs by Messrs. Young & Hall, Southampton-street, Bloomsbury-square, W.C. The following were the firms employed on the work in the new wing:—Messrs. Lawrance & Co. (builders); Mr. L. Collins (builders' foreman of works); Messrs. Dent & Hellyer (sanitary fittings); Messrs. Slater & Co. (heating apparatus); Messrs. Fawcett & Co. (fireproof floors); Messrs. De Grelle, Houdret, & Co. (terrazzo floors); Messrs. Teale & Somers (stoves); The Otis Elevator Company (lift); Mr. V. G. Middleton (electric light); Messrs. Maw, Son, & Thompson (brass and glass furniture, lockers, &c.); Mr. T. Rose (Society's clerk of works). It should be added that the whole of the buildings stand on a framework of pipes driven down through the made ground and peat, to the gravel about 28 ft. below the surface.

BUSINESS PREMISES, ABERFELDY, PERTHSHIRE.—New business premises for a firm of tailors have been built at the junction of Dunkeld-street and Atholl-terrace, Aberfeldy. The materials used for construction were red stone from Keithick quarries with dressings of red free stone from Ballochmyle. Mr. William Bell, of Aberfeldy, was the architect, and the following were the contractors:—Masonry, Messrs. Duncan, Murthly; joinery, Mr. John Adam, Coupar Angus; plumbing and gasfitting, Messrs. Menzies; slating, Mr. Alexander Robertson; plastering, Mr. John Scott; electric light wiring and bells, Messrs. Westwood, Perth; telephone work, Messrs. Anderson & Munro, Glasgow; wrought-iron gates at main entrance, Mr. Duncan Cameron, Aberfeldy. The total cost was between 4,000*l.* and 5,000*l.*

CONSUMPTION SANATORIUM, DELAMERE FOREST, CHESHIRE.—A sanatorium for the open-air treatment of consumption is being erected at Delamere Forest, in connexion with the Liverpool Consumption Hospital. The architects are Messrs. Willink & Thickness, of Liverpool, and Messrs. J. Gerrard & Sons, of Manchester, are the building contractors. The clerk of works is Mr. James Hibbert.

FREE LIBRARY, BOW.—The foundation-stone was laid recently of a free library for Bow. The architect is Mr. S. B. Russell.

NELSON HALL AND BRANCH LIBRARY, EDINBURGH.—On the 25th ult. the second of the Thomas Nelson Halls and the north branch of the Edinburgh Public Library in Hamilton-place, Stockbridge, was opened. The building stands in the triangle between the road to Saxe-Coburg-place and Hamilton-place, and next the Board School. The main entrance is in Hamilton-place, opening into a vestibule, to the right of which is the Nelson Hall, and to the left the counter for the Lending Library and the reading-room. The Nelson Hall is about 54 ft. long by 50 ft. wide, and is divided with two rows of double columns and arches carrying the roofs. The Library is placed in the centre of the building, with accommodation for 12,000 volumes. It is divided from the Nelson Hall by a glass screen, and from the reading-room by a counter. The whole of the rooms are covered with open timbered roofs, having roof-lights. The architect was Mr. H. Ramsay Taylor, of Messrs. Lessels & Taylor.

BOARDROOM, BEVERLEY GUARDIANS. — A new boardroom for the Beverley Union, which has been built at a cost of nearly 2,000*l.*, has just been opened. The building, which occupies a site adjacent to the workhouse, overlooks the Westwood. The new boardroom is 44 ft. by 27 ft., and is furnished with oak fittings. The floor is of wooden blocks on a cemented foundation. A cloakroom and lavatory is provided, and there is a separate entrance to the room for applicants for relief. Messrs. Botterill, Sons, & Bilson were the architects, and Mr. G. Pape, of Beverley, the contractor. The furniture has been supplied by Messrs. J. Elwell & Sons, the heating apparatus being arranged by Mr. J. C. Simpson, and carried out by Messrs. G. Blanchard & Co., Hull.

DIAMOND JUBILEE PAVILION AT THE EDINBURGH ROYAL INFIRMARY.—The Diamond Jubilee new pavilion at the Edinburgh Royal Infirmary, which was opened on the 26th ult. by the Princess Henry of Battenberg, is to be specially devoted to the treatment of diseases peculiar to women. The building, furnishing, and equipment of the pavilion will cost, says the *Scotsman*, about 40,000*l.* The new pavilion stands on the ground immediately to the west of the medical pavilions purchased by the managers from the directors of the Sick Children's Hospital. Its length is 220 ft. by 65 ft. in width. Designed by Messrs. Sydney Mitchell & Wilson, architects, its style is a free treatment of the Scottish Baronial, dictated more or less by the character of the adjoining pavilions. The Diamond Jubilee pavilion is built of red Corsehill stone. It is five stories high, and contains basement, three floors of wards, and attics. At the south end the corner turrets, instead of being round, as in the main buildings, are octagonal, that form being more convenient for baths and ward lavatories, for which the turrets are used. They rise to a height of 95 ft. Between them are open balconies opening from each ward. On the face of one of these balconies is a memorial granite stone, in which is cut an inscription. At the north-east angle of the pavilion there is a large square tower, rising to a height of 100 ft., in which has been constructed a staircase, as also, in the upper stages, electric fans for the ventilation of the building. On the basement floor a new bathing establishment is placed. It contains a Turkish bath with three hot rooms graduated in temperature, a douche room, vapour, needle, sulphur, electric, and other medicated baths. There is a cooling-room, 70 ft. long by 10 ft. in width, and provision has been made for dressing-rooms, lavatories, and accommodation for attendants. All this portion of the building is lined and floored with tiles of various patterns and colours. Between the bathing establishment and the ward above there is a double concrete floor with intermediate ventilated air space, so that the heat from the baths will not penetrate to the wards overhead. The new pavilion is connected with the main buildings of the infirmary by a covered corridor on the ground floor and an open gallery on the first floor. The staircase giving access to the different wards is 30 ft. by 20 ft., and the wards are also in communication with each other by means of a passenger lift, large enough to contain a patient and bed, and separate lifts for food and coals. The staircase is cut off from the wards, at the different levels, by means of a ventilated corridor with glass doors, so as to prevent contaminated air passing from one ward to the other. The ward on the ground floor above the basement is intended to be used as an ordinary spare medical ward, which will be brought into use when any of the wards in the

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medical hospital are being cleaned, or in any other contingency. Its chief ward, 102 ft. by 28 ft., is capable of containing twenty-two beds, with a window between each of them. On the northern end, which is divided into two halves by a corridor 10 ft. wide, are a lecture-room, three wards of two beds each for special cases, a convalescent-room, 35 ft. by 20 ft., to be used also as a dining-room, a nurses' room, ward kitchen, linen stores, and ward baths, lavatories, &c. The wards on the first and second floors are those specially designed for the treatment of the diseases of women. Both wards are identical in size and in the manner in which the accommodation is arranged. Entering from the staircase at the north end is a corridor, on the right of which are the operating room, two special wards of two beds each, one of which will be used as an anæsthetic room, a demonstration or lecture-room, a room for outdoor patients, and a physicians' room. The lecture and out-door waiting-rooms are separated from each other by a movable screen, so that at pleasure they can be formed into a convalescent room 35 ft. by 20 ft. On the left of the corridor are the ward kitchen, bathroom, lavatories, an isolation ward with one bed, nurses' bedroom and parlour, linen stores, &c. The main wards, like that below them, will be 102 ft. by 28 ft., and each contains twenty-two beds. The operating-rooms have been tiled throughout. It may be mentioned also that the wards of the pavilion are not strapped and lathed. The plaster is laid on a brick lining separated from the outer wall by an air space. The floors are of iron and concrete, and the floor-boards are nailed to a layer of asphalt laid on concrete. All corners throughout the building are rounded, there are no cornices, and the mouldings on the doors and windows are of the simplest kind. The attic floor contains fourteen single rooms for fourteen nurses, and seven rooms for servants, besides ample lavatory, bath, and boxroom accommodation. The main lifts go to the attic floor. The ventilation will be by means of electric fans placed in the north-east angle tower; and for heating, steampipes and radiators will be employed. In each ward there will be an open fireplace. The contractor was Mr. Colin M'Andrew. At present there is being erected between this large pavilion and the laundry on the north two buildings of smaller size—one for the treatment of diseases of the ear and throat, and the other for diseases of the eye. The infirmary kitchen accommodation has quite recently been overhauled and enlarged at a cost of about 6,000*l*. The kitchen is situated in the central administrative block, and its enlargement has been effected by annexing certain storerooms, for which accommodation had elsewhere to be found. The kitchens have been doubled in height, they have been tiled from floor to ceiling, and a system of ventilation has been introduced so as to prevent the smell of cooking from permeating the adjoining buildings.

STAINED GLASS AND DECORATION.

CHAUCER MEMORIAL WINDOW, ST. SAVIOUR'S CHURCH, SOUTHWARK.—A stained glass window in memory of Chaucer was unveiled in St. Saviour's Church, Southwark, on the 25th ult. The window, which is in the north aisle, was designed by Mr. C. E. Kempe.

WINDOW, HEALEY CHURCH, ROCHDALE. — A five-light stained glass window has been placed in the west-end of this church, and two small lights in the porch. The subject depicted in the west window is that of "Worship," as shown in the fourth chapter of the Revelations. The centre light contains a figure of our Lord seated on the rainbow throne, while below and in the lights on either side are the four and twenty Elders. In the upper portion of the side lights are angels with instruments of music and censors. The tracery contains figures of the four Evangelists with their emblems. The porch window represents the Pharisee and Sinner. The work is from the studio of Messrs. Percy Bacon & Brothers, London.

FOREIGN.

FRANCE.—Works are to be commenced shortly at Nantes, for the construction of a new quay on the left bank of the Loire, at an estimated expenditure of 875,000 fr.——The new buildings of the college at Cambrai have just been opened.——M. Baumier, architect, of Caen, has been elected President for the ensuing year of the Société des Architectes of Basse Normandie.——M. Nenot, the architect of the new Sorbonne, has entrusted to M. Poilpot, the painter, the decoration of the two vestibules of the Faculté des Sciences and the Faculté des Lettres. The decoration will consist of ten panels reproducing the characteristic monuments of various ages; for Egypt, the Temple of Philæ; for Greece, the Acropolis; for Rome, the Forum; for the Byzantine Age, Saint Sophia; for Arab art, the Alhambra—and so on. This important piece of decoration will be completed in the course of next year.

GERMANY.—The library of the University of Heidelberg is to be rebuilt at an estimated cost of nearly one and a half million marks. The library is separate from the main university building and contains one of the most valuable collections of books and ancient MSS. in Southern Germany. The university was founded in 1380 by Elector Rupert I. On the occasion of the 500th anniversary of its foundation, the aula was restored.——Designs are invited by Mr. Robert Hoffmann, of Dresden, for an art exhibition salon in that city. The competition is open to all architects. The premiums are 1,000, 500, and 300 marks for the sketches adjudged first, second, and third in order of merit respectively, and the competition will close on December 15 next.

AUSTRALIA.—The Legislative Assembly of New South Wales has decided to proceed with the erection of the bridge to North Shore, Sydney, as soon as the designs invited in competition with Australian engineers have been received from London.——The authorities of the Melbourne University contemplate building a metallurgical laboratory and geological school as part of a large central mining school in the city. The estimates for the laboratory are 2,000*l*., and for the school 6,000*l*.——The Government of New South Wales has voted a sum of 5,000*l*. for providing workshops, appliances, &c., at Newcastle in connexion with harbour and other works.——The Bendigo (Victoria) Council is about to erect iron girder bridges in the district, at a cost of about 7,000*l*.

MISCELLANEOUS.

GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—The second meeting of the Society was held on Friday, 26th ult., when Professor Henderson lectured on "Chemical Notes of Building Materials." The lecturer pointed out the various constituents of the atmosphere which acted on materials with regard to their permanency, mentioning elementarily (1) water vapour, (2) carbonic acid and oxygen. Metals were shown to be the most susceptible to atmospheric influences, because of their undergoing corrosion due to oxygen, and in the air of towns this action was greatly promoted owing to the presence of injurious acids. Regarding iron, the various methods of protecting, with the merits thereof, and the precautions necessary to their proper application, were demonstrated, and attention was directed to the galvanic action set up between certain metals, such as tin and iron, on exposure to the air, which action aids the corrosion of the iron. In galvanising with tin this was occasioned by any flaw in the coating, but so long as the coating was intact, galvanising by means of zinc, tin, or nickel was effectual as a protection to iron. The matter of the galvanic couple set up by the contact of iron and lead in the fixing of iron railings was noticed, and sulphur was also considered to be objectionable; cement being particularised as being the most suitable for this purpose. Regarding lead and zinc, the lecturer stated that great care should be exercised in using these for the storing and conveying of water, and on no account should these be used in the construction of cisterns for water to be used for drinking or cooking purposes, as zinc is dissolved by soft water, and lead, when exposed to air and water, produced a compound of lead soluble in water and poisonous. Slate for cisterns was recommended. The lecturer dealt further with various metals, stone, and wood, and remarked in the case of stone that the more compact it was in structure the less likely it was to be affected by external influences. In conclusion, attention was drawn to the elementary facts treated of, which were of great importance and which were too often overlooked. A vote of thanks proposed by the President was heartily accorded.

DEPRESSION IN THE BRICK TRADE.—The brickmakers of Birmingham have been meeting for the purpose of considering the depression under which the industry is at present suffering and the possibility of devising a remedy. The depression is said to be due to a variety of causes, the chief of which however appears to be the excessive cost of fuel. Dear fuel has raised the cost of the various articles used in building operations to such an extent as to bring about the collapse of the building industry. With a diminished demand for bricks has succeeded a severe competition, and a fall in prices to an unremunerative level. Fuel prices have advanced from 100 to 150 per cent. in eighteen months, and whilst the cost of production has thus increased, since April of last year prices of common bricks have fallen from about 27*s*. per thousand to about 22*s*. The West Bromwich and Oldbury brickmakers are said to be in many respects more favourably situated than the Birmingham makers. Serious complaints are made by the latter as to the system of rating. They are assessed according to the amount paid on royalty, which in Birmingham is said to amount to 2*s*. 6*d*. or 3*s*. per thousand, while in the Black Country it is only about 6*d*. The manufacturers have placed themselves in communication with the Steam Machinery Users' Association, with the view of taking combined action against the assessment, which will involve an appeal to the Court of Quarter Sessions. Of the thirty brickyards in the city, owned by about twenty firms, over half have been closed, and the remainder are working less than one-fourth time. A committee which has been making inquiries has submitted a scheme for the combination of all the manufacturers in an automatic pooling arrangement. Each manufacturer is to pay a certain contribution, say of 1*s*. per thousand bricks produced, into a common fund, which will be distributed *pro rata* amongst the members, the firms who produce the smallest quantity consequently reaping the largest share of advantage. The manufacturers are to be left free to fix their own prices, and there is to be no restriction as to the quantity produced. The scheme is still under consideration.—*Birmingham Post.*

THE OLD EXCISE OFFICE, OLD BROAD-STREET.—In a footnote in relation to this building, p. 350 *ante*, it was stated that the design had been attributed, among others, to "J. Gandy." It should have been "J. Gan lon."

NEW RESTAURANT, THROGMORTON-STREET.—Messrs. Mark Patrick & Son ask us to mention that they were the contractors for this work, briefly mentioned in our last issue (p. 373).

NATIONAL REGISTRATION OF PLUMBERS: CONFERENCE AT BIRMINGHAM.—The Lord Mayor of Birmingham presided at a public meeting held in the Council Chamber, Birmingham, on Wednesday the 24th ult., the meeting being attended by representatives of various associations and district councils working in conjunction with the National Registration of Plumbers. Previous to the public meeting a Conference was held in the Council Chamber under the presidency of Mr. Robert Crawford, at which the following resolutions were passed. On the proposition of the Chairman, seconded by Dr. Alfred Hill,

"That in the opinion of this Conference, representing the Public Health and Water Authorities and the Master and Operative Plumbers of Great Britain and Ireland, it is desirable, and would be a great public advantage, if a measure should be passed through Parliament with the object of protecting the public from the results of bad and incompetent workmanship, and securing the efficiency and responsibility of plumbers through a system of registration of the qualified masters and operatives; and that it is the duty of the Government, acting in the public interest, to carry through a measure with this object."

On the proposition of Dr. Williams (Plymouth), seconded by Bailie Dick (Glasgow),

"That twelve representatives of the District Councils be appointed to act in conjunction with the company in approaching the Local Government Board for the purpose of framing a scheme for a Plumbers' Registration Bill, and taking such steps as they may deem necessary for such legislation."

On the proposition of Professor Matthew Hay (Aberdeen), seconded by Dr. Bostock Hill (Birmingham),

"That this Conference approves of the establishment of two grades of registration, one for operative plumbers, in which the examinations would be essentially a test of workmanship and an oral examination substituted for the present written examination; and the other requiring a higher standard of technical knowledge for master plumbers, inspectors and plumbers occupying similar positions; and that it be remitted to the Company and the representatives of the Conference already appointed to prepare a scheme under this resolution, including the question of fees, and after submitting it to the District Councils for their opinion, and finally adjusting it, to put the scheme into operation."

The Lord Mayor, in welcoming the members of the Conference, said that Birmingham was an appropriate place for the Conference, as at present they were engaged in substituting for a pumping scheme, which, for the size and population of the district, was meagre, a gravitation scheme which would give them an ample supply of pure water, and in the matter of water supply plumbing had a very important part to play. There was a difference in one respect between the plumbing which dealt with the public health and that which dealt with the water supply. When the water pipes leaked, people were anxious about their ceilings and carpets, and lost no time in sending for the plumber, but when there was a bad smell they were not so eager to do so. The public, it was to be feared, did not appreciate sufficiently the necessity of looking after all those invisible matters which only make themselves known by their odour. Surely, then, it was all the more important to large communities like theirs that the trade on which all that depended should be of the best possible character.—Mr. Robert Crawford, as Chairman of the Conference, read the resolutions, passed at the Conference. He said the plumbers of this country and their public representatives had been engaged during the past sixteen years in educating the public, the Local Authorities, and the masters and men in the trade, and in creating a higher standard of appreciation of knowledge and of responsibility. They had been successful in creating throughout the whole of Great Britain and Ireland a network of organisation which already had produced splendid results. No one who had had experience of public health matters would deny that an immense improvement had taken place in plumbing work during the last sixteen years in this country.—Alderman Cook, Chairman of the Health Committee, Birmingham, moved a resolution endorsing the decisions of the Conference, supporting its efforts in the interests of the public health, and urging the Government to carry through the Bill for the National Registration of Plumbers.

STREET IMPROVEMENTS, LINCOLN.—A Local Government Board inquiry was conducted at Lincoln on the 24th ult. by Inspector North, with reference to an application by the City Council for sanction to borrow 4,261*l*. for the purchase of land

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for street improvements, and 1,663*l.* for puposes of paving. The Surveyor (Mr. R. A. MacBrair) stated that it was proposed to widen the western end of Saltergate to St. Swithin's-square. The present width was 8 ft., and they proposed to widen it to 30 ft. 8 in. The total length proposed to be widened was 626 ft.

PORT OF BRISTOL.—The Bristol City Council have decided to promote a Bill in the ensuing Session of Parliament giving powers for dock works at Avonmouth. The outlay is estimated at 1,804,700*l.*

PROPOSED REFUSE DESTRUCTOR, GORTON, LANCASHIRE.—A Local Government Board inquiry was held recently at the Gorton Town Hall with reference to the application of the Gorton Urban District Council for sanction to borrow 13,111*l.* for the erection of a refuse destructor at Sunny Brow. The scheme has met with some opposition, and at the inquiry—which was conducted by Colonel W. R. Slack—Mr. Hinnell, engineer, of Bolton, appeared in support of the case for the opponents. Evidence was also given by Mr. James Johnston, engineer, Manchester.

THE CASTLES OF YORKSHIRE.—The annual dinner and meeting of the Bradford Historical and Antiquarian Society was held on the 26th ult. at the Café Royal, Darley-street, Bradford. Mr. J. Norton Dickons, the newly-elected President, occupied the chair. After dinner, Mr. T. Howard (hon. secretary) read the twenty-second annual report of the Committee, and the hon. treasurer (Mr. W. Glossop) read the balance-sheet. Mr. C. R. Federer moved the adoption of the report and balance-sheet, which was seconded by Mr. J. A. Clapham, and agreed to. During the evening the President read a paper on "The Ancient Military Defences of Yorkshire," in which he classified the remains of military fortifications existing in the county, and suggested a number of places which should be visited by the Society. He pointed out that no county was richer in early earthworks and mediæval castles than Yorkshire. Scattered over the eastern and south-eastern parts of Yorkshire were a number of entrenchments, the origins of which were lost in darkness. Many of these had probably been thrown up for cattle enclosures or as tribal boundaries. Then there were a number of mounds—raths, as Professor Phillips called them, or "motes," as Mrs. Armitage styled them—such as the great earthworks at Barwick-in-Elmet, which were probably the work of the great Saxon landowners, while some were afterwards utilised by the Normans and their successors. It was not until after the Norman Conquest that castles in stone began to be built in England. Where there was an earlier work big enough and strong enough to carry a stone wall, the Normans utilised it, and erected thereon a shell such as that at York. Where there were no mounds, or the situation chosen was a new site, the Normans erected their works on a different plan. Specimens of rectangular keeps like those at Richmond, Middleham, and Scarborough, and the one circular keep at Conisburgh, were described in detail. As a specimen of the class of castles known as "shell-keeps," those of Clifford's Tower at York, Sandal, near Wakefield, Pontefract, and Tickhill, were described. In this species of castle a wall was erected on the top of, or surrounding, a mound of earth of earlier date, and the buildings were arranged inside the enclosure and against the wall. After the time of Henry III., when the country became settled, the building of castles was discouraged, and a noble was only allowed to fortify his manor-house or to erect a castle upon a licence from the Crown. No first-class castle was erected in Yorkshire after 1307, and those that were erected subsequently were more palace-castles for habitation than castles for defence. Bolton Castle, near Leyburn, was the largest and best preserved of these fortified manor-houses in Yorkshire, and perhaps the best preserved of its kind in England. By the time of the Civil War and the Commonwealth the castles were falling into decay, and after the fighting they were ordered by the Parliament to be "slighted," which was done by blowing them up.—On the motion of Mr. John Clapham, seconded by Mr. W. Glossop, thanks were accorded to the officers of the Society, and to those who had assisted in the work by contributing papers or in other ways.—*Bradford Observer.*

FALCON-COURT IMPROVEMENT, BOROUGH. — At the Surveyors' Institution, Westminster, on Friday last week, Mr. G. R. Askwith, barrister-at-law, sat as sole arbitrator to decide the value of the freehold interest in the cottages, Nos. 1 to 23, Red-cross-place, in the Borough, required by the London County Council, who are the Local Authority for carrying out the London (Falcon-court, Borough) Improvement Scheme, 1895. The claimants were the trustees of the London Parochial Charities, who claimed for such a sum as, when invested in Consols, would produce the present ground-rent of 140*l.* per annum. The arbitration took place under the Housing of the Working Classes Act, 1890. Mr. R. Nevill appeared for the claimants, and Mr. Corrie Grant represented the London County Council. The property in question, it was stated, was a portion of the Falcon-court area, which had been condemned as insanitary by the Inspector of the Local Government Board. The cottages let in single rooms produced a gross annual rental of 572*l.* The property was leased for a period expiring in 1938 at a ground-rent of 140*l.* per annum. The County Council had already acquired the leaseholders' interest at a cost of 2,500*l.*, and had settled all the other forty claims involved without arbitration. It was claimed on behalf of the Council that the reversion was of no value. Mr. Herbert Winstanley and Mr. W. E. Horne, surveyors, valued the freeholders' interest at 4,467*l.*, Mr. J. F. Field at 3,000*l.*, Mr. Daniel Watney at 3,120*l.*, and Mr. Harper, assistant valuer to the County Council, at 3,180*l.* The arbitrator reserved his decision.

VALUE OF LAND AT WEST HAM.—At the Surveyors' Institution, Westminster, on the 24th ult., Mr. Alfred Savill sat as arbitrator in the case of "Smith *v.* the West Ham Corporation," to determine the value of 3 a. 3 r. 21 p. of land at Silvertown, adjoining the Victoria Dock and the Victoria Graving Dock, which the Corporation have acquired for the erection of artisans' dwellings. Mr. C. B. Marriott appeared for the owner of the land, Mr. Charles Smith; and Mr. E. Morten, Recorder of West Ham, represented the Corporation. Mr. Arthur Tapp, of the firm of Messrs. Tapp & Jones, surveyors, Princess-street, Westminster, said there was a great demand for house accommodation in the district, and the value of land had, during the last few years, largely increased and was still increasing. The piece of land was, until lately, used for grazing, at a rental of 13*l.* per annum. His total valuation was 7,148*l.*, inclusive of 10 per cent. for compulsory sale. After Mr. Morten had addressed the arbitrator it was agreed to accept an award of 5,565*l.*, subject to the decision of the referee as to 120*l.*, the value of 20 ft. of frontage in North Woolwich-road, the title of which was questioned. The amount was practically on the basis of 6*l.* per ft. frontage for North Woolwich-road, and 3*l.* 15s. per ft. frontage in other adjacent roads.

ELECTRIC LIGHT, SLEAFORD, LINCOLNSHIRE.—A Local Government Board inquiry was held at Sleaford on the 24th ult., into an application by the Urban District Council for sanction to borrow 7,000*l.* for electric lighting purposes. The scheme was explained by Mr. E. Bremner Smith, of Oswestry, the engineer.

CAPITAL AND LABOUR.

REDUCTION OF DUNDEE MASONS' WAGES.—Mr. Joseph Wilkie, the secretary of the Dundee Master Masons' Association, has, as the result of a meeting of the master masons, sent intimation to Mr. J. Hume, secretary of the Dundee Operative Masons' Society, of a reduction on the wages of 1d. per hour. The present rate is 8d. per hour. Three months' notice has to be given, and the reduction is to take effect on February 16 next.

LEGAL.

CASE UNDER THE LONDON BUILDING ACT, 1894.

HOSKINS *v.* DICKSEE.

AT Southwark Police-court, on October 24, Mr. Kennedy gave his decision in an appeal under Section 150 of the London Building Act, 1894, by Mr. F. C. Hoskins against a notice of objection served on him by Mr. Bernard Dicksee, District Surveyor for East Newington, in respect of the Horseshoe beerhouse, 87, Old Kent-road.

The case was argued before Mr. Kennedy on October 17, when Mr. Gates appeared for the appellant, and Mr. Horace Avory, instructed by Mr. D. P. Andrews, of the Solicitors' Department of the London County Council, appeared for the District Surveyor.

The appellant, a builder and contractor, had entered into a contract to rebuild the house in question which had been for many years licensed for the sale of beer and wine. The new building, the plans of which had been approved by the licensing magistrates, would exceed ten squares in area, and was planned with bar, bar parlour, and public-room on the ground floor, cellars in the basement, and dwelling-rooms on the first and second floors. The District Surveyor had decided that this building was one to be used in part for the purposes of trade, and in part as a dwelling-house, and had therefore served notice of objection on the ground that Section 74 (2) would be contravened, requiring the part used for trade to be separated from the part used as a dwelling by walls and floors of fire-resisting material, the staircase and other means of approach to the part used as a dwelling to be constructed of fire-resisting materials, and the doorways for inter-communication between the trade and dwelling portions to be fitted with fire-resisting doors. Against this notice of objection the builder appealed.

On behalf of the appellant, Mr. Gates urged that the licensing magistrates had approved the plans, and that the case was governed by the decision of Carritt *v.* Godson (1899, 2 Q.B., 193), in which case it was decided that a fully-licensed public-house did not come within Section 74 (2).

On behalf of the District Surveyor, Mr. Avory argued that the approval of the licensing magistrates to the plans could not affect the requirements of the Building Act, and that the present case was distinguishable from the case quoted, inasmuch as the learned Judges had based their decision on the assumption that a public-house was practically an inn, and that consequently, in a sense, the whole of the premises were used for trade. This was not the case with a beerhouse, which was simply a shop for the sale of beer and wine, and on the same footing as a butcher's, draper's, or any other shop. The trade of a beerhouse was required by the Alehouse Act to be carried on in a dwelling-house, and the holder of the licence was required to enter with the Excise authorities the exact rooms in which he intended to carry on the sale of beer, being liable to a fine for selling beer in any other room not so entered. To hold that a house for the sale of beer was exempt from the section would be to read into it some such words as "but this section shall not apply to premises in which the sale of beer is carried on." There was no obligation implied or direct on the holder of a beerhouse licence to let bedrooms, as was the case with fully-licensed premises.

Mr. Kennedy, in giving his reserved decision, said that he could not distinguish the present case from that of Carritt *v.* Godson, by which he was bound. He must, therefore, allow the appeal with 5*l.* 5s. costs.

On the application of Mr. Andrews, he agreed to state a case for the consideration of the High Court. Mr. Gates urged that a case should not be stated; but Mr. Kennedy said he had carefully considered that point. The case was not on all fours with Carritt *v.* Godson, which dealt with fully-licensed premises, whereas this was only a beerhouse; moreover, his sympathies were with the attempt to enforce the section.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

13,634.—DRAWING AND RULING PENS: *F. Gaufroy.*—In order that one adjustment may answer for setting out lines of varying thickness the pen's handle is formed of two parts pivoted together upon which the nibs or blades are mounted; a spring presses the nibs together for drawing fine lines, and is adjusted with a screw. When a thicker line is needed the two parts are pressed together in the act of ruling so as to separate the nibs to an extent which is limited by another screw which has been already adjusted.

13,640.—A SASH FASTENER: *J. B. Parsons.*—On to the inner meeting-rail is screwed a plate on which is pivoted a lever whose hinged handle becomes turned down when the lever has been moved into engagement with a catch on the other meeting-rail; in order that the contrivance may serve for sashes of different thicknesses the lever's end is caused to pass beneath an inclined plane so that its teeth shall engage with a rack accordingly with the widths of the meeting-rails.

13,641.—AN ANTI-FREEZING CONTRIVANCE FOR WATER PIPES: *J. Schratzenstaller.*—One end of a metal rod which has a large co-efficient of expansion is fastened to a wall, a roller upon its other end bears upon the arm of a lever that works upon a pivot, whilst its longer arm is secured adjustably to a slotted plate, a rod joins the slotted plate to another plate within a cylinder which under normal conditions shuts the feed-pipe's nozzle, the cylinder is connected to the water-tank by an overflow pipe; at a fall of the temperature the contraction of the metal rod effects an uncovering of the feed-pipe nozzle, whereupon water will rise within the cylinder and overflow into the tank and service pipes.

13,645.—ARTIFICIAL STONE SLABS FOR BUILDING PURPOSES: *J. Knight.*—The slabs are intended for use in constructing fire-proof partitions, floors, conduits, tanks, &c., and are fashioned with grooves in their edges for keys of cement; for floors they may be curved or flat and be grooved so to engage with and to enclose the iron joists' lower flanges; in the case of fireproof partitions the slabs are laid upon grooved blocks of artificial stone upon a foundation of cement, the flooring joists of wood or iron being sustained with brackets or hangers set at intervals upon the slabs. Other similar applications of the invention are specified.

13,665.—ARTIFICIAL MARBLE: *F. Heyden.*—A solution of chloride of magnesium together with some mineral colouring are added to an admixture of ground non-calcareous magnesite, sand, marble dust and gypsum, &c.; with that compound marble-like veined patterns are drawn upon a polished base covered with a very thin layer of celluloid; after the pattern has become set a similar filling is poured over it, the colours are fixed by heating the slab to 300 deg. C., it is then saturated with mineral wax, polished with a celluloid solution, and lastly is rubbed with a waxed felt cloth.

13,700.—AN APPLIANCE FOR USE WITH T-SQUARES: *T. H. Roden.*—The inventor's object is to provide means of preventing the square from slipping, and of holding it upon the drawing-board. A spring secures upon the board a gripping-plate, whose pivot pin is carried by the lugs of a plate which is attached to the stock of the square.

13,701.—HOT-WATER APPARATUS: *R. E. Phillips.* The apparatus consists of an injector for heating water for baths, lavatory basins, and similar purposes with steam. A nozzle, forming the steam inlet, is inserted loosely into the conical end of the

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hot-water outlet, and the outlet's lower portion is fashioned in the shape of a double cone in order to accelerate the mingling of the steam with the water. Automatical valves are fitted to the cold water and steam supply pipes.

13,758.—Treads for Stairs, Ladders, Steps, &c., and Lathe Treadles: *A. L. P. Chasles.*—The inventor makes the treads out of metal plates wherein holes are punched so as to raise burred edges, and they are to be secured in their places with screws or the folding-over of their flaps.

13,764-5.—Windows and Casements: *R. L. Williams and T. Payne.*—For opening and closing the windows, and retaining them in any position required, nuts are attached to the sash stiles and screws which pass through the nuts are to be turned by means of endless cords that travel around pulleys. For turning casements and enabling their ready movement across the frame in order that they may be cleaned upon their outer sides, they are hinged on to runners or sleeves which are caused to slide along guides or rods.

13,788. — Dove-tailing Machinery: *J. E. Erickson.*—The sets of saws are separated with distance-pieces, and automatical clamps hold the boards down upon the table; in the case of mortises which are to be cut with two sets of saws, the table —whereon the board has been laid against front-stops and a fence at the side—is reciprocated by means of the crank's connecting-rod, whereupon a spring clamping-bar is released. The clamping-bar, which holds the board during the movement of the saws, frees the board, at the end of the stroke, by means of contact with stops; at that moment the friction gear becomes disengaged by the action of a cam, and the table's motion ceases. The friction gear that turns the crank is brought into action by the pressing down of a foot-lever; two sets of saws carried by reciprocating frames at the machine's other end cut the tenons; the front stops for the boards consist of hooks upon the ends of sliding rods, whose position is adjusted with a screw.

13,834.—Calcining Furnaces: *W. B. Devereux.*—The charge is to be stirred with hollow rakes wherein water circulates, and metal channels in the furnace walls, with their outer surfaces exposed to the air, carry and work the rods which sustain the rakes; the rods also are made hollow for the circulation of water within them, the water being supplied through flexible pipes from a tank above; the hollow teeth of the rods should be formed of porcelain.

13,849.—Incandescent Lamps: *J. Atherton.*—Two slots, to correspond with grooves in the bulb's neck, are cut in the bayonet or screw cap which is fastened against a shoulder upon the neck of the bulb with a wire which is placed in the slots and grooves and whose ends are to be twisted together. For replacing a filament the bulb is fashioned with a long neck divided with a hot wire, or otherwise, and then joined together again. The new filament is firstly mounted upon short wires that have been connected to the leading-in wires.

13,883.—Window Sashes: *A. Tomlinson & W. Phillips.*—For the exclusion of rain and draught the rabbetted stiles of the reversible sash and frame are fitted with doubly rabbetted weather bars or strips, and air baffles or grooves are also formed opposite one another. To render the pivot or hinge weather-tight an extension of the hinge socket's flange is cut away that it may engage with recessed and projecting portions of the hinge pin's flange.

13,895.—Portable Structures and Buildings: *E. Payart.*—For the construction of field hospitals, huts, railway stations, silos, wells, &c., are used corrugated plates, bolted, hooked, or otherwise fastened together, sand, shingle, straw, &c., being filled into the spaces in the hollow walls, which are then closed with horizontal plates. The wall-plates will be laid upon the ground or upon foundation-plates sunk into the soil, and angle-iron pillars secured to spiked foundation plates will serve to stiffen the corners of the building; tie-bars are employed for bracing the hollow roof that is fastened on to vertical plates which will slide upon the wall-plates to enable one to lift the roof and so to uncover the openings for ventilation. The lifting of the roof above the walls can be effected by an arrangement of screws and "lazy-tongs" levers.

13,904.—Mortise Locks: *T. Letheren.*—In order that the case's rear portion shall be as small as possible, the inventor devises a method of moving the bell crank lever, which works the latch-bolt, by the follower. A knuckle-joint joins the follower to the arm that presses upon the lever, so that if the follower is turned in one direction the arm will be lifted as though it were attached rigidly to the follower, but when the follower's motion is reversed the arm is caused to turn upon a stop-pin which serves for a fulcrum.

13,925.—A Solder Supply: *J. F. Kesler and F. A. Hecht.*—The inventors make a self-fluxing solder by preparing a solder with a series of cavities into which some suitable flux is to be filled, thus a proper quantity of flux will be automatically furnished during the process of soldering. In one shape a tube of solder charged with flux is passed between rollers which will form the cavities for taking the flux.

13,951.—Cranes: *T. S. Mossman.* — The contrivance is devised for application to derrick cranes. A ball, fitted at the lower end of the jib, is caused to bear in one of several cups, which are fashioned in a flange that is bolted on to the mast of the crane, and is held in its place by means of a retaining-cap.

13,954.—A Machine for Bevelling Glass: *J. H. Lovell and J. W. King.*—A conical grinding-face is fashioned upon the wheel which is mounted upon an inclined spindle; a reciprocating table, which is vertically adjustable at both its back and front, carries the glass plate, and is slightly tilted so that it shall throw the bevelled edge of the plate into a horizontal level. A roller or a pad upon a weighted lever holds down the plate, whose edge just overlaps the grinding face's inside edge, the wheel being turned in a direction that will keep the plate in close contact with the back-stops.

MEETINGS.

Friday, November 2.

Architectural Association (Discussion Section).—Mr. H. Rose on "Church Bells." 7 m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor Henry Robinson on "House Drainage." 8 p.m.

Saturday, November 3.

British Institute of Certified Carpenters.—Meeting at Carpenters' Hall. 6 p.m.

Institution of Junior Engineers.—Visit to Millbank Station of London Hydraulic Power Company. 3 p.m. (Postponed from October 27.)

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection and demonstration at the Sewage and Destructor Works, Ealing. 2.15 p.m.

City of London College Science Society (White-street, Moorfields, E.C.).—Visit to the "Patent Stone, Disinfecting Apparatus, and Dust Destructor" of the Poplar Vestry. 3 p.m.

Dundee Institute of Architecture.—Opening lecture, "Some Byeways in Architecture," by Mr. G. S. Aitken, F.S.A. 7 p.m.

Monday, November 5.

Royal Institute of British Architects.—Opening address by the President, Mr. Wm. Emerson. 8 p.m.

Society of Engineers. — Mr. C. Rous-Marten on "English and French Compound Locomotives." 7.30 p.m.

Liverpool Architectural Society.—Mr. Halsey Ricardo on "The Revival of Gothic Architecture," illustrated by lime-light views. 6 p.m.

Tuesday, November 6.

Institution of Civil Engineers.—Address by Mr. James Mansergh, President, and presentation of medals and prizes awarded by the Council. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor Henry Robinson on "Water Supply, Sources of Supply and Distribution." 8 p.m.

Wednesday, November 7.

Royal Archæological Institute.—(1) Mr. H. S. Cowper, F.S.A., on "Antiquities Collected in North Africa, Egypt, and Asia Minor, 1899-1900." (2) Mr. J. Lewis André, F.S.A., on "Miscellanea Heraldica." 4 p.m.

British Archæological Association.—Mr. R. Newstead, F.E.S., Curator of the Grosvenor Museum, Chester, on "The Roman Remains Discovered at Chester, 1896-1900." 8 p.m.

Builders' Foremen and Clerks of Works Institution.—Ordinary meeting of the members. 8 p.m.

Edinburgh Architectural Society.—Mr. W. J. Blain on "Some Scotch Houses."

Thursday, November 8.

Institution of Electrical Engineers.—The President, Professor John Perry, M.E., D.Sc., F.R.S., will deliver his Inaugural Address. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor Henry Robinson on "Sewerage." 8 p.m.

Friday, November 9.

Architectural Association.—Mr. L. L. Macassey on "The Legal Position of the Architect." 7.30 p.m.

Glasgow Technical College Architectural Craftsmen's Society.—"Specification for a Roof:" (1) "Timber," by Mr. D. Ritchie; (2) "Slating and Plumbing," by Mr. J. M. Bowman; (3) "Glazing," by Mr. J. Marshall. 8 p.m.

Saturday, November 10.

British Institute of Certified Carpenters (Carpenters Hall. 6 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 16.—By Chancellor & Sons (at Richmond).

Richmond.—51, 52 and 53, George-st., c., r. 535*l.*	£15,150
59, George-st., f., r. 150*l.*	5,750
25 and 26, King-st., f., r. 140*l.*	3,350
King-st., St. Heliers, f., r. 55*l.*	900
14, The Green, c., r. 65*l.*	1,000
2, St. Helena-ter., f., r. 40*l.*	1,000

October 17.—By W. Higgins (at Rugby).

Braunston.—Northants, various enclosures, 51 a., f.	3,660
Freehold house, yard, and 2 a.	510
Two freehold houses and shop	300
Daventry.—Northants, freehold house and factory	320

By Percy H. Clarke.

Fulham.—40, Chesilton-rd., u.t. 80 yrs., g.r. 8*l.*, r. 40*l.*	365
123, Moore Park-rd., u.t. 66 yrs., g.r. 5*l.* 5s., r. 35*l.*	365

By Humbert & Flint.

Rayne, &c., Essex.—Rayne Lodge Estate, 305 a. o r. 7 p., f.	3,400
Rayne Hall Estate, 290 a. 3 r. 29 p., f.	3,325
Two Enclosures of Land, 22 a. o r. 17 p., f.	470
King's Langley, Herts.—Langley Lodge and Ball's Pond Farm, 870 a. or. 23 p., f.	21,500
Harrow, Middlesex.—Sudbury-rd., Mountside Cottage, f.	535

By Thurgood & Martin.

Minories.—No. 152, area 2,420 ft., Corporation Lease, g.r. 21*l.* 14s., fine 151*l.* 18s., r. 247*l.* 15s.	£4,100
Tooting.—Moring-rd., f.g.r. 24*l.*, reversion in 98 yrs.	1,050
Wanstead.—1 to 6, Slaters-alley, c.	250
4 and 5, Voluntary-pl., and a plot of land, c.	400
Holborn.—21 and 22, New-yard, f.	1,325
New-yard, freehold stabling premises, r. 32*l.*	700

October 18.—By G. Fuller & Son.

Chigwell, Essex.—Hainault-rd., Oakhurst and 2 acres, f., r. 50*l.*	1,035

By Hawes & Co.

New Malden, Surrey.—Mount Pleasant, The Cottage, f., r. 34*l.*	400

By Mark Lill & Son.

Edmonton.—31 and 33, Windmill-rd., u.t. 75 yrs., g.r. 5*l.*	250

By Westmore & Young.

Norwood.—Sunnybank, Marion Villa, u.t. 54 yrs., g.r. 3*l.* 15s., e.r. 40*l.*	370

By H. J. Bliss & Sons.

Bethnal Green.—24 and 26, Hollybush-gdns., u.t. 14 yrs., g.r. 6*l.*	300
Old Ford.—38, Eglinton-rd., f.	455
132, St. Stephen's-rd., f.	470
86a, Ford-st., f.	400
Penge.—38, Lennard-rd., u.t. 82 yrs, g.r. 5*l.*, r. 32*l.*	370
Hackney.—35, King Edward-rd., u.t. 25 yrs., g.r. 6*l.* 12s.	450

By Protheroe & Morris.

Sewardstone.—Sewardstone-rd., The Woodlands and 15½ a., f.	2,400
Wanstead.—Redbridge-lane, a block of building land, 3 a. 3 r. to p., f.	960

By James T. Peat (at Reigate).

Reigate, Surrey.—5, 6 and 7, North-rd., f.	490
Redhill, Surrey.—2 and 4, Elms-rd., f.	045

By Worsfold & Hayward (at Dover).

Dover, Kent.—20, London-rd., f., r. 150*l.*	2,750
8, 9, 33, 35, 37, and 38, Granville-st., f.	1,510

By Edwin Evans (at Clapham Junction)

Battersea.—20, and 24, Lavender-rd., u.t. 30 yrs., g.r. 6*l.* 10s.	405
Hammersmith.—11, Glenthorne-rd., u.t. 70 yrs., g.r. 7*l.*, e.r. 35*l.*	365
Balham.—18, 22, and 24, Nightingale-sq., u.t. 94 yrs., g.r. 21*l.*	1,135
Endlesham-rd., a block of building land, f.	345
Fulham.—111 to 129 (odd), Wardo-av., u.t. 89 yrs., g.r. 59*l.* 10s.	2,500
146 to 152 (even). Wardo-av., f.	1,505
42, Kembell-gardens, u.t. 95 yrs., g.r. 5*l.*	220
Balham.—30, Rossiter-rd., u.t. 73 yrs., g.r. 8*l.*, r. 34*l.*	360
27, Elmfield-rd., u.t. 90 yrs., g.r. 6*l.* 10s.	495
Wandsworth.—77, Allfarthing-lane, u.t. 95 yrs., g.r. 6*l.* 10s., r. 36*l.*	330
90, 92, and 94, Summers Town, f.	620
22, Bassingham-rd., u.t. 93 yrs., g.r. 6*l.* 6s.	225
46, Bassingham-rd., u.t. 89 yrs., g.r. 5*l.* 10s.	200
19 and 21, Swanage-rd., u.t. 93½ yrs., g.r. 14*l.* 14s.	465
Norbiton.—1 to 6, Cobham Villas, u.t. 99 yrs., g.r. 42*l.*	1,650

October 19.—By Green & Son.

Crouch End.—26, Fairfield-rd., u.t. 87 yrs., g.r. 12*l.*, e.r. 70*l.*	620

By Millar, Son, & Co.

Burstow, &c., Surrey.—Burstow Lodge Estate, 265 a. 2 r. 26 p., f.	7,500

By Triste & Co.

Clapton.—Upper Clapton-rd., Hadham House and 1 a. 2 r. 30 p., u.t. 38 yrs., g.r. 25*l.*	1,625

By Windrum & Cleave.

Commercial-rd. East.—No. 801, f., e.r. 85*l.*	980
Poplar.—33, Susannah-st., with yard and stabling, f., r. 40*l.*	715
81, Culloden-st., and 81, Dee-st. u.t. 73 yrs., g.r. 3*l.* 15s.	435
Bow.—62 and 64, Quickett-st., u.t. 73 yrs., g.r. 6*l.*	340
East Ham.—144 and 146, Kensington-av., u.t. 98 yrs., g.r. 10*l.*	540
Rotherhithe.—Beatson-st., f.g.r. 35*l.*, reversion in 70 yrs.	720

October 22.—By Edwin Evans.

Stratford.—15, 17, and 19, Livingstone-rd., u.t. 66½ yrs., g.r. 9*l.* 9s.	370

October 23.—By Fortescue & Branson.

Hammersmith.—22 and 24, Glenthorne-rd., u.t. 48 yrs., g.r. 6*l.*	755
Kensington.—80, Masbro'-rd., u.t. 57 yrs., g.r. 4*l.*	245
Shepherd's Bush.—68, Gayford-rd., u.t. 77 yrs., gr. 5*l.*	185
Bethnal Green.—156, 158 and 160, Cambridge-rd., u.t. 5½ yrs., g.r. 12*l.*	360

By Hampton & Sons.

Warlingham, Surrey.—Kellora and 1½ acres, f.	1,935

By W. R Nicholas & Co.

Surbiton, Surrey.—Surbiton Hill, The Beacon, f.r. 165*l.*	2,400

By Reynolds & Eason.

Mile End.—Cornwall-pl., f.g.r. 20*l.*, reversions in 75 yrs.	465

By David Burnett & Co.

Chelsea.—2, 6, 7, 8, 13, 14, 16, 21, 24, 25, and 26, Bywater-st., u.t. 8 yrs., g.r. 32*l.* 8s. 8d.	560
33 to 51 (odd), Marlborough-rd., and 19, Norman-st., u.t. 8 yrs., g.r. 115*l.*	505
53 to 95 (odd), Marlborough-rd., u.t. 8 yrs., g.r. 240*l.* 13s.	1,470
1 to 10, Whitehead's-gr., and 113 to 129 (odd), Keppel-st., u.t. 8 yrs., g.r. 230*l.*	1,215
51 to 57, 91 to 111 (odd), Keppel-st., u.t. 8 yrs., g.r. 90*l.*	760
Hackney.—4, Patriot-sq., f.	560
63, St. Thomas-rd., u.t. 41 yrs., g.r. 5*l.*	415
Hoxton.—15, 22 to 30 (even), 34, 36, 39, 41, 43, 51 and 53, Crondall-st., u.t. 14 and 15 yrs. g.r. 245*l.* 14s.	1,135

By C. & H. White.

Rotherhithe.—271, Rotherhithe New-rd., u.t. 31 yrs., g.r. 13*l.*, r. 45*l.*	625

October 24.—By C. Rawlev Cross & Co.

Putney.—15, Chelverton-rd., u.t. 88 yrs., g.r. 7*l.* 10s., r. 42*l.*	395
31, High-st., u.t. 81 yrs., g.r. 10*l.*, r. 200*l.*	3,145
Chiswick.—Barrowgate-rd., &c., two corner plots of land, f.	460

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By DOLMAN & PEARCE.
Haverstock Hill.—No. 114, u.t. 50 yrs., g.r. 5*l.*, e.r. 130*l.* £1,225
By MARK HUBBARD.
Camden Town.—15, Camden-sq., u.t. 43½ yrs., g.r. 10*l.*, e.r. 80*l.*, ... 470
By J. H. MELLENFIELD.
Willesden.—27, 29 and 31, Mayo-rd., u.t. 81½ yrs. g.r. 15*l.* 525
Greenwich.—13, Bell-st., and 1 to 4, Clive-pl., f... 475
October 25.—By BROWETT & TAYLOR.
Holborn.—17, Red Lion-st., f., r. 60*l.* 1,060
Camberwell.—Albany-st., i.g.r. 55*l.* 5s., u.t. 17½ yrs., g.r. 25*l.* 5s. 240
Wanstead.—Chaucer-rd, f.g.r. 66*l.*, reversion in 85 yrs. 1,600
Wandsworth...14, Lavender Hill, f., r. 75*l.* 1,350
Pimlico.—28, Sussex-st., u.t. 33 yrs., g.r. 8*l.*, r. 40*l.* 385
By R. BURR & SONS.
Stoke Newington.—10 to 20 (even), Elton-st., u.t. 19 yrs., g.r. 18*l.* 600
By WALTER COBB.
Sydenham.—37, Trewsbury-rd., u.t. 70 yrs., g.r. 9*l.*, r. 60*l.* 730
Lawrie Park-rd., Rosendale, f., e.r. 65*l.* 930
By FAREBROTHER, ELLIS, & CO.
Canvey Island, Essex.—Knightswick Farm, 473 a. 3 r. 12 p., f. 3,500
Hammersmith.—River-ter., &c., f.g.r. 64*l.*, reversion in 33¾ yrs. 1,985
Twickenham.—Chestnut-rd., &c., f.g.r. 10*l.*, reversion in 48¾, 56, and 62 yrs. 235
Bethnal Green.—Harold-st., &c., f.g.r. 6*l.* 10s., reversion in 34 yrs. 195
Putney.—1, Henley Villas, u.t. 81 yrs., g.r. 7*l.*, r. 55*l.* 600
1, Ellerton Villas, u.t. 80 yrs., g.r. 7*l.*, e.r. 60*l.* 600
By WALTER HALL.
Willesden Green.—21 to 35 (odd), Gowan-rd., u.t. 96½ yrs., g.r. 50*l.*, e.r. 287*l.* 2,375
Finchley.—5, Regent's Parade, f., r. 85*l.* 1,450
By C. C. & T. MOORE.
St. George's East.—Back Church-lane, the Coach and Horses B.-H., f., g.r. 50*l.* 1,060
Mile End.—Harford-st., &c., i.g.r. 44*l.* 10s., u.t. 16½ yrs., g.r. 20*l.* 220
Jubilee-st., i.g.r. 48*l.*, u.t. 8½ yrs., g.r. 13*l.*, with reversion 250
40, Redman's-rd., area 2,800 ft., c., r. 50*l.* 860
Bromley-by-Bow.—18 to 28 (even), Eastward-st., u.t. 62½ yrs., g.r. 19*l.* 10s. 560
Forest Gate.—235, Romford-rd., f., e.r. 70*l.* 900
Southend, Essex. — Southchurch-rd., f.g.r. 20*l.*, reversion in 77½ yrs. 620
By NEWBON, EDWARDS, & SHEPHARD.
Caledonian-rd.—34, 36, and 51, Outram-st., u.t. 57½ yrs., g.r. 18*l.*, r. 120*l.* 1,120
20, 32, and 34, Delhi-st., u.t. 57½ yrs., g.r. 18*l.*, R 106*l.* 16s. 1,110
Chalk Farm.—102, Belmont-st., u.t. 65½ yrs., g.r. 6*l.* 10s., r. 44*l.* 400
Finsbury Park.—5, Venetian-rd., u.t. 77 yrs., g.r. 6*l.* 10s., r. 36*l.* 385
Canonbury.—5, Canonbury Grove, u.t. 18 yrs., g. 7*l.*, r. 40*l.* 265
Clapton.—College-av., a Plot of Building Land, f. 64, Kenninghall-rd., f., e.r. 65*l.* 450
Dalston.—104, 106, 114, and 116, Richmond-rd., u.t. 22½ yrs., g.r. 24*l.* 880
Willesden.—4, Church-rd., u.t. 68½ yrs., g.r. 8*l.*, r. 40*l.* 690
By STIMSON & SONS.
Bow.—78 to 84 (even), Fairfoot-rd., u.t. 62 yrs., g.r. 15*l.*, r. 120*l.* 12s. 400
Peckham.—173 to 179 (odd), Commercial-rd., u.t. 59 yrs., g.r. 10*l.* 975
Camberwell.—72, Flaxman-rd., u.t. 64 yrs., g.r. 6*l.*, r. 28*l.* 940
Southwark.—236, 238, and 240, Tabard-rd. (site of), area 3,158 ft., f. 275
Hackney.—307, Victoria Park-rd., u.t. 44 yrs., g.r. nil, e.r. 45*l.* 500
Bayswater.—94, Talbot-rd., u.t. 58 yrs., g.r. 12*l.*, e.r. 70*l.* 480
Edmonton.—Balham-rd., Florence Villa, u.t. 98 yrs., g.r. 4*l.* 10s. 445
Bermondsey.—34, Ernest-st., u.t. 16½ yrs., g.r. 3*l.* 5s. 150
New Cross.—167, Shardeloes-rd., u.t. 64 yrs., g.r. 5*l.*, e.r. 35*l.* 120
Brixton.—41, Treherne-rd., u.t. 62½ yrs., g.r. 5*l.*, r. 32*l.* 350
By WORSFOLD & HAYWARD.
Stockwell.—27 and 27A, Stockwell Green, f. e.r. 40*l.* 350
Canning Town.—4 to 16 (even), Constance-st., u.t. 79 yrs., g.r. 21*l.* 700
1 to 9 (odd) and 10, Victoria-pl., u.t. 79 yrs., g.r. 18*l.* 645
October 26.—By HERRING, SON, & DAW.
Streatham.—135, Hopton-rd., u.t. 80 yrs., g.r. 12*l.* 12s. 460
By WHEATLEY, KIRK, PRICE, & CO.
Romford, Essex.—Hornchurch-rd., the Ormonde Cycle Works, area 4 a., u.t. 88 yrs., g.r. 25*l.* 500
By J. C. PLATT.
Battersea.—37 and 39, Falcon-rd., u.t. 77 yrs, g.r. 14*l.* 10s., r. 115*l.* 2,550
Caledonian-rd.—No. 510, u.t. 42½ yrs., g.r. 10*l.* 10s. e.r. 60*l.* 1,520
Holloway.—1 and 2, Hillmarten-rd., u.t. 41½ yrs., g.r. 16*l.*, r. 110*l.* 485
Stockwell.—13, St. Michael's-rd., u.t. 65 yrs., g.r. 7*l.*, r. 45*l.* 940
Camden Town.—5, Chalk Farm-rd., u.t. 30 yrs., g.r. 7*l.*, r. 60*l.* 460
Brentford, Middlesex.—218, High-st., f., r. 35*l.* .. 440
By E. & S. SMITH. 660
Clerkenwell.—5, Amwell-st., u.t. 11 yrs., g.r. 7*l.* 7s., r. 65*l.* 350
Holloway.—58, Huddleston-rd., u.t. 66½ yrs., g.r. 7*l.*, e.r. 52*l.* 570
Highgate.—3, Onslow-gardens, u.t. 88 yrs., g.r. 9*l.* 9s., e.r. 60*l.* 640
Muswell Hill.—Muswell-avenue, Claremont, u.t. 96 yrs., g.r. 6*l.*, r. 38*l.* 440
By A. J. SHEPPIELD.
Acton.—Stirling-rd., &c., f.g.r. 169*l.*, reversion in 99 yrs. 4,255
Colville-rd., f.g.r. 254*l.*, reversion in 99 yrs..... 6,448
Hoxton.—8 and 47, Bookham-st., u.t. 34 yrs., g.r. 10*l.* 12s. 6d., r. 80*l.* £735
Poplar.—22, Willis-st., f. 200
17, 19, and 21, Annabel-st., u.t. 28 yrs., g.r. 7*l.* 10s. 225

***Contractions used in these lists.*—F.g.r.** for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

**** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 16 0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 12 0	,,	,, ,,
Smooth Bright Facing Stocks..	2 18 0	,,	,, ,,
Shippers	2 2 0	,,	,, ,,
Flettons.....	1 10 0	,,	at railway depôt.
Red Wire Cuts ..	1 15 0	,,	,, ,,
Best Fareham Red	3 11 6	,,	,, ,,
Best Red pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,, ,,
Do., Bullnose ..	4 12 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 6	,,	,, ,,
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats . .	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	,, ,,
Best Portland Cement	38 0	per ton ,,
Best Ground Blue Lias Lime..	24 6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks,	32s. 6d. per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt	
Bath ,, ...	1 7	,,	,,
Farleigh Down Bath ..	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,, ...	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale ,,	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York ,,	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super. at rly. depôt.	
,, ,, 6 in. Rubbed Ditto..	2 10½	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 3 in. self-faced Ditto	0 9	,,	,,

SLATES.

in. in.	£ s. d.	
20×10 best blue Bangor..	11 5 0	per 1000 of 1200 at ry. dep.
,, best seconds ,,	10 15 0	,, ,,
16×8 best ,,	6 2 6	,, ,,
20×10 best blue Portmadoc	10 18 0	,, ,,
16×8 best blue Portmadoc	6 0 0	,, ,,
20×10 best Eureka unfading green.....	11 2 6	,, ,,
16×8 ,, ,,	6 15 0	,, ,,
20×10 Permanent green	10 0 0	,, ,,
16×8 ,, ,,	5 12 6	,, ,,

TILES.

	s. d.		
Best plain red roofing tiles..	41 6	per 1,000	at rly. depôt
Hip and valley tiles....	3 7	per doz.	,, ,,
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles....	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles.....	4 0	per doz.	,, ,,
Valley tiles.....	3 9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50 9	per 1,000	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles.....	3 8	,,	,, ,,

PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0	,, ,, ,,

	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens.....	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens.....	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens.....	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in. ..	14 0 0	15 0 0
Battens.....	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,, ...	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
¾ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6
Compound Girders ,, ,,	12 5 0	13 10 0
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	11 7 6	12 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	10 0 0	10 10 0
Staffordshire Crown Bars, good merchant quality	10 15 0	11 5 0
Staffordshire "Marked Bars" ..	13 5 0	- - -
Hoop Iron, basis price.....	11 0 0	11 10 0
,, ,, galvanised	17 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.....	11 5 0	- - -
,, ,, to 24 g.....	12 10 0	- - -
,, ,, to 26 g.....	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14 15 0	- - -
,, ,, 22 g. and 24 g.	15 5 0	- - -
,, ,, 26 g.....	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.....	18 0 0	- - -
,, ,, 22 g. and 24 g.	18 10 0	- - -
,, ,, 26 g.....	20 0 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 15 0	14 10 0
,, ,, 22 g. and 24 g.	14 10 0	15 10 0
Cut nails, 3 in. to 6 in.....	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 7 6	- - -
Pipe in coils	20 17 6	- - -
Soil Pipe..	23 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	28 0 0	- - -
Silesian.....	27 10 0	- - -
COPPER—		
Strong Sheet..... per lb.	0 1 1	- - -
Thin ..... ,,	0 1 3	- - -
Copper nails ..... ,,	0 1 3	- - -

[*See also next page.*

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COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Bridge	Newcastle-upon-Tyne Corporation	Not stated	Nov. 15
Harbour Offices	Swansea Harbour Trustees	100*l.* and 50*l.*	Nov. 30
Parade Extension	Bridlington Corporation	35 guineas and 15 guineas	Dec. 1
Municipal Buildings	South Shields Town Council	200*l.*, 100*l.* and 50*l.*	Dec. 31

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Stone Paving	Tottenham U.D.C.	P. E. Murphy, Engineer, 712, High-road, Tottenham	Nov. 6
Additions to Schools, Marmion-street, &c.	Tamworth School Board	J. W. Godderidge, Architect, 4, Bolebridge-street, Tamworth	do.
Shop and Three Houses, Bishop-street, Londonderry	Mr. S. Bell	R. E. Buchanan, Civil Engineer, Castle-street, Londonderry	do.
Double Cottage, Crofts, Elgin, N.B.	.....	A. & W. Reid & Wittett, Architects, Elgin	do.
Building Work at Workhouse	Belfast Guardians	Young & Mackenzie, Archts., Scottish Provident Bldgs., Belfast	do.
Stables, &c., Underwood	Paisley (N.B.) Commissioners	J. Lee, Civil Engineer, Municipal Buildings, Paisley	do.
Chimney at Electricity Works, Valley-road	Bradford Corporation	Mawson & Hudson, Architects, Bradford	Nov. 7
Reservoir, &c., Peden Burn, Crawford	Wishaw (N.B.) Commissioners	W. R. Copland, Civil Engineer, 146, West Regent-street, Glasgow	do.
House, &c., Menston, near Otley	.....	Milnes & France, Architects, 99, Swan-arcade, Bradford	do.
School and House, near Chipping Norton	Over Norton School Board	A. E. Mace, School Offices, Chipping Norton	do.
Hotel, Annfield Plain, Durham	Mr. T. Pearson	G. T. Wilson, Architect, 121, Durham-road, Blackhill	do.
Additions to Winton's Assembly Rooms, Gt. Yarmouth	Messrs. J. & W. F. Goode	C. G. Baker, Architect, Town Hall Chambers, Great Yarmouth	do.
Two Houses, Halifax	.....	F. F. Beaumont, Architect, Southgate Chambers, Halifax	do.
Covered Ways at Infirmary, Milton	Portsmouth Guardians	G. E. Smith, Architect, Victoria-road North, Southsea	do.
Building Work, Thames-street, Weybridge	.....	C. Welch, Architect, London-street, Chertsey	do.
Well Sinking, Sheephouse	Drogheda R.D.C.	P. Dowdall, Workhouse, Drogheda	Nov. 8
Lodge, Gillas, Cautley, Sedbergh	Mr. C. W. Baxter	S. Shaw, Architect, Kendal	do.
Enlargement of Post Office, Watford	Office of Works	Secretary, Storey's Gate, S.W.	do.
Foundation Preparations, Manston Hospital	Leeds Corporation	E. T. Hall, Architect, 57, Moorgate-street, E.C.	do.
School Buildings	Calstock (Cornwall) School Board	H. J. Snell, Architect, The Crescent, Plymouth	Nov. 9
Police Houses, Dalton-in-Furness	Standing Joint Committee	H. Littler, Architect, County Offices, Preston	do.
Additions to Police Station, Hindley, near Wigan	do.	do.	do.
Water Works, Habbershaw, Inverurie, N.B.	.....	Jenkins & Marr, Civil Engineer, 16, Bridge-street, Aberdeen	do.
House, Califer Moss Farm, Forres, N.B.	.....	J. Forrest, Architect, High-street, Forres	do.
Test House, &c., Tame-street, Ancoats	Chorlton & M'chester W'house Com.	A. J. Murgatroyd, Architect, 23, Strutt-street, Manchester	do.
Additions, &c., to No. 9, The Beacon, Exmouth	Mr. R. H. A. Woodman	E. E. Ellis, Architect, Exmouth	do.
*Repairs and Painting to the Market Buildings	Borough Market Trustees	W. Woodroffe, Archt., Town Hall Chmbrs., High-st., Southwark	do.
Alterations to Hotel, Antrim	Mr. J. M'Nally	J. M. M'Nally, Antrim	Nov. 10
Street Works, &c.	Burnley R.D.C.	S. Edmondson, Civil Engineer, 18, Nicholas-street, Burnley	do.
House, The Butts, Warkworth	.....	M. T. Wilson, Architect, Alnwick	do.
Additions to Workhouse	Newton Abbot (Devon) Guardians	S. Segar, Architect, Union-street, Newton Abbot	do.
Wesleyan Church, Hensingham	.....	A. Huddart, Architect, 22, Lowther-street, Whitehaven	do.
Congregational Church, &c., Woodhouse-lane, Leeds	.....	G. F. Danby, Architect, 10, Park-row, Leeds	Nov. 12
Schools, Mellis	.....	Rev. T. H. Peat, The Rectory, Mellis	do.
Grauite (400 tons)	Quarry Bank, U.D.C.	A. Homfray, Cradley Heath	do.
School Superstructure, Waterloo	Oldham School Board	R. Holt, Architect, 11, Dale-street, Liverpool	do.
Widening James Bridge	Darlaston, U.D.C.	J. C. Joynson, Surveyor, Public Offices, Darlaston	do.
*Slop and Material Carts, Water Vans, &c.	Willesden District Council	Engineer, Public Offices, Dyne-road, Kilburn, N.W.	Nov. 13
*Iron Fencing	Walthamstow School Board	School Board Office, High-street, Walthamstow	do.
Malting, Belford, Northumberland	Messrs. Simpson & Co.	Brewill & Bailey, Architects, Angel-row, Nottingham	Nov. 14
Additions, &c., to Orlands, near Kilroot	Bishop of Down and Connor	W. J. Fennell, Architect, Scottish Provident Buildings, Belfast	Nov. 17
Tram Car Depôt, Cleveland-road	Wolverhampton Corporation	J. W. Bradley, Civil Edgineer, Town Hall	Nov. 19
*Isolation Hospital	Spennymoor U.D.C.	G. W. Rogers, Surveyor, Spennymoor	do.
*Two Cottage Homes, &c.	Woolwich Guardians	Church, Quick & Whincop, Architects, William-st. Woolwich	Nov. 21
*Engine House and Boiler House, &c.	Darlington Corporation	Borough Surveyor, Town Hall, Darlington	Nov. 22
*Pumping Engine, &c.	do.	do.	do.
*Car Depôt and Workshops	Salford Tramways Committee	Tramway's Engineer, Town Hall, Salford	Nov. 30
*Alterations and Additions to Watford Field School	Watford School Board	C. P. Ayres, Architect, Burvale, Watford	No date
House, George-street, Lynn, Norfold	.....	E. E. Colman, Architect, 24, King-street, Lynn	do.
Pipes, &c., Colebrook	Plympton, Devon Gas Co., Ltd.	Secretary, Gas Works, Underwood, Plymyton	do.
Two Cottages, Tennyson-avenue, King's Lynn	.....	L. F. Eagleton, Architect, Bank Chambers, King's Lynn	do.
Presbyterian Church, Cardiff	.....	Habershon & Co., Architects, 14, Pearl-street, Cardiff	do.
Shop, Leatbeg, Mulroy, co. Donegal	.....	J. Wilkinson, Milroy, co. Donegal	do.
Schoolroom, Shirebrook, near Mansfield	Methodist Free Church	J. Perkin, Architect, Shirebrook	do.
Hotel, Chichester-road, South Shields	The Executors of John Turnball	M. Hall & Son, Architects, King-street, South Shields	do.
Alterations to Premises, 51, Prospect-place, Swindon	.....	W. Drew & Sons, Architects, Victoria-road, Swindon	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary	Application to be in
*Clerk of Works	Minehead U.D.C.	.....	Nov. 6

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. —. Contracts, pp. iv. vi. viii. x. & xix. Public Appointments, pp. xvi. & xix.

PRICES CURRENT (*Continued*).

	Per ton, in London. £ s. d.	£ s. d.
BRASS—		
Strong Sheet ,,	0 0 11	- - -
Thin ,, ,,	0 1 1	- - -
TIN—English Ingots ,,	0 1 6	- - -
SOLDER—Plumbers' ,,	0 0 8	- - -
Tinmen's ,,	0 0 10	- - -
Blowpipe ,,	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3½d. ,, ,,
,, ,, fourths	3d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths	5d. ,, ,,

PRICES CURRENT (*Continued*).

Fluted sheet, 15 oz.	3½d. per ft. delivered.
,, ,, 21 ,,	4¼d. ,, ,,
⅛ Hartley's Rolled Plate	3d. ,, ,,
⅛ ,, ,, ,,	3½d. ,, ,,
¼ ,, ,, ,,	4d. ,, ,,

OILS, &c.	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
,, ,, ,, in barrels ,,	0 3 2
,, ,, ,, in drums ,,	0 3 4
Boiled ,, ,, in pipes ,,	0 3 4
,, ,, ,, in barrels ,,	0 3 5
,, ,, ,, in drums ,,	0 3 7
Turpentine, in barrels ,,	0 2 7
,, in drums ,,	0 2 9
Genuine Ground English White Lead per ton	27 10 0
Red Lead, Dry ,,	25 0 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 8 0

PRICES CURRENT (*Continued*).

VARNISHES, &c.	per gallon. £ s. d
Fine Elastic Copal Varnish or outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 8 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

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TO CORRESPONDENTS.

G. B. R. (Below our limit.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ASTON MANOR.—For alterations to fire station, &c., Chester-street, for the Urban District Council. Mr. G. H. Jack, Surveyor, Council House, Albert-road, Aston Manor:—

Hughes & Stirling	£1,505	Gowing & Ingram	£1,225
W. Hopkins	1,420	C. Hughes	1,207
Whitehouse & Sons	1,395	T. Elvins	1,185
F. Nicols	1,370	Lee & Sons, Avenue-road, Aston, Birmingham	1,179
G. Trentham	1,320		
W. Bishop	1,275		

BECKENHAM.—For making-up Blandford-road and others (four contracts); also Bromley-gardens, for the Urban District Council. Mr. J. A. Angell, Surveyor, Council Offices, Beckenham:—

	S. Saunders.	G. Wilson.	Mowlem & Co.	C. Pearce.
	£	£	£	£
Blandford-road	7,007	4,093	3,432	3,364
Oakwood-aven.	4,161	1,725	1,651	1,542
Gowland-place	1,394	480	456	418
Yewtree-road	1,251	437	405	374
Total	13,813	6,735	5,944	5,698

Bromley-gardens.

S Saunders	£4,106
G. Wilson	1,676
J. Mowlem & Co.	1,532
C. Pearce	1,450

BRADFORD.—For the erection of five shops, &c., Victoria-square, for Messrs. Wm. Whitaker & Co., Limited, Brewers, Bradford. Messrs. T. C. Hope & Son, architects, 23, Bank-street, Bradford. Quantities by the architects:—

Contracts signed for £5,200

Masonry.—Balmforth & Ingham, Queensbury, near Bradford*.
Joinery.—Dyer & Scn, Bradford*
Ironfounding.—Rhodes & Co., Bradford*
Plastering.—Dixon & Co., Bradford*
Plumbing.—S. Rushworth, Shipley*
Painting.—G. Atkins, Bradford*
Skylights.—Hellwell & Co., Brighouse*
Slating.—Nelson & Son, Bradford*

[Amount estimated by the architects, £5,000.]

BRIGHTON.—For alterations and new shop front to 17 and 17A, North-street, Brighton, for Mr. A. Cavendish. Mr. W. H. Nash, architect, 17, North-street:—

W. & T. Garrett	£725	Saunders & Sons*	£651
J. Barnes	679		

CHELMSFORD.—For the erection of new County Constabulary headquarters, for the Essex County Council, including County offices and recruits' quarters, residences for the Chief and Deputy-Chief Constables, chief and junior clerks, drill instructor, two blocks of stables and grooms' quarters. Messrs. Clare & Ross, architects, Chelmsford, and 1, West-street, Finsbury-circus, E.C. Quantities by Mr. J. S. Parmenter, Chelmsford and Ipswich:—

Holliday & Greenwood	£21,806	Parmenter	£19,322
Johnson	20,884	West	19,193
Coulson & Lofts	20,856	Grimwood	19,744
Everett	20,400	Thoday	18,674
Brown	19,998	Smith, Witham*	17,445

[The above prices include yard boundary walls and fences, underground mains from Springfield-road, Surveyors' charges, &c.]

DOVER.—For the erection of a pavilion, &c., on the Promenade Pier. Mr. M. Noel Ridley, 11, Dartmouth-street, and Mr. Robert J. Beale, Broadway House, Westminster, joint engineers:—

Penney & Co.	£7,280 17 5	Fasey & Son, Leytonstone*	£6,280 0 0
W. J. Adcock	7,000 0 0		
Alfred Thorne	6,837 0 0		

GRAVESEND.—For the supply of Guernsey granite (1,000 tons), for the Town Council. Mr. F. T. Grant, Borough Surveyor, Town Hall, Gravesend:—

	s. d.
Griffiths & Co.	13 11 per ton.
Mowlem & Co.	13 10 ,,
A. & F. Manuelle	13 3 ,,
Fry Bros.	12 2 ,,
J. Hall, Poplar*	11 11 ,,

LONDON.—For the execution of private sewerage works for the Fulham Vestry. Mr. Chas. Botterill, C.E., Town Hall, Walham Green, S.W.:—

	26, Averill-street.	54, Burnthwaite-road.	39, Burnthwaite-road.	15, Hartopp-avenue.	18, Hartopp-avenue.	20, Hartopp-avenue.	19, Crefeld-road.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
C. Trelaine	33 0 0	29 0 0	27 0 0	28 0 0	27 0 0	28 0 0	28 0 0
J. Meredith	20 0 0	20 0 0	19 0 0	19 0 0	19 0 0	19 0 0	23 10 0
W. R. Marks	21 15 0	19 10 0	16 18 6	18 10 0	16 7 6	19 15 0	19 15 0
Smith & Son	23 13 0	19 7 6	17 17 0	19 5 0	18 10 6	19 5 6	17 19 0
J. Shirley	17 10 0	18 0 0	18 0 0	17 10 0	17 10 0	17 10 0	19 0 0
G. Roberts	—	18 15 0	18 15 0	17 12 0	17 12 0	17 12 0	—
Surveyor's estimate	25 5 0	23 0 0	17 0 0	20 0 0	18 0 0	22 0 0	23 10 0

GRAYS (Essex).—For the erection of twenty-five cottages, Parker-road, for the Urban District Council. Mr. A. C. James, Surveyor, District Council Offices, Grays:—

P. Brown	£6,325	H. J. Carter, Grays*	£5,250
Wood & Co.	5,308		

GUILDFORD.—For the supply of 1,000 tons of granite road metal, for the Town Council. Mr. C. G. Mason, C.E. Tuns Gate, Guildford:—

	Per ton. s. d.		Per ton. s. d.
Fry Bros*, Lion Wharf, Greenwich	15 4	A. & F. Manuelle	15 9
L. Somerfield	15 6	G. Lemaitre	16 9
Griffiths & Co., Ltd.	16 4	J. Mowlem	16 4
		E. & H. Beevers	15 7

HANWELL (Middlesex).—For the supply of granite for the year ending March 31, 1901, for the Urban District Council. Mr. Sidney W. Barnes, Surveyor to the Council:—

	Hand Broken. s. d.	Machine Broken. s. d.
Henry L. Cooper	0 0	19 7
G. Le Maitre	18 9	0 0
Griffiths & Co., Limited	18 4	0 0
L. Sommerfeld	0 0	18 0
Mowlem & Co.	17 8	17 2
Fry Bros.	17 6	0 0
John Hall, Poplar, E.*	16 9	0 6

HAVERHILL (Suffolk).—For the erection of a laundry, &c., at the workhouse, Kedington, for the Guardians. Mr. W. H. Carr, architect, Clare, Suffolk. Quantities by architect:—

S. Wiles	£285	T. Humphrey, Steeple Bumpstead, near Haverhill*	£149
W. Deeks	230		

LONDON.—For the execution of road works, Pentonville-road, for the Clerkenwell Vestry. Mr. P. G. Killick, Surveyor. Quantities by Surveyor:—

	Paving. per yard.	Concrete. per yard.
Griffiths & Co., Ltd.	£0 19 0	£1 3 10
Mowlem & Co., London*	0 18 5	1 3 0

LONDON.—Additions to business premises, Offley-road, Kennington, for Messrs. Sharwood & Co., Limited. Mr. H. Phelps Drew, architect, 33, King-street, Covent Garden. Quantities by Mr. J. Rookwood, 25, Bedford-row:—

Norton	£1,509	Edwards & Medway	£1,297
Snewin Bros.	1,397	Wilkinson Bros.*	1,250

LONDON.—For erecting dwelling-house at Hendon, for Mr. C. C. Abbott. Mr. Frederick Geo. Willard, architect, &c., 1, Nunhead-lane, Peckham, S.E.:—

H. Boulter, 21, Sancroft-street, Kennington-cross, S.E.* £440

LYMINGTON (Hants).—For the execution of sewerage-works, engine-house, &c., for the Town Council. Mr I. Pym-Jones, engineer, 14, High-street, Lymington:—

For Oil Engines and Centrifugal Pumps.

Bird & Co.	£563 18 6	Crossley Bros.	£557 15 0
Hunt & Rose	567 10 0	Hornsby & Sons, Grantham*	554 0 10

For Engine-house, Sewers, &c.

Coston & Co.	£1,275
Plascott & Son, Southampton*	1,107

MELTON (Suffolk).—For extensions and alterations to the Suffolk County Asylum, Melton. Mr. A. J. Wood, architect, 22, Surrey-street, Victoria-embankment, W.C. Quantities by Messrs. Widnell & Trollope, 20, Tothill-street, Westminster, S.W.:—

Higgs & Hill, Ltd.	£82,500	Johnson & Co., Ltd.	£75,600
Foster & Dicksee	79,560	Lawrance & Sons	73,000
Rudd & Son	79,444	C. Wall	71,700
Patman & Fotheringham, Ltd.	79,000	Pattinson & Sons	67,500
H. Lovatt	77,575	Kerridge & Shaw*	65,917

Electric Plant.

Royce & Co., Ltd.	£2,691 12 0	Crompton & Co., Ltd.	£2,284 0 0
Holmes & Co.	2,493 0 0	Lawrence, Scott, & Co., Ltd.	2,268 16 4
Siemens Bros. & Co., Ltd.	2,387 7 5	Reavell & Co., Ltd.*	2,255 12 9
Scott & Mountain, Ltd.	2,314 0 0		

Wiring and Fittings.

Mann & Co.*‡	£2,740 18 9

‡ The lowest of seventeen tenders received.

MIDDLESBROUGH.—For the erection of tower and spire to the Church of St. Peter. Mr. J. Mitchell Bottomley, architect, 28, Albert-street, Middlesbrough:—

Thos. Dickinson	£800 0 0	Bastiman Bros.	£613 9 3
Albert Palfnaman	702 19 6	Stephen Coates, Ormesby-road, Middlesbrough*	562 14 10
Allison Bros.	700 0 0		
Anthony Lyons	652 11 9		
W. A. King	634 10 9		

MIDDLETON (Lancs).—For the erection of electricity buildings, for the Corporation. Messrs. Stones & Stones, architects, 10, Richmond-terrace, Blackburn:—

Partington & Sons, Middleton £5,950

MOSS SIDE (Lancs).—For paving, sewering, &c., Great Western-street and Middleton-street, for the Urban District Council. Mr. H. B. Longley, Surveyor, Council Offices, Moss Side, Manchester. Quantities by the Surveyor:—

General Contract.

W. H. Worthington, Manchester,‡ £6,276 19 0

‡ The lowest of five tenders received.

Artificial Flagging.

The Hard York Stone Co., Lightcliffe £400 7 8

NOTTINGHAM.—For rebuilding the Old Moot Hall, Wheeler Gate, for Messrs. J. Brown & Co. Mr. A. R. Calvert, architect, Low Pavement, Nottingham:—

William Maule, Nottingham* (lowest tender) £4,567

NOTTINGHAM.—For the construction of sewerage works, St. Ann's Well-road, for the Corporation. Mr. Arthur Brown, C.E., Guildhall, Nottingham:—

E. Lucas	£14,404 17 8	Johnson & Langley	£9,861 10 0
Kerry & Co.	12,170 17 11	T. Smart	9,500 0 0
R. M. Parkinson	10,985 0 0	Nowell & Sons	8,999 0 0
George Bell	10,768 0 0	Lock & Andrews	8,583 4 3
Barnes & Co.	10,750 0 0	Benthey & Loch, Leicester*	8,275 11 3
Bower Bros.	10,590 0 0		
W. Wall	9,917 0 0		

PONTEFRACT.—For the erection of six houses, Ferrybridge-road, for Mrs. Smith and Mr. Hurst. Mr. W. Hurst, architect, Pontefract:—

Bricklaying and Masonry.—Arthur Taylor*	£600 0 0
Carpentry and Joinery.—Curry & Co.*	274 10 0
Slating.—George Spurr*	86 17 0
Plastering.—T. W. Senior*	83 0 0
Plumbing and Glazing.—T. Leng*	70 0 0
Painting.—S. Harrison*	13 12 6

[All of Pontefract.]

The proprietors provide ranges, stoves, and sanitary ware.

POYNTINGTON.—For rebuilding the viaduct, for the Dorset County Council. Mr. W. J. Fletcher, County Surveyor, Wimborne:—

Alfred Andrews	£300 0 0	Samuel Curtis	£285 0 0
Alex. Betten	298 6 6	F. J. Hayward	240 9 9

PWLLHELI.—For the erection of a town and market hall, Penlan-street, for the Town Council:—

Jones, Roberts, & Jones	£6,566 16 9	R. Williams	£6,022 0 0
Thomas & Williams	6,241 0 0	P. Edwards, Doddleston, Chester*	5,890 0 0
Owen & Jones	6,150 0 0		

STAINES.—For the supply of 350 tons, Guernsey granite, for the Urban District Council. Mr. E. J. Barrett, C.E., Town Hall, Staines:—

	Per ton, delivered at Staines Junction. s. d.
Griffiths & Co.	17 6
Mowlem & Co.	17 2
A. & F. Manuelle	16 7
Fry Bros., Greenwich, S.E.*	15 10

TIRPHIL (Mon.).—For widening a highway bridge over Rhymney River, for the Bedwellty Urban District Council. Mr. J. H. Lewis, C.E., Blackwood, Mon. Quantities by Mr. Lewis:—

Williams & Sons, New Tredegar* £977 18 6

WARWICK.—For additions to workhouse, for the Guardians. Mr. F. P. Trepess, architect, 8, Jury-street, Warwick. Quantities by architect:—

Building Only.

Dawkes & Son	£255	J. & C. Castimore, Warwick*	£210
E. Tallip	230		

Disinfector.

Tomlinson & Milan, Huddersfield* £180 10

WORKINGTON.—For alterations and additions to property at corner of South William-street and Vulcan's-lane, for Mr. J. L. Yeowart. Messrs. W. G. Scott & Co architects, Victoria-buildings, Workington:—

Masonry.—L. Ferguson, Caledonia-place, Workington*	£255 13 6
Joinery.—G. H. Chambers, Dean-street, Workington*	263 0 0
Slating.—J. B. Whitfield, Station-road, Workington*	14 8 0
Plumbing.—W. Strathern, King-street, Whitehaven*	121 0 0
Plastering.—J. Lawson, Gordon-street, Workington*	95 0 0
Glazing and Painting.—Harwood & Cowen, Harrington-road, Workington*	80 0 0
	£830 1 6

[*See also next page.*

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YATTON.—For the erection of two cottages. Mr. C. A. Rowley, architect, 38, College-green, Bristol :—

J. Hatherly	£475
G. & H. Needham, Yatton*	436

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect :—

CAPLAND-STREET.—Refitting the boys' and male and female infants' offices, rebuilding the girls' offices, and refitting with separate pans, refitting boys' offices Deaf and Dumb Centre, and teachers' offices, new channels to lavatories, re-arranging falls to tar-paving in portions of playgrounds in order to avoid unnecessary gullies, and new drainage scheme, including a new connexion to sewer in Capland-street :—

Godson & Sons	£3,238 0 0	Stevens Bros.	£2,948 0 0
Killingback & Co.	3,235 0 0	Martin, Wells, & Co.	2,909 0 0
Lawrance & Sons	3,211 0 0	G Neal	2,822 15 1
Williams & Son	3,119 0 0	R. P. Beattie‡	2,802 4 7

MANCHESTER-STREET. — Enlargement and improvements.

Ground Floor—Infants' Department.—Providing two new classrooms, 50, 60 ; re-dividing and re-stepping classrooms C and D into classrooms C, D, and E, 56, 48, and 48, and providing additional lighting ; providing new kindergarten gallery in babies' room and re-lighting babies' room ; providing new hall, 58 ft. by 31 ft. ; new cloakrooms, lavatories, stock, and teachers' rooms ; removing existing classroom F and forming new staircase in place ; providing one new exterior and one new interior water-closet for teachers ; additional open and new covered playgrounds, and forming new entrances in Tonbridge-street.

First Floor—Boys' Department.—Providing two new classrooms, 50, 60, enlarging classroom F from 40 to 60 ; re-dividing and re-stepping classrooms C and D into classrooms C, D, and E, 56, 48, and 48, and providing additional lighting to same ; re-seating and re-lighting classroom A ; providing new hall, 58 ft. by 31 ft. ; providing two new staircases, cloakrooms, lavatories, stock and teachers' rooms, removing existing classroom F and forming new staircase in place.

Second Floor—Girls' Department.—Providing two new classrooms, 50 and 60 ; enlarging classroom F from 40 to 60 ; re-dividing classrooms C and D into C, D, and E, 56, 48, and 48, and re-stepping and providing additional lighting to same ; re-seating and providing additional lighting to classroom A ; providing new hall, 58 ft. by 31 ft. 4½ in. ; providing two new staircases, new cloakrooms, lavatories, teachers' room, and stockroom ; removing existing classroom F, and forming new staircase in place.

Third Floor.—Providing drawing classroom (area, 1,247 ft.), modelling-room (area, 268 ft.), new water-closets, and additional playground for girls.

Heating by low-pressure hot-water apparatus. Enclosing, draining, and tar-paving the additional land, and providing new drainage scheme.

Revised accommodation :—Boys, 442 ; girls, 442 ; infants, 446 ; total, 1,330 ; net gain, 142.

T. L. Green	£20,483	Lawrance & Sons..	£19,172
Leslie & Co., Ltd.	20,132	Clarke & Bracey	19,163
Grover & Son	19,822	Treasure & Son, London and Shrewsbury‡	18,533
C. Cox	19,606		
Miskin & Sons	19,584		
Williams & Son	19,558		

EDINBURGH-ROAD. — School for thirty blind children (two classrooms of fifteen each) and special school for sixty (three classrooms of twenty each), and enclosing, draining, and tar-paving additional land :—

Outhwaite & Son	£8,291	Johnson & Co., Ltd.	£6,660
O. Craske	7,569	Lawrance & Sons	6,561
Leslie & Co., Ltd.	7,044	J. Appleby	6,337
Miskin & Sons	6,918	Treasure & Son, London and Shrewsbury‡	6,296
Unsigned	6,766		

MERTON-ROAD—Enlargement—Boys, 120 ; girls, 120 ; infants, 78 ; total, 318. Providing two new 60 classrooms for each department ; extending corridor ; providing three new teachers' rooms, one for each department ; enlarging boys' and girls' cloak-rooms ; providing new cloak-room for boys ; converting temporary girls' and infants' teachers' room into stock-room for girls ; providing new stock-room for boys ; new entrance porch for infants ; re-dividing and re-stepping existing south classrooms for boys' and girls' departments. Revised accommodation —Boys, 360 ; girls, 360 ; infants, 389 ; total, 1,109.

Bulled & Co.	£5,383	Johnson & Co., Ltd.	£4,844
F. & H. F. Higgs	4,972	Garrett & Son	4,700
O. Craske	4,962	E. Triggs	4,683
Wall & Co.	4,945	J. & C. Bowyer‡	4,576
B. E. Nightingale	4,943		

TOWNMEAD-ROAD SCHOOL.—Accommodation :—boys, 360 ; girls, 360 : infants, 360 ; total, 1,080. Graded school on three stories. Hall—boys, 54 ft. 6 in. by 32 ft. 6 in. ; girls, 54 ft. 6 in. by 32 ft. 6 in ; infants, 54 ft. 6 in. by 32 ft. 6 in. Class rooms—boys, 40, 40, 56, 56, 60, 60, 48 ; girls, 40, 40, 56, 56, 60, 60, 48 ; infants, 40, 40, 56, 56, 60, 60, 48. Drawing classroom, 1,178 ft. area. Playgrounds area per child—boys, about 76 ft. ; girls and infants, about 48 ft. each. Heating by low-pressure hot-water apparatus. Area of site about 71,050 sq. ft. School-keeper's house :—

B. E. Nightingale	£36,350	Stimpson & Co.	£32,320
Leslie & Co., Ltd.	34,105	Lawrence & Sons	32,052
Miskin & Sons	34,035	J. & M. Patrick	31,089
Kirk & Randall	33,531	Smith & Sons, Ltd.	30,933
C. Wall	33,425	Wallis & Sons	30,853
O. Craske	33,384	Treasure & Son, London and Shrewsbury‡	30,422
Killby & Gayford	32,780		

WEST-HILL SITE.—Erecting three iron buildings :—

W. Harbrow	£1,565 0	Hawkins & Co.	£1,355 0
T. Cruwys	1,548 0	Mitson & Co.	1,252 0
Croggon & Co. Ltd.	1,397 10	J. & W. T. Hunter‡	1,175 0

‡ *Recommended for acceptance.*

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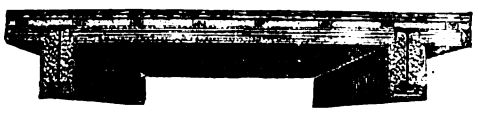

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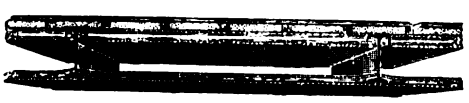

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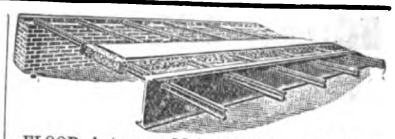

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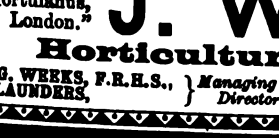

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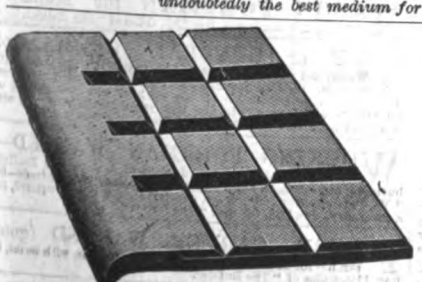

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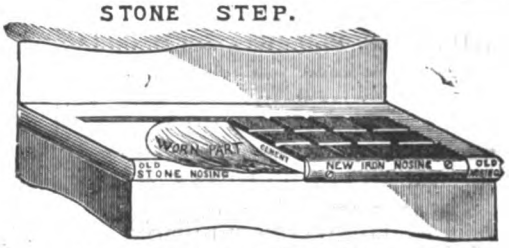

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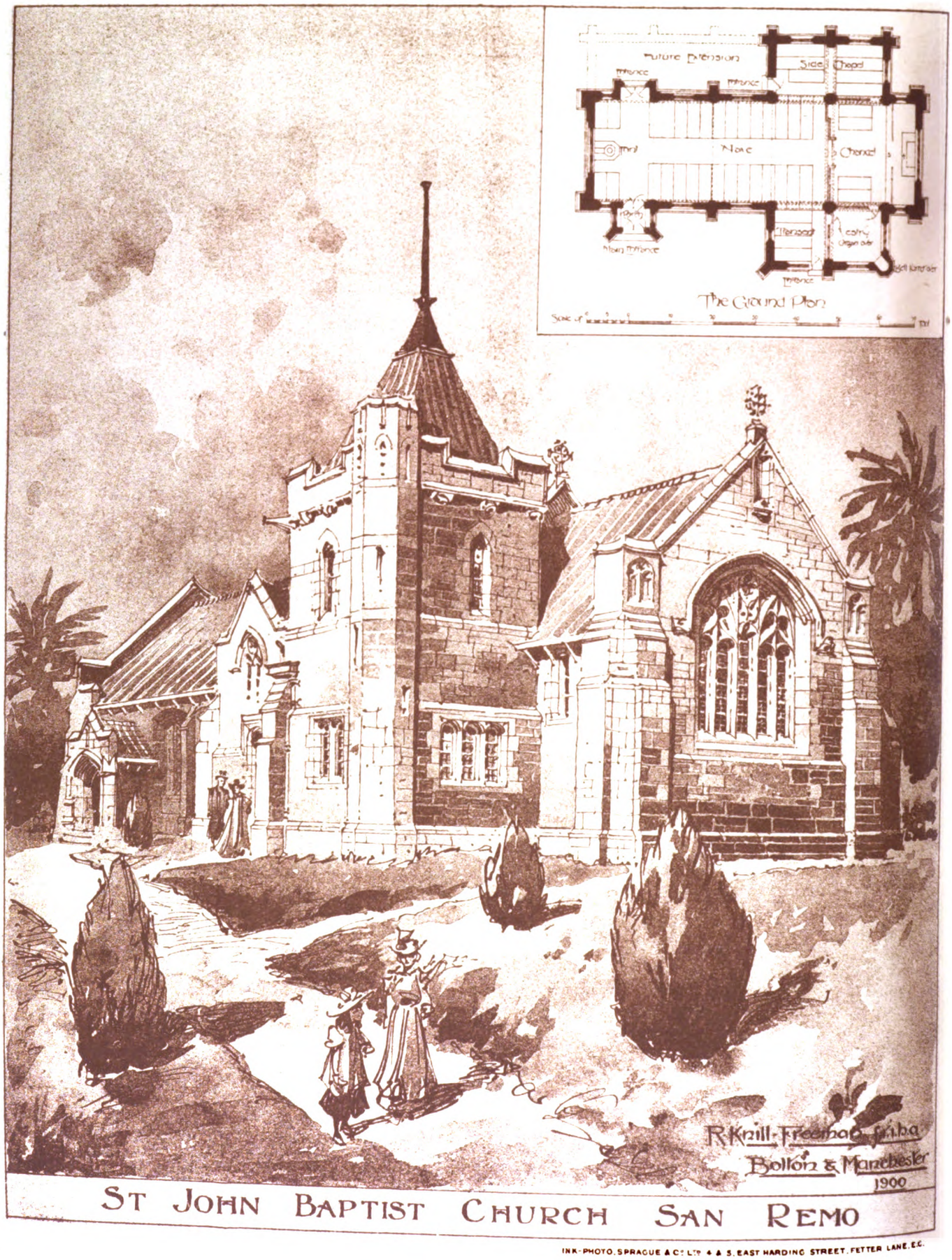

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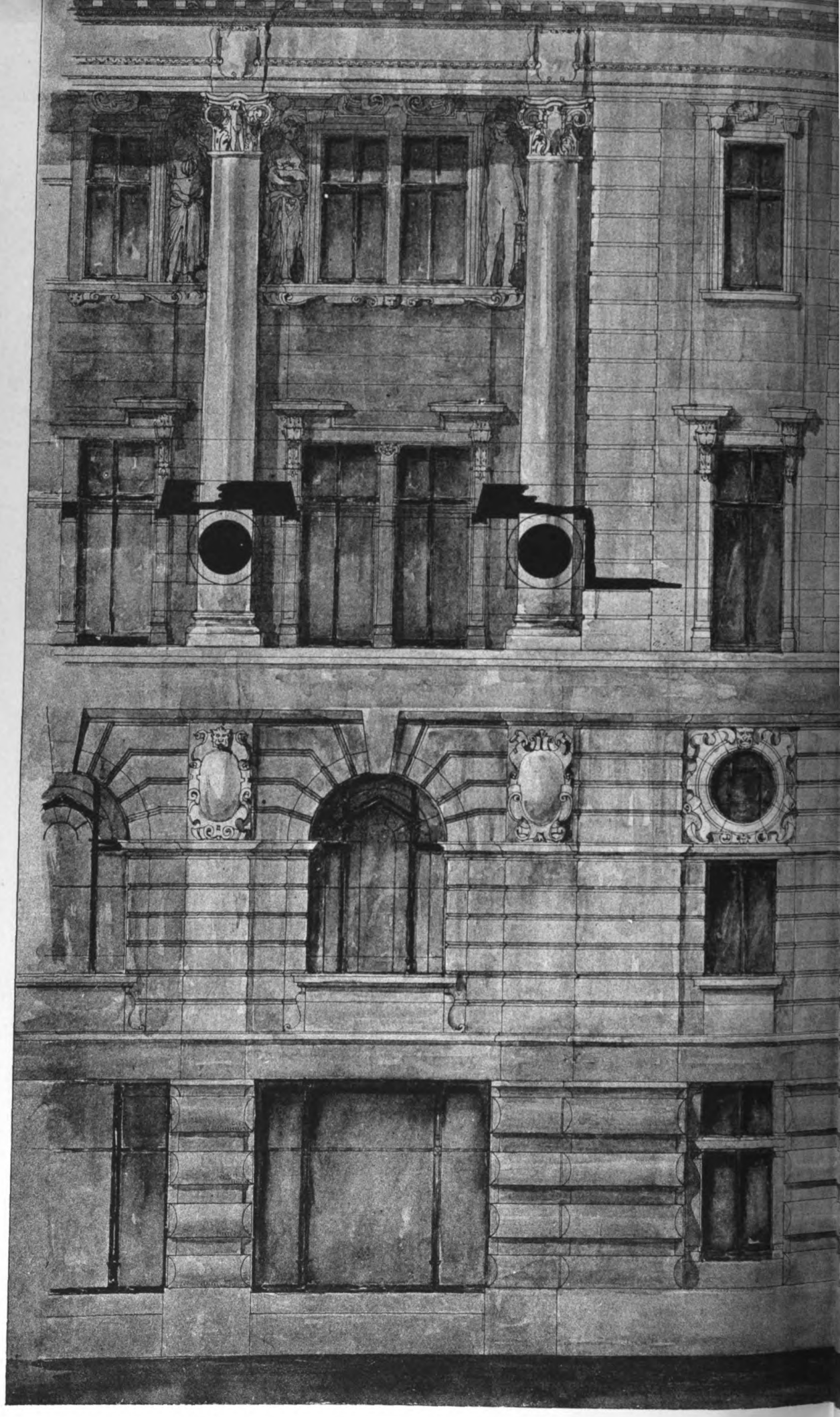

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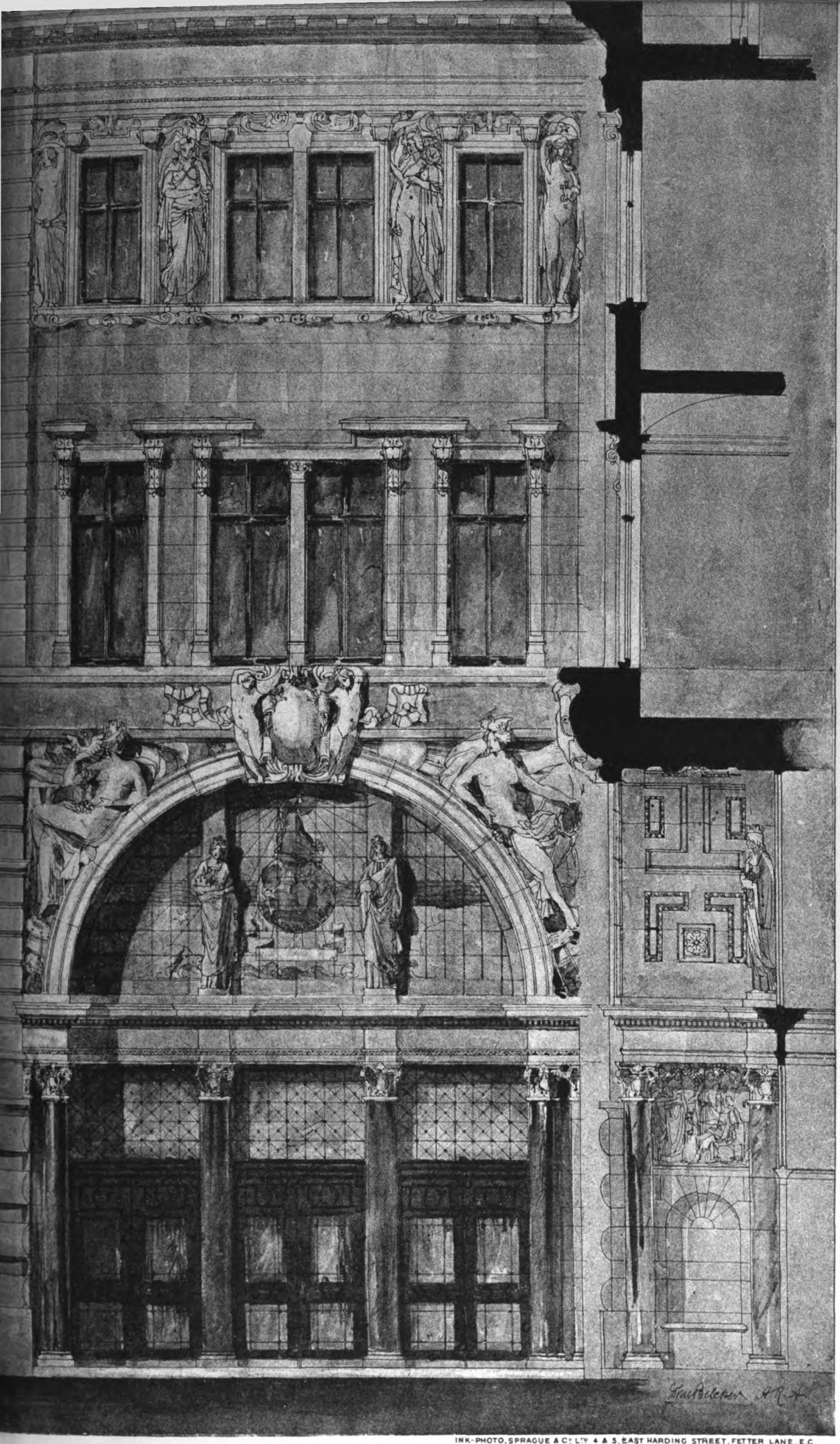

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Athens: 1900.

TERRIBLE sounds of masons at work — only too suggestive of "restoration"—strike on the ear of the visitor to the summit of the Acropolis in this year 1900. To most people the idea of restoring so fragmentary a ruin as the Parthenon must appear sufficiently grotesque. Might we not as well set to work on Karnak or Philæ, which also claim attention for similar reasons? There is, however, a certain amount of excuse to urge in the case of the west front of the Parthenon. Its portico is a fairly well preserved example of ancient architecture, and without some serious repairs the fragment is in danger of losing a certain completeness which it at present possesses.

In this very unusual example of "restoration" certain practical difficulties suggested themselves at the outset. The most defective parts demanding immediate attention were the great blocks of marble forming the architrave. The space to be spanned between the columns is as much as 8 ft. in the clear. This would, of course, have been very great for any system of mere iron ties or supports, and so a regular reinstatement of the defective and cracked architraves had to be undertaken in marble. The system which has been adopted is, perhaps, fairly satisfactory under the circumstances, although it would have been more in accordance with modern feeling in such matters to use some merely mechanical support.

In examining these very necessary repairs the idea persistently suggests itself that some use might have been made of the innumerable sections of the original architrave (in good condition) which serve at present to litter the top of the Acropolis. By making use of these old portions (many of which are absolutely perfect and ready for re-use), instead of introducing new marble, two very great advantages might have been gained. In the first place, the ground around the Parthenon would have been cleared to some extent and restored to its original condition, instead of presenting, as at present, the appearance of a disused quarry; and the old weather-stained marble would certainly have harmonised better with the rest of the ruin. But instead of adopting any such system, the restoring engineers have gone to work in the usual "restoring" manner, and are drawing immense blocks of fresh marble from the quarries for the purpose; and the cracked or defective portions, as they are removed, are being added to the labyrinth of marble blocks which crowd the site of the temple, adding to the confusion and disorder of the ruins. Many of the capitals of the western portico are being renewed; these with their brand-new appearance will have a particularly disturbing effect under the circumstances.

The restoration of the west end of the Parthenon may now be considered a *fait accompli*, and, considering the extent to which it has been carried, the idea suggests itself that the flanks of the temple might be rebuilt as far as the fallen materials permit. Such a reconstruction of the fallen columns, and even some portion of the cella walls, would be perfectly easy, and would add immense interest to the building for the ordinary traveller. At present the visitor to the Acropolis finds himself wandering in a maze of fallen columns and *débris*. His ideas of what the Parthenon may once have been are formed with difficulty under such conditions; but if these fallen columns were replaced, their stupendous effect would be well worth the trouble and trifling expense. This replacement would not be in reality so much a "restoration" as the work which has recently been carried out at the west end.

The great Doric columns of the flanks of the Parthenon lie as they fell at the moment of the explosion of the Turkish powder barrels on September 26, 1687. Rolled over in separate drums from the high stylobate, they must have struck the ground with tremendous force. Perhaps, however, the comparatively bare rocky platform, as we see it at the present time, was covered with earth in those days. In any case it is very astonishing that the marble should not have been more shattered in its fall than it was. Such an example of resistance to concussion is deserving of special study by a geologist. To replace these columns would be as easy as a child's playing with toy bricks.

The admirable reconstruction of the beautiful little temple of Niké, on the projecting side of the Propylæa, and the replacement of much of the Erechtheion, which took place in 1835, under the care of certain German archæologists, afford excellent precedents of what might be done with the greatest advantage for the heaps of ruin which at present obscure the surroundings of the Parthenon. These old Greek monuments, in which no kind of mortar or cement has ever been used, and where the stones have been accurately squared or rounded to fit their relative positions, lend themselves very easily to such a method of reconstruction. The temple of Niké had absolutely disappeared at the beginning of the past century, its marble blocks used up in the Turkish bastions of the Beulé gate. Now it stands once more complete, a very inconsiderable portion missing, and nothing which affects its general design, the whole a remarkable example of the vicissitudes to which a building may be subject, and of the patient care and perseverance of the archæologists of seventy years ago.

The above remarks apply equally to the ruins of the Propylæa and the ruined staircase. After the removal of the mediæval buildings on the Acropolis and the Tower of the Franks in 1875—a piece of restoration which Freeman, Lenormant, and other archæologists protested against at the time, and every one must regret at the present day—this part of the ruins was left in a very unsatisfactory state. The visitor has to climb over rugged rocks, up the broken remains of the ancient staircase, and eventually finds himself on the remaining upper

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platform amongst masses of marble entablature which have fallen from the roof. His impressions of what the original entrance to the Acropolis was like would have almost been clearer in the days when the mediæval walls still served to form an intelligible construction. It is to be hoped that, when the trolley machinery for drawing up the new marble for use at the Parthenon is eventually removed, something may be done to render this most impressive of all ancient gateways a little more intelligible by clearing away the fallen fragments.

At the present time (September, 1900) fresh excavations are being made in the immense mound of earth which has accumulated outside the lower portion of the Propylæa. The object of this is to bring to light a possible ancient roadway which led up to the Acropolis from Athens. Large numbers of house walls and other remains have been unearthed, showing this to have been a thickly populated centre at one time. These ruins seem chiefly mediæval or Byzantine, superimposed through successive ages, and afterwards covered over with the heaps of earth and *débris* cast forth in 1875, when the Turkish earthwork fortifications were pulled down. The laying bare of this ancient road is a matter of great interest, but to complete the scheme of excavation a few remaining traces of mediæval fortification about the Beulé gate will have to be removed, and then little more than the bare rock will remain at that point.

The unfortunate monuments of the Acropolis have now reached their lowest stage of ruin and ill-usage by the successive generations and nationalities which have made use of them each in a different way. The Parthenon—a shrine of the lost religion of the ancients, the precise use of which remains a mystery—has been by turns a Latin Cathedral, a Byzantine church, a mosque, and a powder magazine. It is now being "restored" as a ruined curiosity for the admiration of future ages. But will our descendants appreciate our well-intentioned efforts, any more than we are disposed to value the restorations of our forefathers? At the beginning of the past century a German architect very nearly obtained the commission to rebuild the whole Parthenon, but luckily funds were not forthcoming, so that "job" was pigeon-holed. Perhaps the present restoration is hardly less damaging in its degree to the fragment which has been the admiration of the world for more than a hundred years. A restored ruin must always have a grotesque appearance when the restoration takes the form of inserted new material and workmanship. In the present case only the extreme difficulty of satisfactorily supporting the enormous weight of the parts in danger can excuse a departure from the more usual and common-sense application of mere bolts and straps of iron to hold the different parts together.

Little has been done by excavators in Athens itself of recent years. The almost unintelligible ruins of the Stoa (in modern language, bazaar) of Attalos—built in B.C. 159—have been unearthed and are being arranged for public inspection. The curious inscription which once decorated it has been discovered and restored, but very little else of a monumental description has been found. A few of the various mediæval badges—probably acting as coats-of-arms in the days of the Athenian Dukedom—may be observed amongst the heaps of fragments within the enclosure.

Roman remains in Athens seem to count for little with modern archæologists, and they are consequently proportionately untouched. The great theatre of Herodes Atticus is in a remarkably well preserved condition, and its traditional wood roof may still afford a problem for future students. Certainly there is not much trace of any wood construction on any of the inside walls, but Roman methods of carpentry and covering of large spaces are little known, they have not received that study and attention which they well deserve.

The curious "Tower of the Winds" has been criticised as a work of advanced decadence, and as such has been quite abandoned by the restorers to a fortunate neglect. Not so with the beautiful "Choragic Monument of Lysicrates," this charming little monument seems to have been "restored" in every sense of that word about the middle of the past century, according to a pompous French inscription at its base.

The Emperor Hadrian—greatest of all the building Emperors—gave Athens one of his grandest temples, of which a very small fragment now remains. The eighteenth-century views of Athens show a much greater number of columns standing than at present, but the lime burners seem to have found the ruin particularly convenient. Possibly the few remaining columns at the angle of the temple are much in the same condition as in Turkish times, when a Stylites saint occupied their architrave. Hadrian's market-place still contributes to form the town gaol of Athens. Very few of its parts are freed from the exceedingly squalid modern houses which have been built up against its walls, and the whole neighbourhood is particularly uninviting. Close by are the few old mosques still standing in Athens, long since deprived of their minarets and converted into private dwellings of the most squalid character.

Modern Athens dates from the middle of the nineteenth century. Its architectural features are of the very poorest type of modern Levantine cities, the kind of building to be found in Alexandria, Smyrna, or Odessa. Naturally the architects of modern Athens have aspired to reproduce the well-known characteristics of the ancient Classic monuments — characteristics of a totally different race, and a long out-of-date state of society and culture; and the result is, of course, utterly incongruous. The details of the Acropolis monuments are plastered, or cut in marble veneer, on every house in the town, without any regard to their appropriateness. Most of the architects employed have been Germans, and consequently, but for the semi-Oriental mode of construction (or absence of sound construction), the designs would seem equally at home in Munich. Such a style of construction, peculiar to the Levant, is doomed to brief existence. The common houses built but a few years back are often in a deplorable state of decay; useless roofs; walls filled with rotten timber; careless, cheap building of all kinds cause collapse after twenty or thirty years of existence. The Oriental mind is singularly averse to any idea of repair, and so these houses sink into the heaps of *débris* which always mark an old site in the Levant. Within the last few years the people who live in Athens (one can hardly call so mixed a society by any other name) have evidently become rather dissatisfied with the feeble appropriations of Classic details for their modern buildings, and an effort is being made to revive the more natural Byzantine style. As an example, a small square building with a central dome, which constitutes the Greek exhibit at the present Paris Exposition, is to be re-erected in Athens, and to constitute the home of the new School of Art. A few other modern public buildings betray the same revolution in ideas, and a very great improvement on the lath and plaster "Classic" style may perhaps be the result. The orthodox clergy have always displayed a certain disinclination to adopt the details of the Parthenon or the Erechtheion for their churches; their incongruity is too self-apparent; and the exigencies of a cross plan prevent much resemblance to any Classic building. The cathedral built some twenty years ago is a deplorable design covered with "Classic" ornaments of a meaningless character, and there is another very large church called S. Constantin in the same style, not yet finished, but since the Russians built their elegant little Byzantine church in the Rue des Philhellènes a marked improvement in ecclesiastical taste has manifested itself.

In the environs of Athens a remarkable piece of "restoration" is in progress. The curious Roman tomb-monument of C. Julius

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Philopappus, dated A.D. 114, is being very thoroughly restored in somewhat the same manner as the Parthenon. The monument, consisting of a sort of wall, 40 ft. high and about 33 ft. wide, curved on plan, and decorated with niches, statues, and carvings of a very common Roman type, has a most singular resemblance to a very ordinary Renaissance altar-piece. About one-third of this monument is missing, and the remaining two-thirds are now undergoing a most thorough "restoration." What can be the use of restoring the ruined portions of such a fragment with fresh marble and modern sculpture?

The very interesting example of a Byzantine convent at Daphne, not far from Athens, where the Frankish Dukes of the De la Roche family were buried, has passed through the restorers' hands, and the ducal sarcophagi, with curious versions of European coats-of-arms, have been turned out of their vaulted resting places into a yard where they now serve as cattle troughs. The building has been a good deal rebuilt, and its historical associations, of unique interest, have been destroyed. But alas! such an instance as this is merely characteristic of modern Greece. To the modern Slavs all historical interest (to the foreigner) is supposed to centre in the age of Pericles, and unfortunately they will probably not discover until too late that the Byzantine and mediæval periods of history in the peninsula have also great attractions for many of those visitors whom they desire to see in ever greater numbers wintering in Athens. Everywhere in modern Greece the destruction of mediæval monuments is going on; only a year ago the marvellously picturesque fortifications of Nauplia (Napoli di Romania) were destroyed in a most purposeless manner, and the ugly, mean houses which the walls had served to screen laid bare.

NOTES.

The late Mr. W. Young.

THE whole architectural profession will have heard with sincere regret of the death of Mr. William Young, just as he had secured one of the greatest opportunities that any architect could expect to have, and while the great building which he might have hoped to have seen completed under his own direction was still only in existence on paper. Indirectly, it may be said that he almost sacrificed himself to his War Office design, for there is no doubt that his arduous labour on it had for the time told on his health, and rendered him less able to cope with the illness to which he succumbed. Mr. Young was an enthusiast in his work, and in this matter of the War Office design he had made innumerable studies and sketches before he could satisfy himself. Mr. Young's predilections obviously were always in the direction of orthodox Classic design, which he treated with great dignity though perhaps, previous to the War Office design, not with great originality. His Glasgow Municipal Buildings, his most important executed work, we have never been able to admire very much, and therefore felt, in the first instance, as we believe others did, rather a doubt as to his selection for the War Office; but it must be admitted that he fully vindicated the choice, and produced a design of great dignity (the more remarkably so because the irregular outline of the inadequate site selected by the Government was very much against him), and admirably planned for its purpose. It will now have to be put into other hands to be carried out, and we hope that his design will be respected, and carried out as he left it. It is only justice to him that this should be done, since he has not lived to carry it out himself.

The New Street Designs.

IT is stated that the London County Council are going to submit three of the street designs to their valuer to report on their "financial aspect." This is all very well; but it ought to be remembered, in justice to the architects, that they were not asked to make the most financially economical design, but the *best* design; though, of course, the practical conditions of street architecture must come into the problem. If another report be correct, that the Council are proposing to make use of portions from different designs piecemeal, they will do what must result in failure, besides being most unfair to the architects concerned.

Arbitration.

THE recently-reported case of the Manchester Ship Canal Company *v.* S. Pearson & Son, Limited, is of importance in regard to arbitration. There had been an agreement to refer any dispute between the parties to three arbitrators, one to be appointed by each of the parties and the third by the two so appointed. One of the parties only appointed an arbitrator, but the other did not and commenced an action at law. Thereupon the first party took out a summons to stay the action, and on appeal the order to stay was made. This case, therefore, clearly puts an end to some doubts which have recently arisen in regard to the Arbitration Act, and shows that the Court will not allow a person who has agreed to refer a question to arbitration to escape from his agreement. These questions in regard to arbitration are so constantly arising in contracts connected with buildings and other works that it is very important that those who decide to refer their disputes to arbitration should be sure that they will not, in spite of such agreement, be dragged into a lawsuit.

Egypt Exploration Fund.

AT the fourteenth ordinary general meeting of the Egypt Exploration Fund, held in the theatre of the Geological Museum in Jermyn-street on Wednesday afternoon, when Sir John Evans took the chair, and there was a large attendance, Professor Flinders Petrie, in a most characteristic though short address, drew attention to the far wider aspect of human history which recent exploration in Egypt had opened out to us. It might safely be said, he observed (and we quite agree with him) that "there had never been a greater extension of knowledge of man's past in any decade than the discoveries of the last five years had unfolded." He might have added, *quorum pars magna fui;* but the audience could supply that reflection for themselves. From the discoveries in the royal tombs at Abydos the early kings of the First Dynasty, who had been regarded as mythical, now came before us real personages, as familiar as those of the Thirtieth Dynasty or of Saxon England. Such remarkable results from the investigations already made ought to encourage those who can afford it to subscribe liberally towards the further work of the Egypt Exploration Fund. Both energy and talent are forthcoming in abundance; but money is much wanted.

The Hellenic Society.

AT the meeting of the Hellenic Society on Thursday last week, Mr. Penrose in the chair, Mr. Arthur Evans read a most interesting paper on "The Tree and Pillar Cult of the Mycenæans and its Mediterranean Relations; with Illustrations from Recent Cretan Finds." The object of the paper was to show that the Mycenæan worship consisted mainly in a reverence for sacred trees and pillars which were supposed to be, either permanently or at intervals, the abode of the god. The subject was illustrated by drawings of some very curious engravings on Mycenæan signet rings. The recent excavations at Knossos in Crete, conducted by Mr. Evans, and which have resulted in such remarkable discoveries, had brought to light the existence of pillar shrines in Mycenæan buildings. The pillar, we can have little doubt—and we think Mr. Evans implied that—was the conventionalised representative of the original tree. Evidences of the prevalence of the same idea among the Semitic race were furnished from Biblical sources; Mr. Evans instanced the pillar set up by Jacob at Bethel. Dr. Waldstein, who was present, questioned whether, considering the evidence we had of high civilisation in the Mycenæan period, worship could then have been of the primitive kind suggested by Mr. Evans, and thought that this pillar cult was more probably a survival from an earlier period. If that should be the case, however, it only adds to the historic interest of the representations.

Is the Trolley Wire Dangerous?

AN accident which happened in Vienna vividly illustrates one of the dangers connected with the trolley wire used in the overhead system of electric traction. In the early morning of November 1, whilst it was still dark, a telephone wire broke and, making connexion with the trolley wire, became a source of danger to every one in the neighbourhood. An elderly woman was the first to come in contact with it and fell down as if in a fit, being quite unable to release her hold of the wire. A man going to her help was caught round the neck by the wire and fell as if struck by lightning. Two other men going to their assistance were also struck down and, in the words of the *Times* correspondent, lay "writhing in agony and shrieking for assistance." Apparently it was fully five minutes before the current was turned off and it was found that the first two victims had received very severe injuries from burns and shock. It was a wonder that they were not killed outright. Considering the very rapid progress that is being made with overhead systems of electric traction in this country, it would be well for electricians not to minimise the dangers of the trolley wire. A few serious accidents from shocks would go a long way towards making electric traction unpopular, and would lead to still stricter Board of

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Trade regulations. It will be remembered that Mr. Trotter issued regulations for the guidance of the police in trolley wire accidents at Cape Town. It might be advisable to issue some similar rules for this country. We have always been of opinion that overhead electric traction in crowded thoroughfares is fraught with great danger. The guard wires, which are employed to prevent the telephone wires from coming into contact with the trolley wire, may be themselves a source of danger during gales or snowstorms. Expert electricians would not care to grope in the dark for live 500-volt wires, even if they were wearing dry goloshes.

The Marble Arch, Cumberland Gate.

It is rumoured that the Marble Arch is to be pulled down and rebuilt elsewhere. The Arch, adapted by Nash from those of Septimius Severus and of Constantine at Rome, and constructed of Carrara marble at a cost of, reputedly, 80,000*l.*, was originally designed to carry Chantrey's equestrian statue of George IV. (now in Trafalgar-square), and was first erected in the Mall, opposite Buckingham Palace, 1825-7. The sculptured work is by Flaxman, Westmacott, and Rossi. The beautiful gates, designed and cast in a copper alloy by Samuel Parker, cost 3,000 guineas; they were unfortunately damaged as they left the foundry, and were shorn of their upper frieze and semi-circle. In 1745 a mean brick arch was built at the north-east corner of Hyde Park. Decimus Burton made designs for gateways for the new iron gates presented by H. P. Hope in 1822, and for a lodge, to replace the lodge and gateways built there by Soane in 1794. In 1851 the iron gates were divided and placed at the sides of the Marble Arch upon its removal to Cumberland, formerly known as Tyburn, Gate. There is no doubt that the Marble Arch is absurdly placed at present, where it has no meaning and fronts nothing, and we should be very glad to see it re-erected in some position where it could suitably add to the architectural dignity of a site, and form a State entrance of some kind; but considering what was the fate of the Burlington House Colonnade, we think the authorities ought to make it clear, before removing the arch, what they mean to do with it, and that it is really to be preserved and re-erected, and not allowed to "go to spoil."

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

VII.—Catalogue Raisonné of Examples.

(Continued.)

District VII. A.—Lincolnshire and Yorkshire.

Of pre-Conquest monuments of the first importance Lincolnshire possesses two—Stow and Barton-on-Humber, while the only Yorkshire example worthy to place beside these is the seventh century crypt at Ripon. On the other hand, there are several fairly complete Saxon churches, such as Bracebridge by Lincoln, Ledsham and Kirk Hammerton between Leeds and York, and structures or features of special interest, as at Hough-on-the-Hill by Grantham, Broughton near Brigg, Skipwith near Selby, and Bardsey north of Leeds. In actual number of examples furnished to the list Lincolnshire surpasses every other county, and the forty-one from south of the Humber are supplemented by twenty from the Ridings. It will be found that Durham and Northumberland forming District VIII. furnish another score, so that the four north-east counties are responsible for the addition of more than eighty examples to our list. Of these, a very large proportion have as their feature of interest the square west tower, comparatively rare in Saxon work in other parts of the country. In the counties just mentioned there are fifty-one of these towers, while the rest of England, though we include early *round* examples in East Anglia, produces thirty-four. Of the fifty-one northern examples by far the largest number are of a somewhat peculiar character, marked by the presence and absence of certain special features, and form a class by themselves, known currently as the "Lincolnshire bell-tower." It will, therefore, be most convenient to go over Districts VII. and VIII. twice, on the first occasion (A) dealing with the monuments, whether churches or towers, that correspond with the criteria which have hitherto been employed, and on the second (B) taking the whole series of towers of this special character in both the districts and treating them as a class apart.

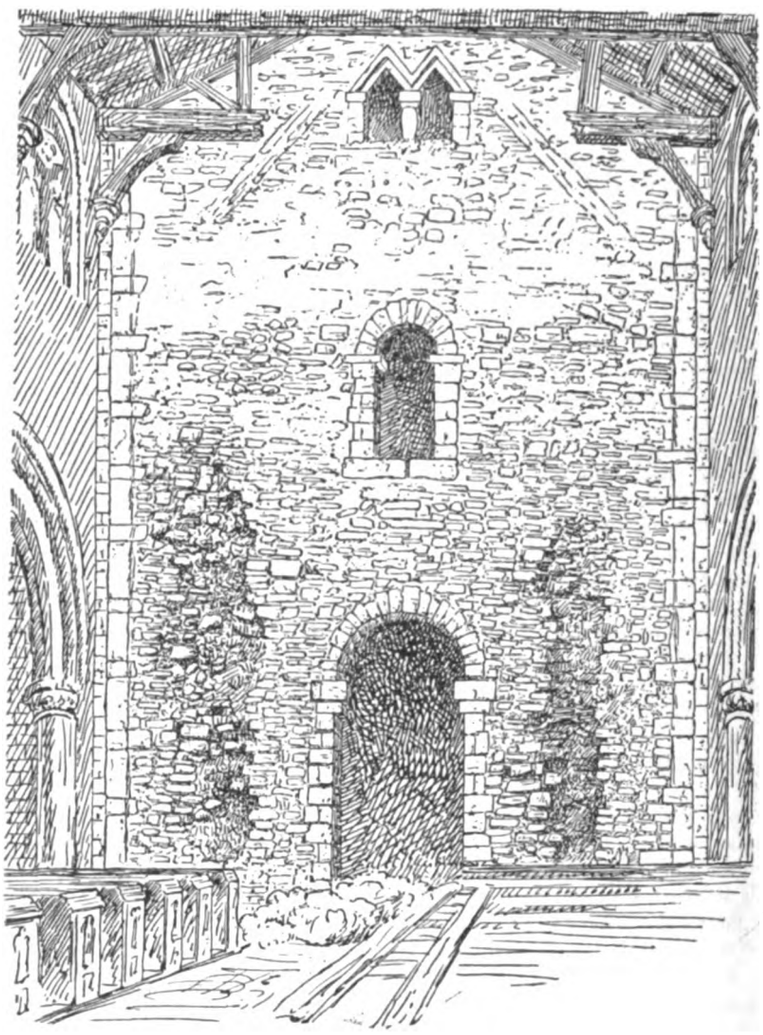

Fig. 23.—East Face of Tower, Barton-on-Humber: Showing Marks of Side Walls of Original Small Chancel of Saxon Date.

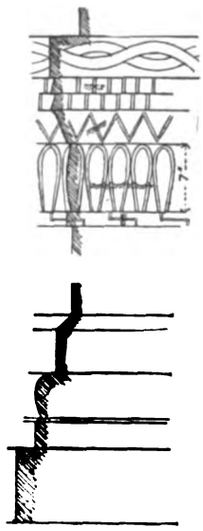

Fig. 22.—Impost and Base Moulding of South Door of Nave, Barholme, Lincolnshire.

District VII. A.—Lincolnshire.

Beginning in the south of the county, l. and s. work is reported at the chancel quoins of [*Tallington*], but the ivy prevents verification. (The old sacring-bell hangs still above the east gable of the nave.) At *Barholme* a narrow blocked south door in the nave wall offers a curious problem. The portion of the walling in which it occurs has a base moulding of several members, and above the doorway there rises, as at Corhampton and Stanton Lacy, a pilaster strip, ending under a portion of a horizontal string course of square section. The doorway has a roll moulding on jambs and arch, while the top of the former and the imposts are enriched with ornament that is not specially Norman in form and is used so timidly as to suggest a pre-Conquest carver. The work must in any case date near the middle of the eleventh century; but though the mouldings and ornament might be Norman, yet the pilaster strip is so characteristically pre-Conquest, that we are justified in making it date the doorway (fig. 22).

Thurlby, near Bourn, has l. and s. at the west quoins of the west tower.

Little Bytham.—Here the south-east quoin of the nave shows l. and s. work and has a plain square plinth, while the adjoining chancel wall has an Early Norman south door and a plinth with double chamfer. The contrast between Saxon and Early Norman is well marked.

Skillington shows l. and s. on some of the nave quoins.

Ropsley.—This fine and conspicuously situated church, commanding its large village, has l. and s. quoins at all four corners of the nave, which measures internally about 40 ft. by 16 ft. A Norman arcade has been cut in the Saxon wall.

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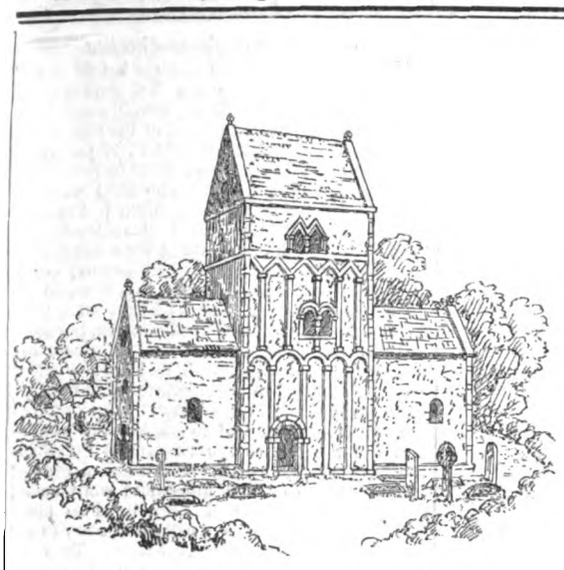

Fig. 24.—Original Saxon Church, Barton-on-Humber.

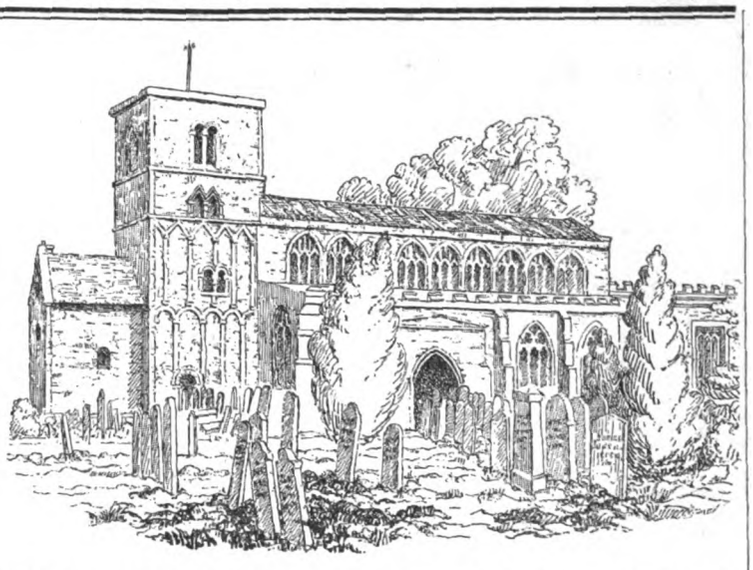

Fig. 25.—Present Church, Barton-on-Humber: Showing Late Mediæval Development.

Wilsford.—Here, too, l. and s. quoins attest a pre-Conquest origin. Passing by Syston, where part of the masonry on the south and west is irregular and early-looking, and where the treatment of the belfry openings by transitional builders is well worthy of attention, we find at *Stragglethorpe*, not far from Newark, a curious blocked doorway in the west wall, with triangular head and sloping jambs. The masonry is concealed by plaster.

Hough-on-the-Hill, near Grantham, has a square west tower with semi-circular stair-turret to west of it. The openings both in tower and turret exhibit some very primitive-looking details that find a counterpart in early Irish work, and the whole structure is of curious interest.

Cranwell, near Sleaford, a small nave-and-chancel church with north aisle, has some l. and s. work on the north-east quoin of the nave.

Bracebridge, just outside Lincoln, is one of the most complete Saxon churches in the country. It has a fine and characteristic west tower, to be afterwards noticed, a nave, and in all probability a chancel, of Saxon date, and a later north aisle, in the wall of which has been reinserted the original north door of the church. The four nave quoins are treated in the l. and s. technique, the chancel arch has side openings, and there is a curious squint near the south door.

The interest of the churches in Lincoln itself is confined to their towers, and we pass northwards into the Lindsey division of the county, where we are met at *Stow* by a singularly fine Saxon and Norman church, that is believed by some to have held cathedral rank as the seat of the bishopric of Lindsey from 678 to 870 A.D. The plan, cruciform with central tower, is too advanced for a period as early as these dates would indicate, but its builders, whenever they worked, have left us both a grand arch on enriched jambs between nave and central tower, and also one of the finest examples in the country of quoining with huge squared stones, many of which are of Roman origin. The walls of the transepts thus treated rise from a double base-moulding with chamfered edges, and are pierced irregularly with some characteristic windows. The nave and chancel are both Norman, and the upper part of the tower much later.

It will be noticed on the map that the Lincolnshire examples are confined to the undulating country due south from Lincoln, called Kesteven, and the north-western half of Lindsey; while Holland, the fen country east of Kesteven, with the southern part of the wolds of Lindsey, though abounding in churches, are unrepresented in the list. Possibly local research might do something to readjust the balance. The numerous churches in the wolds between Lincoln and the Humber are represented in the catalogue by their towers, but upon two of the most northerly of them there is something to be said of a more general kind. One is *Barton-on-Humber*. It has been a matter of surmise that there was a class of pre-Conquest churches in which the lowest stage of a square tower formed the nave, a small chancel being built on to the east of it.* Some investigations kindly made by Mr. C. Hodgson Fowler in the course of some work he was carrying out at Barton-on-Humber brought to light direct evidence of the truth of this surmise, which becomes thus an established fact and one of no little interest. The church in question exhibits now an old Saxon square tower and curious western adjunct thereto attached, with a handsome and very spacious late mediæval aisled nave and chancel. At one time, as we know now, while the tower with its western adjunct remained the same, there only appeared to the east of it a tiny square-ended presbytery some 20 ft. in length. From this has been gradually developed the imposing structure which now forms the body of the church, the tower and adjunct having practically dropped out of use. The east wall of the tower, when stripped of its plaster in 1897, disclosed the marks of the side walls of the original small chancel, and the foundations of these walls, with the south-east quoin distinctly marked, were laid bare by excavation. The plan of the first Saxon church is thus made clear, though its upper arrangement, and especially its lighting, present some difficulties. Of Saxon date we have then, besides these chancel foundations, the tower, with l. and s. quoins, pilaster strips like those at Earls Barton, and double windows with mid-wall work; and the west adjunct with similar quoins, double-splayed r. h. windows to north and south, and in the west wall, one above the other, two circular double-splayed lights, in both of which remain portions of the original wooden mid-wall slab pierced with holes for the transmission of light. It may be observed that the external splay of all these windows is much less than the internal (*ante*, fig. 6). The illustration, fig. 23, shows the marks of the walls of the original early chancel as revealed when the plaster was recently stripped off the east face of the tower, while figs. 24 and 25 exhibit the contrast between the aspect of the original Saxon church of which the ground story of the tower was the nave, and the later mediæval structure in which the original small chancel has developed into a relatively enormous edifice. It is a striking object-lesson in the growth of the mediæval church.

Broughton, a few miles north-west from Brigg, noteworthy as one of the only two villages which even touch the straight Roman road from Lincoln to the Humber in its course of thirty miles, has a square west tower with a later semi-circular stair turret on its west face. The present tower arch is ornate on the side towards the tower but very plain towards the church, and is clearly the original chancel arch of a church of the form now fixed at the neighbouring Barton-on-Humber. Regarded in themselves as criteria, this fine arch which has angle shafts on the west side, the south door of the tower with moulded archivolt, the masonry which shows a good deal of herring-boning, the quoins with a total absence of l. and s. work, are all signs which would make a pre-Conquest date somewhat doubtful, though none of them preclude it. The plan is, however, decisive, as nothing like it is known in Normandy. Moreover, the tower arch is not more advanced than the Late Saxon one at Kirkdale, Yorks. See *infra*, fig. 26.

* *Archæological Journal*, vol. liii., p. 333.

YORKSHIRE.

The vast extent of this county and the character of much of the country make architectural exploration somewhat difficult, and the following list might, no doubt, be supplemented. The valuable papers by Mr. C. C. Hodges, of Hexham, on the pre-Conquest churches of Northumbria, that appeared in the *Reliquary* in 1893-4, came down into Yorkshire, but did not exhaust the field of study it presents. Continuing our course from south to north, and passing over for the moment the special class of towers before mentioned, we come, in the fine church of the somewhat inaccessible village of *Laughton-en-le-Morthen*, near Rotherham, to another specimen of the Saxon north door preserved with the adjacent masonry when the rest of the church was rebuilt. Passing Stainton-by-Tickhill, where the plain chancel arch has Norman rather than Saxon character (*ante*, fig. 5), we reach, between Leeds and Selby, the Early Norman Kippax and the Late Saxon *Ledsham*, where the west tower, nave, and chancel-arch are of the original date. The masonry is regular, and the internally-splayed windows of the nave were large. The most interesting feature is the south door of the tower, where the enrichment (much restored) shows both foliage scrolls and interlaced work.

Skipwith, near Selby, possesses a west tower with distinct pre-Conquest features in the fine tower arch with strip work, double-splayed lights, and a very curious recess in the east wall of the ringing chamber, as if for keeping books, &c., lighted by a special window in the side wall adjacent to it.

At York there must be mentioned some masonry of possible pre-Conquest date in the crypt of [*The Cathedral, York*].

St. Mary Bishophill Junior, York, possesses a recessed tower arch of distinctly pre-Conquest type, which would suffice to place the church in the list even without the characteristic mid-wall work on the belfry stage.

North of Leeds we find an interesting and apparently early example in the tower of *Bardsey*, which may possibly belong to a type represented further north, where an original west porch has had a tower built over it at a later date. The walls of this porch or tower are barely 2 ft. thick, and the space they enclose measures 8 ft. from north to south, by 10 ft. 2 in. west to east. There is a narrow north door, and old r.h. lights above to north and south, internally splayed and with sloping jambs. There is no sign of a west door, but the mark of a gable is to be seen a little way up in the west wall, as at Monkwearmouth. The tower above is about 50 ft. high, and has on the south side double openings, with mid-wall work on two stories.

Kirk Hammerton—A small, but fairly complete, Late Saxon church, with west tower, nave, and chancel. The west door of the tower has angle shafts, and the chancel arch is

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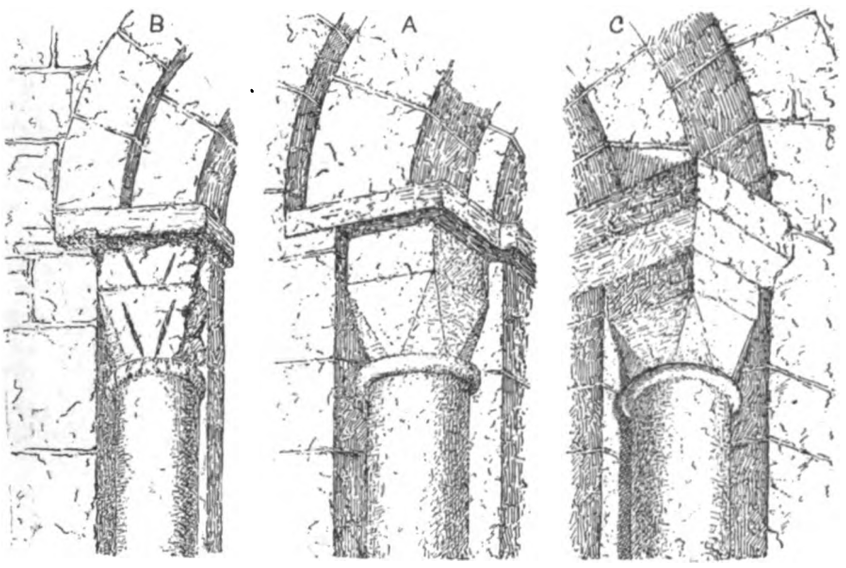

Fig. 26.—Late Saxon Recessed Arches with Angle Shafts.

A.—Kirkdale, Yorkshire. B.—Kirk Hammerton, Yorkshire. C.—Broughton, Lincolnshire.

recessed, but the pre-Conquest character of the work is attested by the close resemblance of the west door to that at Kirkdale. The walls, of great proportional height, are of large, roughly-squared stones, and are a typical example of this kind of masonry that is common in the pre-Conquest work of Yorkshire. There are modern additions to the church to north.

Kirkby Hill, by Boroughbridge, resembles Kirk Hammerton, but is less pronounced in pre-Conquest character. The old south door can be traced, and had carved ornament on its east impost. In this part of the county Hawkeswell and Little Ouseburn are eleventh century churches without distinct pre-Conquest features, and Ainderby Steeple has some fragments of early masonry incorporated in the west end of the present edifice. The important example is, of course, the crypt at the Cathedral of *Ripon*. The direct literary evidence connecting this crypt and the similar monument at Hexham with Wilfrid and the seventh century is quite convincing, and the character of the structures bears out the ascription. The crypts are of the *confessio* form with a chamber for the disposal of relics and passages of access, all rectangular in plan, and hence suggesting a square-ended presbytery to the church above them. The chambers and passages, in which there are niches for lamps, are roofed with barrel vaults or flat slabs, and at Hexham the stones are mainly Roman, so that the technique agrees with the other evidence as to date.

On the east side of the county both on the wolds and the moors there are examples to be noted. One would like to recognise Saxon work on the highly-interesting site of Goodmanham (Bede ii., 13), but this is probably confined to a sun-dial. The site is on the first rise of the wolds and commands the plain towards Selby and York, while the church itself is conspicuous and isolated. The narrative in Bede concludes with the words, "that spot, formerly a place of idols, is still shown not far from York to the east beyond the River Derwent, and is now called Godmunddingaham, where the priest himself on the inspiration of the true God defiled and destroyed the altars that he himself had consecrated," and it is a near conjecture that the church occupies the site of the heathen fane. Passing by some towers we must note *Kirkdale*, where the pre-Conquest origin of the church is attested by the interesting inscription over the door of entrance, giving the name of the builder and indicating a date of about 1060. Parts of the present fabric, including the south and west walls of the nave are of this date, but the chancel arch has been altered out of all recognition. The best feature is the west doorway, now inside the modern west tower, which resembles that in the same position at Kirk Hammerton, and the tower (formerly chancel) arch at Broughton, Lincolnshire. Fig. 26 gives a sketch of the three examples. On the exterior there appears to have been formerly a pilaster strip running up to the point of the west gable before the tower was built, and this fact gives us a date for this special feature which occurs, *e.g.*, on the east gable of Boarhunt.

Hovingham.—Here are a square west tower built of largish roughly-squared stones like Kirk Hammerton, with some herring-bone courses; a tower arch of the plain type, constructed Norman fashion; double belfry openings with mid-wall work on all four faces, and, besides these features, a more distinctively Saxon indication in the form of a double-splayed window on the south face.

Middleton-by-Pickering.—The strip-work round the blocked west door of the west tower of this interesting church is enough to stamp the tower as pre-Conquest. There are some small early lights, but the belfry openings are later.

Hackness, near Scarborough, famous for its interesting though mutilated Saxon cross, has an ornament of interlacing serpents carved on the impost of the chancel arch, and as this is built with through-stones it is probably pre-Conquest. The rest of the church shows no special sign of age.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE opening meeting of this Institute for the present session was held on Monday evening at No. 9, Conduit-street, Regent-street, W., Mr. William Emerson, President, occupying the chair.

Death of Mr. William Young.

The President said it was a matter of very great regret to him that he had to announce the death of a very eminent member of the profession, *i.e.*, Mr. William Young, who died quite suddenly and who was buried that day. Mr. Young, who had a very large practice, had built houses for Lord Cadogan, Lord Faversham, the Earl of Wemyss, and he was one of the two architects selected for the new Government buildings. A notice of the life and works of the deceased, by Mr. J. M. Brydon, his intimate friend for many years, would shortly appear in the *Journal* of the Institute. He (the President) had no doubt they would wish a letter of condolence to be sent to the widow and family of the deceased.

Mr. Alex. Graham, hon. secretary, said he regretted to announce the decease of Mr. Joseph Goddard, of Leicester, a Fellow, who was elected in 1871; of Charles Henry Driver, elected an Associate in 1867 and a Fellow in 1872; and of Mr. Lloyd Tayler, Fellow, of Australia.

District Surveyors' Examination.

Mr. S. P. Pick, President of the Leicester Society, having been introduced to the meeting,

It was announced that at a statutory examination held by the Institute on the 25th ult. the following gentlemen had passed, and the Council had granted them certificates of competency to act as District Surveyors under the London Building Act, *i.e.*, Messrs. H. A. Legg, Associate, of Christ's Hospital, and R. D. Hansom, of Dulwich.

Portrait of Professor Aitchison.

Mr. Aston Webb said that on behalf of the subscribers he had to ask the President to accept for the Institute a portrait, painted by Sir Lawrence Alma-Tadema, of the past President, Professor Aitchison, R.A, Royal Gold Medallist, and Professor of Architecture at the Royal Academy. [Mr. Webb here unveiled the portrait of Professor Aitchison.] Proceeding, he said that Lord Beaconsfield, in "Tancred," in looking about for a suggestion for the improvement of architecture, could only think of one thing, viz., that it would be an excellent thing if an architect were shot. No one had acted on that suggestion, but since about that time the Institute had taken care that their past Presidents should be hung. Whether an improvement in architecture could be attributed to that he did not know, but on behalf of the subscribers he had to ask the President to add the portrait to the suspended Presidents hanging in that room. The name of the past President was such a household word among them, and his life had been lived so much with them, that it was hardly necessary to say much about Professor Aitchison. They all knew the delicacy and refinement of his work as shown in his Assurance offices in Pall Mall, in the Founders' Hall in the City, in Lord Leighton's house, and in other works. They knew also his power of colour, shown in many houses, notably in Lord Leconfield's, Sir Wilfrid Lawson's, and in Mr. Lehman's in Berkeley-square, and very notably in a recent instance in the decoration of the chapel in the great Oratory at Brompton. They also knew the great antiquarian and archæological knowledge that Professor Aitchison had. This had been shown in his Academy lectures, in papers and addresses before the Institute, and the humour and pleasantness which the Professor had imparted to those lectures made their delivery very acceptable. There was another side to Professor Aitchison's career which was not always remembered, and of which he was sure the Professor was deservedly proud. With all his architectural qualities, he had also been for many years an excellent and indefatigable District Surveyor, and the combination of those two qualities—the artistic and the business—had been most useful to him and the profession to which he belonged. Some architects were perhaps a little apt to go with the swing of the pendulum—at one time it was all art and at another time it was all practice—whereas most would feel that there should be a combination of both for a successful architect. It was of the greatest importance that the District Surveyors of London should be men of the highest attainments and position, and it must have been of great assistance to that body that they should have had a man like Professor Aitchison in their ranks. He (the speaker) had heard from those who had carried out work in the Professor's district that he devoted the same care and attention to work of that sort as he did to more strictly architectural work, and that he thought as much of carrying out the provisions of the Building Act properly as of decorating an ecclesiastical bane. He (the speaker) felt sure the subscribers would wish him to express on their behalf their thanks to Sir Lawrence Alma-Tadema for the magnificent work he had painted for them, for the time and skill he had devoted to it, and for his kindness in accepting an honorarium which they all knew did not in the least represent the value of that fine portrait. The Institute had been fortunate in having had many distinguished painters to paint the portraits of past Presidents. Sir L. Alma-Tadema, who, ever since his election as an honorary Associate, had been a good friend to the Institute, had already painted one—*i.e.*, John Whichcord. The Institute also possessed a refined and exquisite portrait of Cockerell by Boxall, R.A., a fine portrait of Sir Horace Jones by Frank Holl, a splendid Waterhouse by Orchardson, and a wonderful Penrose by Mr. Sargent. The newly-painted portrait would equal anything they already possessed, and in looking at it they could not fail to say, "There is the man." The portrait would help to enliven those dull walls for many years to come.

The President, in accepting the portrait and in heartily thanking Mr. Webb and the subscribers for such a magnificent work, said the thanks of the Institute were most certainly due to Sir L. Alma-Tadema, who had so kindly undertaken to paint the portrait of his old friend. In the future, in looking at the portrait, they would all feel how vividly it spoke of the learne

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scholar, the eminent architect, the genial friend, and the kindest-hearted President the Institute ever had.

Sir Lawrence Alma-Tadema said it was a happy moment for him when the President came to him and asked him to paint the portrait. What could be more desirable to an artist than to paint the portrait of a dear friend for a dear friend? Professor Aitchison was a dear friend of his of long standing. He was always the same, and always had the same smile for his friends.

President's Address.

The President then read the following address:—

COLLEAGUES, LADIES, AND GENTLEMEN,—

On taking this chair at our first sessional meeting of the twentieth century, the sixty-sixth in our annals as a chartered institution, I find it difficult to express in suitable terms my high appreciation of the honour of being again elected to the office of President. I can only say it shall be my most earnest endeavour to advance the interest, promote the welfare, and enhance the influence of the Royal Institute of British Architects, and to uphold the dignity of the profession.

Our session which commenced last November and ended last July was the last of the nineteenth century, and I then thought it opportune to review the architectural work of the century, its present aspect, its shortcomings, its vitality, and to consider what signs there are of the development of a characteristic national architecture in the future. The twentieth century may be an epoch of extraordinary evolution. May it not be an epoch in the history of the art of architecture?

There are many signs of quickening vitality in the architectural world, pointing to a new development. Should this be the case, it is but natural to suppose that the influence of the Royal Institute of British Architects on the profession, and through its members on the general public, will be a most important factor. A hundred years ago there was no Institute of this kind in connexion with architecture in the United Kingdom. We received our charter sixty-four years ago, when there were only 182 members enrolled. We now number in the various classes of membership a total of 1,745. Besides this, in our seventeen allied Societies in the provinces and Colonies we have over 850 architects in federation with us, making in the aggregate nearly 2,600 members. This speaks volumes for the extended and increasing influence of the Institute. If all these units, imbued with a proper and unselfish interest in the cause of architecture, are in the aggregate working with any enthusiasm at all—and this no one can doubt who knows what is going on in the profession—I think I cannot be wrong in prophesying a great advance in our art during the coming century.

It was comparatively easy to review in a measure the work of the past one hundred years. As to the future, there is a saying that it is unwise to prophesy—unless one knows; but one may draw conclusions by analogy. Lord Macaulay said: "People have only retrograded in civilisation and prosperity from the influence of some violent and terrible calamities, such as those which ruined the Roman Empire or desolated Italy at the beginning of the sixteenth century . . . . The natural human tendency is towards improvement." This same principle is surely applicable to our modern architecture.

Trusting that no overwhelming calamity may occur to the detriment of our race and civilisation, and that, should reverses or bad times come, they will only tend to strengthen our moral, intellectual, and physical force, let us rely on the natural human tendency towards improvement, and cherish the hope that our future architecture may reach a perfection transcending all that has gone before. Surely this should be the case. We have knowledge of all the past; we have greater facilities for the acquirement of every branch of learning than any people ever had; science is at a higher level than in any former period; shall progress in the art of architecture alone be arrested? It is not possible. The vitality shown in our academies, schools of art, guilds of arts and crafts, and not least exemplified in the studies and works of the students in connexion with the Royal Academy and the Royal Institute of British Architects, tends to prove the truth of this theory of progress.

Let us consider some few points of interest in connexion with the architectural practice of the present time, as well as some subjects of importance that may influence our art during the twentieth century. There can be no doubt that the most important question of the moment is the necessity for a better and more methodical system of education for our students in architecture than exists at present. The Institute can only stimulate and assist such steps as may be taken in this direction. Its *rôle* is not that of a teaching society; its function is to foster and encourage the art of architecture, to guard the interests of the profession, and to examine and ascertain the qualifications of those wishing to be enrolled on the list of its members. England is lamentably deficient in adequate means of imparting the necessary grounding to the students who wish to turn their attention to this particular art.

The pupil, as a rule, picks up—as Mr. Arthur Cates has put it—his knowledge piecemeal, in a haphazard sort of way, in the office of a large practitioner, with but little attention from the one who really could teach him. This is almost unavoidable in the office of an architect in large practice. Then in order to pass the Institute examination the student crams with certain teachers. The cramming may have the result of passing him, but it leaves him still inadequately educated. Further, there is in all our schools too much concession to temporary or ephemeral fashions, notwithstanding many good examples of work done by our architects of this century in various defined sober and self-restrained styles. Men such as Burton, Wilkins, Barry, Scott, Cockerell, Soane, Pennethorne, Nash, Wyatt, Pugin, Elmes, Burges knew the groundwork of their art thoroughly, and this knowledge was the cause of the purity, dignity, good proportions, and detail of their designs. There is much talk at times of Palladio, Michelangelo, Brunelleschi, and other old masters; but I wonder how much the average architectural student really knows of any one of them?

More severe and systematic courses of tuition exist in France. Their devotion, however, is limited almost exclusively to Renaissance. Their work, often most correct, is somewhat wearisome. But their course of study is thorough. A close familiarity with the best of what has gone before in Classic, Gothic, and other styles should enable the architect who is gifted with some power and freedom of thought and expression to avoid the wearisomeness of the French modern architecture. And it may be remarked, in passing, that the faults in proportion and detail, and the incongruities often found in our English work, might be avoided in like manner. The new Byzantine Cathedral of Marseilles shows the thoroughness of French methods of study. It is correct and imposing, but somewhat dull. Surely a little more freedom, a little more originality of thought, would have saved it from this charge of dulness without impairing its purity or dignity. In France the centre of this thorough study of architecture, where each student gets properly grounded in first principles, is the École Nationale des Beaux-Arts. And this is a Government establishment. In Italy the central school is the Academy of St. Luke, also under Government. In Germany there are a number of excellent training schools for architects, all under Government control. In the universities, colleges, and technical institutes of America there are some half-dozen or more first-class training departments in architecture, which have now reached such efficiency that their students are ceasing to go to France for purposes of study. And the best American architects are often University graduates to begin with. All these countries have felt that the interests of the community and the State demand the efficient education of the student of architecture. In England at present there are no Government schools of architecture worthy of the name, or any individual endowments that would render a successful organisation possible. It is true there have been certain schools of architecture attached to the schools of art, as at South Kensington; but in these the grounding in first principles has been on somewhat unsystematic and desultory lines, and the teaching of architecture is altogether subservient to the classes for painting and sculpture. The methods at the Royal Academy School appear to be similarly wanting in systematic grounding. A new school, under the Board of Education, forming part of the Royal College of Art, has been inaugurated at South Kensington, and a reorganisation of the schools of art generally is in progress; but this new school is, apparently, to be of limited scope, and designed mainly for the training of art teachers; and though students of architecture will be received, it will be chiefly to learn drawing and the artistic side of architecture. It will therefore be a hard task for the new teaching authorities to make it a complete and systematic school of architecture from the foundation to the finish. However, until it starts work it is premature to say what it may become or to discuss its efficiency. Our universities seem to ignore architecture, the only bodies who touch the subject at all being University College and King's College, London, and Victoria University in the North. It had been hoped that the authorities, in the reconstruction of the London University, would have taken some steps for the representation of architecture; but notwithstanding that their attention had been particularly drawn to the desirability of this, and that a sister art and sister sciences are duly represented on the Senate, architecture remains unrecognised, and can only now be admitted by Act of Parliament. Apparently this is because there are really no properly constituted or efficient schools of architecture in the country, or none worthy of university recognition. However, Mr. Bailey Saunders, the Secretary to the London University Commission, in his letter to the *Times*, informs us "that amongst certain Boards enumerated in the regulations a Board of Fine Art, including architecture, is to be appointed, and there is nothing to prevent the future Senate recognising architecture as a branch of science." Let us hope it may also be recognised as a fine art. If at any time the Senate of the London University does see its way to offer the opportunity of conducting examinations of a professional character jointly with this Institute, we shall not, I imagine, be slow to avail ourselves of it. All this points to the immediate need of some efficient training school for architects, providing thorough grounding and systematic education. Our junior society, the Architectural Association, has done much to further this object. If it extends its work in the direction suggested by the President a short time back, and becomes really a teaching body, a properly constituted, systematic and efficient school of architecture such as the universities will recognise, the thanks of the whole profession will be due to it, and an advance of unparalleled significance will have been made in our architectural education. But this is a matter of large and grave importance, and will require the deepest and most serious consideration if it is to be initiated at all; and to have any chance of success it must be no dilettante effort, but must be started on a proper basis, with the most competent professors in all the branches necessary for the complete educational equipment of the architect. An enterprise of this magnitude, undertaken in such a spirit, would be a fitting inauguration of the dawn of the twentieth century. Should it become a reality, I cannot but think that the sympathy of the Institute with such a movement would prompt us to assist in every way commensurate with the means in our power. It might then be advisable, and even possible to concentrate the energies of the Royal Institute of British Architects, the Architectural Association, and the Architectural Museum in one comprehensive scheme housed under one roof as the architectural centre of the United Kingdom, and indeed of Greater Britain. But such a scheme would involve great expenditure, and architects, as a rule, do not become wealthy men. Still there are a few amongst our leaders to whose generosity I should suppose such a scheme would appeal. And surely there are also some public-spirited persons outside our profession who, appreciating the vital necessity for a better system of education amongst architects, and the value of good architecture in the history of a great empire might, if properly approached, be inclined to assist munificently in the carrying out of such an object.

The oft-repeated cry against the *formal* teaching of any art seems to have died of late, and we hear less of the triumphs of unaided genius. It is, perhaps, only in novels that the Phœnix of painting and sculpture takes his erratic flight, exhibiting at the Royal Academy with no previous tuition, and earning a princely income immediately after the appearance of his first picture. We must admit that in architecture, as in the sister arts, the "flash of

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genius" is necessary to give impulsion to the work of the architect, but every genius is the better for sound teaching. As William Allingham has said—

"Books, gowns, degrees will leave a fool a fool,
But wit is best when wit has been to school."

In connexion with education we have in the collection of casts that forms the Architectural Museum a most potent instrument ready-made to our hands. This series was gathered together about thirty or forty years ago, when Gothic was most in vogue, and the examples are mainly in that style. The museum building itself is in need of repair, the collection wants rearranging, and additions of good examples of Cinque-cento, Spanish, and other styles of art in which sculpture and plaster decoration play a leading part. If this museum, expanded in scope, were made part of the school suggested by the Architectural Association, and were organised in connexion with the Institute, it would be worth considering whether to its copies of architectural sculpture and details an addition should be made of a technical collection. It might then show samples of building materials—without being a trade museum or an advertisement of building appliances and inventions, but being a museum wherein the student or architect could learn the properties and uses of the raw materials of his art. It is true we already have the Geological Museum; but the specimens of building-stone, for example, shown there give no information on the points on which the architect is interested, such as constituent parts, weathering capacities, crushing weights, specific gravities, supply sources, prices, the uses to which it has already been put. This project would be easy were the Institute in possession of more commodious premises. We had a faint hope of obtaining the use of Burlington House, lately vacated by the London University, but unfortunately it is to be taken up for Government offices.

A second very important question is that of the present status of the architect. Any person, however unfitted to practise the art of architecture, or even that of building with no pretence of architecture at all, can put a plate on his door and dub himself "architect." This is an absurdity, and as much a danger to the lives and pockets of the community as the quack practising in medicine. With a view to remedying this state of affairs, it has been suggested that some form of registration by Act of Parliament of architects now carrying on business (and hereafter those who have passed an examination) should be adopted. But as this would not prevent quantity surveyors, engineers, land agents, house agents, builders, and others undertaking the duties of architects, and obviously for many years would introduce to the public a host of absolutely unqualified men, as specially licensed by Act of Parliament to perform duties not only involving the security of the life and property of the subject, but the reputation in future years of the cultivated and artistic sense of this great Empire, I need scarcely remind you that the Institute has hitherto strenuously opposed such a measure.

As an instance of an unauthorised and meaningless use of the word "registered" I saw a short time ago in a provincial town a name on a door-plate, with the words "Registered Architect" attached. On inquiring what this signified, I learned that he was a registered member of some architectural society—not the Royal Institute. No doubt the unthinking public might attach some value to this title, implying some superior qualifications for practice as an architect. It would also be likely to exercise a prejudicial effect on those who declined to attach to their names such a meaningless word. That the public should be safeguarded in some way in regard to the practice of architecture by unqualified persons is becoming daily more apparent.

The status of medical men in every branch of their profession is gauged by the qualifying examinations they have passed and the registerable diplomas granted them by the various legally qualified universities or medical corporations. Though the registration of these diplomas is not compulsory, any man having obtained a qualification in medicine or surgery is allowed to practise according to his qualifications, whereas an unregistered medical man cannot hold an appointment in any public or Government institution, his certificates are not valid, nor can he recover any charge in a court of law. This is for safeguarding in a measure the lives of the community from unqualified practitioners in medicine and surgery.

As to solicitors, their qualifications are fixed by the Solicitors Acts, and any person who attempts to practise as a solicitor without those qualifications is amenable to the criminal law. A qualified solicitor must (*a*) have duly served as clerk under a binding contract for a period fixed by law under a practising solicitor; (*b*) have passed the proper examinations; (*c*) have been duly admitted and enrolled; (*d*) possess a proper annual certificate (on which a considerable stamp duty is charged) enabling him to practise for the current year. His fees are regulated by law, and can be taxed by duly appointed officials. This is to safeguard in a measure the interests and property of the community from the action of unqualified men who might otherwise practise as lawyers.

But at present there is no safeguard to the lives and pockets of the community from the actions of unqualified persons practising as architects. A revival of the ancient guild system seems to be a strongly marked modern tendency, nor can there be any doubt of its protective value to all professions, since enrolment in a recognised society practically amounts to registration. Thus accountants are not, I believe, bound by Act of Parliament to register; indeed, I suppose any one may practise as an accountant; but no one can use the title "Chartered Accountant" unless he belongs to the Institute of Chartered Accountants and has passed an examination. The value of the title "Chartered Accountant" is due to the fact that the examination is very severe, and considerable knowledge of law is required. In order, therefore, to improve the status of members of an established corporate body like ours in the eyes of the public, the examination for membership should also be severe, and comprise not only construction and architecture, but legal and other subjects necessary to fit a man for his profession. The Incorporated Law Society commenced its existence in a very similar way to the Royal Institute of British Architects. After a time it began to impose the passing of examinations as a condition of membership. Later, the registration of solicitors was made compulsory. Still later they acquired the entire control of examinations, the custody of the Roll of Solicitors, the registration of articles of clerkship, the power of admission and readmission of solicitors, the renewal of their certificates, and other powers.

To follow on somewhat similar lines should be our policy; and whatever steps towards the legalisation and control of the practice of architecture may in the future be considered desirable, this Institute should be prepared to initiate any movement which might be likely to best serve the public interest and place the profession of architecture in the high position to which it is entitled. Whenever we can obtain for this Royal Institute such legal recognition, with extended powers for regulating the qualifications of persons desirous of becoming architects, the admission to membership would become practically admission to the architectural profession. It would be a guarantee of efficiency, through the fact of having passed examinations held either by the Royal Institute of British Architects or by universities or other qualified examining bodies in conjunction with the Institute. The professional status of an architect would then attain a position commensurate with the dignity of the vocation.

It may be as well to remind you that Her Majesty's Government, the Government of India, and corporate bodies both in London and the provinces have recognised the standing and influence of the Institute on many occasions, and have frequently sought our advice and assistance for the public benefit. Surely, then, there is good reason to hope that in the near future any well-considered scheme emanating from us for giving a legal status to any qualified practising architect would receive the favourable consideration of the Government. Many details would have to be carefully considered before submitting to Parliament any measure for making this Institute the controlling body of the architectural profession, and I think that this question should receive the serious attention of the Council early in the century.

There is a third matter, in relation to architects and the practice of architecture, to which I must refer, and that is public competition. This was a burning question when I was a pupil, is a burning question now, and will, I fear, continue to vex the souls of future architects. I cannot help expressing the opinion, based on years of experience, that whether looked at from the point of view of the client who desires to obtain a good building, or of the architect who wishes to do himself justice, or of the general public interested in fine architecture—architectural competitions are a failure. In most cases better designs, or designs more suited to special requirements, would result if architect and client were in constant consultation from start to finish, than if the former was working from printed instructions only. For years past correspondence in the professional journals has shown the keen sense of dissatisfaction caused by competitions. A strong evidence of this is the recent raising of the question whether an assessor should judge higher value to the plan or to the elevation of competitive designs. It frequently happens that the competing architect, unable to consult his client, elects either to depart from the prescribed conditions of accommodation for the sake of his elevation, or to fulfil the plan conditions to the detriment of his design; in each case placing the judge in a most difficult position, and possibly causing discontent to both competitors and the promoters of the competition. In making these remarks I have no wish to decry the work of many of those eminent architects who have earned their reputations by competition. In my own case the commission for the largest building I am responsible for—the Allahabad University for the Government of India—was obtained in competition. But I am bound to say it was practically redesigned, in consultation with the authorities concerned, after the competition had been decided in my favour.

I have lately been arbitrator in a case where one point in dispute was that the architect, after gaining a competition, had practically to replan the whole building to suit requirements of authorities who ought to have been consulted at the beginning, for which replanning he claimed payment; and I know of a number of similar instances. The selection of a capable architect, and placing him in direct *rapport* with his employers from the beginning, would have saved an enormous waste of time, money, and energy. It would be easy to compile a long list of both public and private cases in which the results from this cause have been disappointing and in some instances disastrous. And it is significant that in recent Government buildings the principle of competition has been virtually abandoned.

It is said, however, that it gives the young man a chance. That may be so; but in architecture, as in every other profession, the man of energy and ability will come to the front, competition or no competition. The work a man has done is as good a criterion of his powers as any fresh design he may produce in competition, and it becomes simply a cruel waste of time and money to force him continually to compete. In a merely economic sense the waste of money and energy in this strife is absurd and monstrous. In six competitions I could name the total sum to be expended was 400,000*l*., and there was an aggregate of 320 competitors. Say that each one spent at least 60*l*.—which in most instances is less than the actual sum—on the preparation of the plans, the total cost to the architectural profession in competing for these six works would have been 19,000*l*., and that for a net profit to be divided amongst the six successful architects of some 12,000*l*., assuming that say 2 per cent. on the total amount involved would be the cost to the architects of carrying out the works. Is it not a monstrous injustice that we should be compelled to waste so much money, energy, and brain power in order to obtain an honest livelihood? No tradesman even would submit to such injustice. But architects themselves are greatly to blame in this matter. We have not sufficient *esprit de corps*. Too many of us are ready to enter into competition where the terms are manifestly unfair on the bare chance of obtaining the work. Private competitions are on a different footing, where each competitor is paid a fair sum for his design. This Institute has done much to help in getting competitions started and carried out on fair or approximately fair lines, but it rests with individual members to show some self-respect and dignity in declining to compete unless the terms are fair, and the competitor placed first by the assessor be employed to carry out the work.

However much the Institute has done, I am confident the Council would be only too

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pleased to do more. There have been some suggestions made in a recent discussion in one of the architectural papers which are scarcely practicable. Our Competitions Committee, or Council, can only take action when a competition is announced or an assessor is asked for; and then only by suggestion, for we cannot dictate. More often than not we are asked to appoint an assessor after the conditions have been decided upon and issued by the promoters, or the designs have been actually submitted.

I think matters might be helped somewhat if allied societies also appointed small standing competition committees, whose business it would be, on hearing of contemplated competitions, immediately to open communication with the promoters, and point out to them the views of the Institute, and our suggestions as to conditions. This course might prevent, in many instances, the conditions being issued before an assessor was appointed, and so save much trouble.

A properly appointed assessor affords a better guarantee for careful examination of designs than the haphazard system which used to prevail; but I think architects should refuse to compete unless the conditions are just, and have been drawn up by the assessor. With regard to suggestions made as to the method of appointing an assessor, I can only express my opinion that a body of men, however able the individuals composing it may be, is not the best instrument for selecting a person for any particular appointment. A responsible person who has the opportunity of consultation with reliable colleagues has a much better chance of making a fitting selection. But when all is said and done, an assessor cannot always be relied upon as infallible, any more than in legal matters a judge's verdict may not sometimes require reversing.

There is one other matter I may mention in connexion with our professional practice. After negotiations lasting I am afraid to say how many years, at last a definite form of building contract has been agreed upon between our Council and the Institute of Builders, and now only needs the approval of our general body at a business meeting. This will shortly be laid before you, and, gentlemen, I think this is a most important point, and one that will save endless difficulties between architects and their clients and contractors in the future.

So much for matters in connexion with the professional practice side of architecture. Now let me glance at one or two subjects that may become important factors in the architecture of the next century. First of all comes the question of the art of architecture as distinguished from mere building. I have already mentioned the debate as to whether in a competition the assessor should regard more the plan, or the artistic qualities of the elevation and design. It has been suggested by an eminent Royal Academician that theory should be subservient to practice, and that the elevation is the growth from the plan—the plan first, the elevation after—a principle, he considers, too often neglected. I cannot think that any hard and fast principle can be laid down. There is a sense in which it is true that the elevation should grow from the plan, but in practice, I think, an accomplished architect considers both together. Our art is largely a matter of co-ordination, compromise, and compensation; one gives up a trifling advantage of plan to obtain a better artistic effect, or one foregoes a point of effect in design for the advantage of the plan.

Architecture is neither planning nor making fine elevation, but a combination of the two—and of much more besides. For there is a subtle and not easily defined quality to be found in all good architecture, one not always included in convenience of plan or propriety of design, which the world has agreed to call "Art." Tolstoy says, "Art is a human activity transmitting feelings," and the stronger the "infection" the better the art. The test of its greatness is not only whether it infects with the artist's feelings those who may be prepossessed in its favour by special education or fashion, but whether it is capable of influencing the unbiassed judgment of the world at large in different countries and times. The late Lord Leighton also evidently felt this to be the meaning of the word "art," for in one of his lectures he said: "Art is based on the desire to express and the power to kindle in others emotion active in the artist, latent in those to whom he addresses himself." The quality of this transmitted feeling is of infinite importance. If the work is virile and noble, it elevates the soul; if it is puerile or vicious, it debases it. Certain triumphs of our art—the Parthenon, the Pantheon, the Taj Mahl, the cathedrals of Chartres, Rouen, and others, and some of the best examples of the Cinque-cento period — well-known works, still freshly transmit the feelings of their creators and in Tolstoy's phrase unmistakably "infect" the beholder with their sentiments.

It is our misfortune just now to have urged upon us comparatively trivial and local views of this great subject. We have had this century a Classic revival, which would take a temple portico as a model and plant it on to a domestic palace as fitting rural architecture. However charming this may appear in a distant view of a large landscape, as at Prior Park at Bath, nothing could be more incongruous with domestic English life or with the severity of the weather in this uncertain climate. This class of work did not "infect" more than a portion of the community predisposed in its favour.

We have had enthusiasm for mediæval art reproducing for modern requirements and worship fourteenth-century churches, complete in all their parts—or introducing ecclesiastical details and construction into modern domestic work, regardless of the difference in times, politics, social life or thoughts, and of the eternal fitness of things. This class of work did not "infect" more than a portion of the community who were educated to appreciate the influence. We have had those who said that, in the absence of sculpture, architecture is non-existent, being then simply building. We have had others who affirmed that, as "good wine needs no bush," so good architecture needs no sculpture. The revulsion of feeling caused by the extremes of the Gothicists is now producing a school who think the finest architecture consists of plain Georgian windows and a good cornice—a nice simple style in which the minimum of detail labour may answer for the maximum of building. This school cannot look at Gothic without exasperation, as years ago the Gothic admirers could not regard Classic; but it has been noted before this that differences in points of taste often produce greater exasperation than differences in points of science.

With few exceptional instances, every one of these schools fails in greatness as the best of old work did not fail—according to either of the above definitions of art. What is it that is wanting? Was the perceptive faculty missing in the designers—or the large and cultivated mind, the breadth of view and artistic inspiration which lead the genuine artist to interpret in his work the wants and feelings of all times and peoples, or did they aim to satisfy only the ephemeral fashion of the moment? If so, this means that more thoughtful education, culture, and travel are required for expansion.

It is a matter for serious regret that the East, and especially India, the cradle land of much that we most prize in Europe, is so entirely neglected by our students and professors. Indian architecture has a whole world of instructive examples of grandeur of proportion, picturesque grouping, perfect planning, and beautiful detail, besides an indescribable, nameless poetry nowhere else to be found. I do not suggest that we should copy Oriental architecture any more than that we should copy Greek or Egyptian work, but that it should be seen and studied as an educational process, as well as for its own sake, and the more especially as Great Britain is now not only a European but an Asiatic power. In these days men are apt to restrict and stint their studies and tastes, as trees are stunted by Japanese gardeners, until their own peculiar little school or period of architecture stands to them for the whole circle of art, a course that is as narrowing and prejudicial to progress in art as it would be in the field of science. I only say that notwithstanding the wealth of art to be found in Italy, Greece, and elsewhere in Europe there is, nevertheless, much to be learned further east. Surely it is the want of real educational grounding in properly constituted schools, and of larger travel and wider study, that causes us to find so much that is disappointing in our modern work.

Her Majesty's Government of India has done many things in the interests of Indian art and archæology of less promise and profit than would be the establishment of travelling studentships in India; while to the patriotic and wealthy in this country the idea may well be commended, for there can be no doubt there is as much to be learned in the East as in the West.

As to the next century, among its many problems it seems likely that some revision of our present methods of church planning may result from the needs of great congregations in our cities and large towns. It is not Dissent alone that now commands large crowds and requires expanded tabernacles. The Mother Church also needs grand areas for worship, where all can see and hear.

Perhaps in the near future it may be thought advisable to consider the plans of such buildings as the ancient Basilicas, the early church of Santa Sophia at Constantinople, the Pantheon at Rome, the grand Oriental mosques, and the church of Santa Maria del Fiore at Florence, with a view to avoid the blocking of the central portions of our large churches or cathedrals, after the mediæval manner so detrimental to congregational worship. We may then possibly find a way to bring the altars forward instead of placing them some hundreds of feet away from the nearest part of the congregation. Something may then be arrived at larger, broader, simpler, grander, and more suited to an enormous, earnest, devotional congregation intent on taking part in the service of worship, than in an arrangement whereby they are crowded out of sight by the narrowness of the nave and the massiveness of the piers. I can conceive that such a building might be a glory to the century, not necessarily of cold, Classic details, or of Oriental feeling, or of severe Gothic, but nervous with the life and aspirations of modern times and beautiful in proportion and detail and in sculptured lessons.

Also as to our streets, we have the problems of open spaces, public buildings, institutions, hospitals, asylums, schools, houses for the poor, and blocks of self-contained dwellings for the middle classes. There is much to be done, notwithstanding the strides that have been made in the arrangements of all these during the last fifty years. London is being fast rebuilt—certainly in the central part. I would ask on what principle is this rebuilding being done? Is more forethought being expended than in former centuries? Is the laying-out of new streets on large enough lines to free the constriction of the ever-increasing traffic, to admit of abundance of light and air to the overcrowded areas, and to obtain Heaven's blessing of green leaves and trees in our main thoroughfares? Is any shelter from rain and snow thought of for pedestrians? Are our open spaces, bridges, and approaches to be properly designed and laid out by our most capable men, or left to the chance ideas of the subordinates of our county councils and other authorities? The time must come in the next century when the rebuilding of London for its enormously increasing population—increasing, I believe, at the rate of some 50,000 annually—must be proceeded with in real earnest, not merely in the childish way of pulling down at intervals a few squalid neighbourhoods, and running new streets on chance lines through the clearing, as being the cheapest method of making a small improvement, and on designs obtained by ill-considered methods, with no definite intention of carrying them out. Is new London to be allowed to grow up with as little apparent design as a vegetable—controlled by a thousand influences, some hidden, some vainly directed? Or is it to be on an imperial, necessary, convenient, healthful, and tasteful plan, properly thought out and laid down beforehand by competent hands, and rebuilt under a wise control? If the latter, it is time energetic steps were taken to arrange for it, and the best architects and engineers asked to collaborate in the matter. Our main thoroughfares, narrow and choked with traffic, dangerous to life and limb, wanting in light and air, are gradually being reconstructed on almost the old lines, subject only to the improvements in construction, and to regulations as to heights insisted on by the London Building Act. They are unhealthy by overcrowding; the wood paving alone, through insufficient cleansing of the dust impregnated with impurities, is causing new diseases of eyes and throat.

One cannot but feel that a step in advance has been made by the fact of the London County Council becoming alive to the importance of obtaining thought-out schemes and designs for future improvements, though only in part, before rebuilding is commenced. The Strand to Holborn scheme is clearly a movement in the right direction, recognising as it does a

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general principle, however ill-advised the County Council may have been in the particular method of applying it; for we cannot but regard as unfair their conditions to the architects and the nature of an arrangement unsatisfactory by which, even when designs may be settled on, there is no guarantee or certainty that they will be carried out.

But if in the rebuilding of London our authorities are wise, at an early date in the new century plans should be prepared showing future lines of building and increased width of thoroughfares; and all future building operations, private or public, should be controlled within these lines, no matter at what cost. The streets should be wide, our main thoroughfares sufficient to allow of trees, like the Unter den Linden or the Paris Boulevards, and arranged to harmonise with beautiful buildings. The roads should have efficient means of copious flushing and cleansing with water.

It is worth considering whether shops should have arcades over the footpaths for the protection of pedestrians from rain, snow, and sun. There are objections on the ground of police supervision and light, but they are by no means insuperable, while undoubtedly the arcade gives the architect his only chance of making a shopfront constructively reasonable. At present huge façades of stone or terra-cotta and brick appear to be slung in air over a yawning abyss of plate-glass. Of course, every one knows they rest on iron girders and columns, but a well-designed arcade would give a sense of safety and constructive propriety and still might admit sufficient light to the shops.

There should be subways everywhere, as exist now under a great part of the streets of Paris. These would contain the sewers and drains, water and gas pipes, wires for electric lighting, and telegraphs and telephones, hydraulic power pipes, and possibly mains for a public supply of steam for heating and ventilating, cooking, and driving machinery—thus avoiding the present and ever-recurring nuisance of the breaking-up of the roads.

Our public buildings, institutions, middle-class blocks of self-contained houses, and dwellings for the poor should have their surroundings clearer and their sites arranged for free admission of light and air in abundance, and the ground area not overcrowded by inmates. The spaciousness would also permit the architecture to be seen, and would be an incentive to higher-class design, which, as well as the laying-out of the streets, should be under official control.

The problem of the housing of the poor should be so solved as to raise the working classes to a higher physical and moral level, and assist in redeeming them not only from the worst evils of poverty and misery, but from evil surroundings and wickedness. Sir Thomas More said, "All men, even the vicious themselves, know that wickedness leads to misery, but many even amongst good men have yet to learn that misery is almost as often the cause of wickedness." It will become in the next century a part of the highest duties of architects to see to this. They must render the dwellings of the poor not only comfortable and sanitary, but beautiful, so as to educate and raise their tastes. The movement to this end, based on the awakening conscience of the upper and middle classes, as well as on the urgent practical necessities of growing London, is at present only in its infancy. With the happily constant growth of human sympathy, it must become one of the most poignantly interesting as well as one of the most important problems of the age—one which the most accomplished architects need not feel to be beneath their notice, and which, indeed, they should be called upon to assist in solving. We all know of examples of even almshouses, picturesque, beautiful, and dignified, designed by some of the greatest men. There have been powerful rulers in the world's history who have dared not only to rebuild cities, but to decree their removal when necessity demanded. Amber, the ancient capital of Rajpootana, was deserted, and the town of Jeypore erected to take its place, by the order of its ruler, Jey Singh. Toghlukabad, near Delhi, is a similar example. Turin has been rebuilt during this century, though on the uninteresting mechanical gridiron system which the Americans have adopted in laying out their new towns.

The rebuilding of a city is a rare opportunity and should be well and artistically done. John Wood, of Bath, and his son had this rare chance, and they took advantage of it in a splendid manner. Sir Christopher Wren prepared sketch-plans for rebuilding London after the Great Fire, but had no opportunity of carrying out his ideas. Now London is unique in the fact that, notwithstanding its wonderful and continuous growth through many centuries, its centre, the City, has always been fixed. In any future reconstruction this centre must be the starting point; the main arteries for traffic must be arranged to radiate from this centre to the surrounding suburbs.

But this is not all. We heard at our Congress last session of the necessity for collaboration between the architect and sculptor and painter; that is to say, closer union of all the arts is needed in the master art of architecture. Painting *may* have more scope in the architecture of the future, in the way of internal decoration, than during the past century, and there are many signs of this coming to pass. But sculpture *must* have much to do with the design of the external architecture and re-arrangement of new London if it is to be worthy of this great Empire. The question of the right manner of its introduction in detail I do not propose to open. I am not addressing pupils. I am simply stating my conviction that we may look forward to a far more intimate union between sculptured work and constructive forms than we see at present. Yet most of us have observed recently in the productions of some of our younger sculptors strong appreciation of the decorative capabilities of their art, and one could mention men to whom might be confided the carrying-out of even a constructive piece of decoration with the certainty that it would be wrought in harmony with its architectural environments. This harmony is not always effected. Nothing can be more wasteful and absurd than to finish sculpture placed at a great height above the eye to the extent that the figures on the top of Milan Cathedral are finished. Or, again, I cannot think it happy to place sprawling meaningless figures on the sides of window pediments, like some I noticed the other day—out of scale, coarse, and so large in comparison with the pediments that they looked scarcely capable of sustaining their weight; or, on the other hand, to place in similar positions rows of nude children, repeated *ad nauseam*, is a costly, meaningless, and futile decoration. Nor can I think yards of repeated terra-cotta ornamentation excellent. But much depends on the manner of the introduction of such embellishments. Sculpture in connexion with architecture should not be the first object to attract the eye, but should take its place as part of the general scheme, adding to and not upsetting the general harmony, helping the architecture to tell its tale.

Sculpture is the natural complement of architecture, often indeed as integral a part of it as the blossom is of the tree, crowning it with beauty, and manifesting in clear and unmistakable terms its object and purpose. At first, carver and mason were one; later on, as skill increased and finer materials came into use, the sculptor became, as art critics say, "emancipated from bondage," and had no further need for the ladder by which he had climbed. So now it is laid down on high authority that "the insulated statue is the highest and truest production of the sculptor's art." It is difficult to upset dogmas. But the doctrine is more literary and popular than sound. Not that I would grudge sculpture any place that may be claimed for such work as independent art. Yet as to which are the triumphs of art in sculpture I believe the sculptors would be unanimous in their verdict for those by Pheidias on the Parthenon. We now see these technically perfect works as "insulated" statues or groups in our galleries. But they were much more than marvels of the skill of an independent sculptor. They were part of an architectural composition to which they gave a nobly decorative effect, while they were fraught with a significance which few of us can now adequately appreciate, expressing the attributes of the Virgin protectress of the city, whose image in ivory and gold was enshrined within the temple.

The sculptors of the Middle Ages, no mean artists, seldom attempted the "insulated" statue. At a later date Donatello produced statues independent in themselves, and not "mere adjuncts" of architecture. Now at Florence one may see the original of this clever artist's St. George as an "insulated" statue in the Bargello, but there is a copy in a niche of the church wall from which the original was removed (for better preservation), and I think I prefer the work as a "mere adjunct." Also I would prefer the same artist's beautiful singing boys relief in the place for which it was originally designed, though it may now be seen in most galleries as an independent work.

The critics who uphold this doctrine of insulation, as we may call it, doubtless think of the matchless single figures of Greek workmanship, of which copies and a few originals are seen usually in a fragmentary state. But they probably forget that the majority of these works, including even the magnificent Venus of Milo, now standing in solitary grandeur in the Louvre, were originally part of an architectural composition. I cannot help feeling that sculpture divorced from architecture loses greatly in value, character, style, and teaching. Not only is the charm of work wrought in harmony with architectural surroundings lost, and any teaching of a definite age missing, but its composition suffers from the absence of the confining lines which enhance its value. With freedom and detachment more elaborate detail is possible. The work ceases to be sculptural, while the artist often lapses into that kind of naturalistic imitation which, carried to the bitter end, is seen at Madame Tussaud's.

There is a great gulf between the portrait statues and busts of Rome, conceived and executed in a style which was then a vital force, set in congenial architectural surroundings, and our forlorn and sparsely sprinkled public effigies. If an estimate were framed of the cost of these latter, I feel persuaded that half the sum spent on irregularly spotting our public places with insulated statues (which are never even washed) would have sufficed to cover the greater part of our public buildings, now blank and inexpressive, with fitting sculptured adornments, significant in meaning and beautiful in effect.

A building is of itself an historical monument, upon which, more fitly than by any insulated work, the varied aims, achievements, interests, and story of the time can be permanently inscribed. I do not mean to say we should have no independent statues at all, but rather that when we do have them, even in our public places and gardens, and on our bridges, they should form part of a properly considered architectonic scheme.

But there must be in our future progress not only collaboration with the arts in sculpture and painting, but also with science in engineering. The opportunities afforded of constructing vast enclosures, bridges, roofs, &c., by means of iron and steel were impossible in former times with only the older materials. In such works the science of the engineer must necessarily be predominant; but there is no reason, if engineers and architects would work amicably together, why this class of work should not be grand and beautiful. If architecture neglects scientific construction in other materials than brick and stone, it is not properly fulfilling its mission. On the other hand, iron and steel could certainly be used without the meagreness or aridity of effect to which we are unhappily so much accustomed. It certainly is not impossible to make a beautiful iron bridge or roof. I occasionally go to a small railway station, not very far from London, where the ironwork always "infects" me with a pleasurable feeling. The forms and details are beautiful without too great extravagance or waste of material by unnecessary weight. But instances of this sort are rare; and no doubt, as a material, iron or steel has many drawbacks in an æsthetic sense. But anyhow this is a subject to which our rising generation of architects should turn their earnest attention, if progress is to be made in many of the great structures of the time; and I reiterate they should work in collaboration with engineers as well as sculptors and painters.

I have now, gentlemen of the Institute, ventured to direct your attention to a few of the subjects that appear to me to call for our consideration, and in some cases for our united action, if there is to be material progress in our art during the next century. The growth of our Institute and similar bodies, and the status of our profession; the necessity for the establishment of a broader, more systematic, and comprehensive scheme of education in architecture; the unsatisfactory nature of the competitive system; the expansion and concentration of the energies of this Institute in connexion with the Architectural Association and the Architectural Museum; the cultivation

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of a more effective and intimate sympathy between the architect, the sculptor, and the engineer; and some of the problems and opportunities presented in the rebuilding of London, have been glanced at, with, I feel, somewhat diffuse references to other cognate subjects. But one cannot expect that a large body will in all these matters see eye to eye with one who, though occupying this chair, is but an individual. I have, however, at least expressed some of my most earnest personal convictions, and as such I commend them to your consideration. The interests of the profession are not altogether in the hands of the Royal Institute of British Architects, for, unfortunately, there are architects who are not members.

But if influence is to be brought to bear on the many important problems in connexion with our art in the near future, arising out of the development of the country and this great city, the heart of the British Empire, it must be by unselfish co-operation. If our Institute is to be a power in influencing public opinion, and the education, efficiency, and honourable conduct of the profession, a right feeling of *esprit de corps* should animate all our architects in an endeavour to increase its authority as their representative. With this object in view I conclude by appealing to those who, having the necessary qualifications, have not yet joined us to do so, that all our forces may unite in the work we are endeavouring to carry out in the interests of the public, the profession at large, and the noble art of architecture.

Mr. Alfred Waterhouse, in proposing a vote of thanks, said that in their President they had a man of strong individuality and one who knew how to impart dignity to his position as head of the Institute. The President showed this during the recent Architectural Congress and he had shown it that evening in his address. Mr. Emerson's remarks on the progress of architecture and on the development of the Institute were most interesting and they must all heartily appreciate what had been said on the subject of architectural education, as also on that of the registered architect. Though they did not know what the future had in store for them, yet he (the speaker) felt that there would always be considerable difficulty in putting an official stamp on a man's position as an architect. They could not but give their cordial assent to what the President had said as to competitions. Competitions gave fine opportunities to energetic young men, but at what a cost! They knew that architects were actuated, not by a love of gain but by their enthusiasm for art, but even architects must live and it was to be regretted that their enthusiasm was so often taken advantage of. Perhaps a report from the Competitions Committee, giving particulars of competitions, would do much to open the eyes of the profession to the often unsatisfactory character of these contests. The President had called attention to a recent controversy as to whether the plan or elevation be more important—making more for good architecture. They would do well to recall and reflect on the words the President used. In speaking of the rebuilding of London, the President had recommended the consideration of projects for main lines of thoroughfare well in advance of their realisation, so that they should all form part of a well-conceived scheme. That was a matter of enormous importance, and could not have too much thought and deliberation bestowed upon it. Most of them would remember the late Arthur Causton's contribution on the subject, and his proposals should not be forgotten. Mr. Causton's proposals were similar to the President's, viz, to take a comprehensive view and to make every improvement, however small, work up to and form part of this gigantic subject. They joined with the President in feeling that their art, if it was to flourish, must be nurtured by unselfish co-operation, and if the Institute was to be the power for good they must wish it to be, it must be by a thorough *esprit de corps* animating all its members.

Mr. G. F. Bodley seconded the vote to the President for an address, he said, which had been exhaustive and most interesting. They were all looking forward, he thought, to what might be a great future for architecture, and in thinking of their present-day work they should cast their minds back and think of those great days of art—the Greek and the Roman and our Gothic—and of that marvellous thing (which he thought was true) that in the great days of art there was not one thing made that was not beautiful. They might dig up from their gardens an object made in those days, and they would be sure to find it beautiful, instinct with expression—the expression of life. It was that that they should remember in thinking of our present art. It was reported that some of the steps of St. Martin's Church, Charing Cross, were to be removed in order to widen the street. That might seem a detail to many, but it was an important matter. In passing those steps he felt as though in Rome; the steps were perfectly right. It was now proposed to lump them up equally and remove the landing in the centre; in his opinion the whole beauty of the steps rested in that landing—a place of rest as one went up. More than twenty years ago William Butterfield asked him to represent him at the Board of Works in protest against a similar proposal. He did so, and put before the Board of Works Mr. Butterfield's and his own views on the subject, and, perhaps partly because of that, the proposal was not then carried out. He hoped it never would be.

Mr. E. R. Robson hoped the Institute would take a strong course in the matter of the steps of the church. About twenty years ago he was shown, by the then engineer to the Board, how the steps were to be altered. He said to the engineer: "You might as well pull down the portico itself."

Mr. F. C. Penrose said it would be a fatal thing to alter the steps. About twenty years ago he wrote a letter to the *Times* on the subject, strongly deprecating the proposed alterations. Happily the matter was not proceeded in.

The vote of thanks having been agreed to,

The President, in reply, said the Institute had the matter of the proposed removal of the steps of St. Martin's Church before them.

The meeting then terminated.

The next meeting will be held on Monday, when Professor Lanciani will read a paper on "Architectural Results of the Latest Excavations in the Forum at Rome."

MODERN DAMS AND ANCIENT WATERWORKS.

THE following is extracted from the interesting address read on Tuesday to the Institution of Civil Engineers, by the newly-elected President, Mr. James Mansergh. After sketching the development of water-purification up to the present time, Mr. Mansergh proceeded:—

"I should like to say a few words about the coming into fashion of the stone dam in impounding reservoir construction. Although Mr. Bateman made many such reservoirs in his time, I believe he never built one with a dam of stone, and I think I am right in saying that the Vyrnwy was the first Mr. Hawksley had to do with.

In 1878 I built a small one on the River Wyre, in front of a low weir of Sir Robert Rawlinson's, for the Lancaster Corporation, about 57 ft. high above the river, across a narrow gorge, where I could give the wall a curve in plan of only 100 ft. radius. In such a situation the structure could obviously be made much lighter than say the Rankin type section for a long straight wall.

There is great comfort in building a dam in masonry as compared with making an earth bank, but we should not allow fashion to run away with us, and so build in stone when earth and puddle would answer the purpose equally well at much less cost. I think where we get 100 feet of water behind a dam it ought to be built of stone, but it is essential in my opinion that such a structure should be founded on an unyielding base of sound rock from side to side of the valley. With anything less than this there may be unequal settlement owing to the varying weight of the wall, likely to induce fracture. I do not think it is good work to tie a stone wall into the side of an earth valley.

I cannot say that I much admire the American practice of building a composite dam, *i.e.*, part of its length in earth and part in stone, as they are now doing at the New Croton reservoir of New York (which I saw four years ago) and have previously done in many smaller works. They seem to trust in Providence or good luck over there to an extent we dare not do here. In such cases the core or watertight barrier in the earth bank is not puddle as we should make it, but a thin stone wall joined on to the end of the true stone dam. I am not sure that such a core may not be made from end to end of an earth dam, if very special precautions are taken by well rolling the bank to ensure that unequal settlement or surging does not take place. I have never yet ventured to try it, but if I do not get nervous as I grow older I may some day.

Mr. Hill's wall across the outlet of Thirlmere into St. John's Beck is about 50 ft. high above the stream bed, and is a very picturesque structure. The Vyrnwy dam is an exceptionally heavy wall, splendidly put together, about 85 ft. high above the river; and the granite wall built across the Meavy on Dartmoor by Mr. Sandeman is about the same height, and is a really handsome piece of masonry.

I am proud to have been associated, as Consulting Engineer, with this work, for it has a special interest in that it completes the scheme initiated by Admiral Drake over 300 years ago for the supply of Plymouth. I have not seen Mr. Deacon's wall built with Aberthaw lime near Merthyr, nor Mr. Watson's at Gowthwaite on the Bradford Nidd scheme, and have only sighted the Swansea Cray Reservoir Works from the railway.

In mentioning these and the three main dams varying from 122 ft. to 128 ft. high above ground and the lower submerged wall I am building on the River Elan, I have, I think, named nearly all, if not quite all, the masonry dams of any pretentions in this country. The highest of these lis 40 ft. lower than the New Croton, which is not erected as at first intended at Quaker Bridge, but two miles higher up the valley. I have just received some photographs of this work which represent the wall as being built in horizontal courses of roughly-squared stones—a method which I do not approve. What we want in such a wall is ample weight and good vertical bonding, and this can be secured by building in stones of from two tons to 6 tons in weight practically as they come from the quarry, and surrounding them with smaller stones and good concrete well rammed in so as not to leave any interstices. We are getting in the Elan walls very nearly 50 per cent. of solid blocks to a little more filling, and the whole structures will weigh when complete from 157 lbs. to 160 lbs. per cubic foot, and will practically be monoliths. In one of them we have built 100 ft. high in two eight-month seasons, and cannot discover by careful examination, or with the level, the slightest indication of settlement.

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Until the advent of modern electrical engineering I have hitherto looked upon the work of a hydraulic engineer as the most interesting, as it probably is the most ancient, branch of our practice.

The railway engineer began his business seriously only a few years before I was born, and the electrical engineer is a creature but of yesterday, whilst one of my predecessors built a dam of hewn stone at Kosheish to divert the course of the Nile from the spot upon which Meua desired to build Memphis nearly 5,800 years ago.

In Egypt also a canal was made by order of Usertesen III., by which he sailed southward to crush Ethiopia 2,660 years B.C.

In Babylonia, 2350 B.C., Siniddinam, the King of Larsa, enlarged the canal—a still more ancient work—on which Larsa was situated, while Rimsin, King of Elam, provided an outlet for the Tigris (River of the Gods) into the Persian Gulf about the same time.

Khammurabi, the King of Babylon, about 2320 B.C., having witnessed the ravages of floods in the Lower Tigris, organised a system of improvement in the complicated network of ditches and channels which intersected the territory belonging to the great cities between Babylon and the sea with gratifying results.

In India efforts were made in very early times to preserve and utilise the rains and rivers, and in Beluchistan the great cyclopean dams of stone known as the Ghorbasta were erected, it is believed, about 1800 B.C., or 3,700 years ago.

In Egypt irrigation works can be traced back to a very remote period. In that comparatively level country an extensive system of artificial ponds, reservoirs, or lakes, with a network of distributing canals, was in existence at least as early as the time of Sesostris, otherwise Rameses II., about 1388-22 B.C.

If the art of irrigation was taught to the ancient Egyptians by the natural overflowing of the Nile, it is probable that Egypt in her turn afforded an example to Assyria and Baby-

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lon, to Carthage and Phœnicia, and also to Greece and Italy.

In Persia there is evidence that the hydraulic engineer had carried out irrigation works from 600 B.C. to 700 B.C.

In Greece Athens was supplied about 520 B.C. with water from an ancient spring called Callirhoe, flowing from the foot of a broad ridge of rocks which crosses the bed of the Iliasus.

In Ceylon it is believed the first tank for irrigation purposes was built by Pandinousa, the second of the Hindu kings, in the neighbourhood of his capital Anuradhapoore, about 504 B.C..

In India it appears, on the testimony of the Greek writer Megasthenes, who lived about 300 B.C., that irrigation was certainly practised before his time.

Coming down into the Christian era, the aqueduct of Merida in Spain was erected about 10 A.D., that of Segovia about 105 A.D., and the new water supply for Olympia was introduced by Herodus Atticas, A.D. 157.

In the early seventies I had a commission to examine and report upon the Claudian aqueduct, by which water was supplied to Naples 1,800 or 1,900 years ago from the Orciuoli springs in the Sabato valley, between Serino and Avellino. At the time of my visit the river-bed was practically dry from Orciuoli upwards towards Serino, and it was most interesting to see how the welling out of the ground of these magnificent springs went to produce in a few chains a stream of probably 15,000,000 gallons to 20,000,000 gallons a day. I found the remains of the Claudian aqueduct in several places both below and above ground.

I had great difficulty in obtaining permission to examine the former, and it was only through the authority of the local Syndic, under pressure from a member of the Italian Parliament, who accompanied me, that I obtained a guide to one of the shafts. This man protested piteously against the removal of the shaft covering, and crossed himself vigorously when I took steps to ascertain the depth to the conduit.

I got out a scheme to utilise these springs on modern lines, and made an estimate of the cost, but nothing further came of it at the time. Some ten years later, however, the work was taken in hand, and now Naples is supplied from the source utilised in the time of Claudius.

In refreshing my memory about early waterworks, I have been pleased to find the history of nine of the aqueducts of Rome as told by Sextus Julius Frontinus, water commissioner of that city in the second half of the first century of the Christian era, and I propose to go into some detail about them at the risk of re-telling to some of you a story that you are already well acquainted with.

This work of Frontinus' has become accessible to English readers through the enterprise of Mr. Clemens Herschel, an American engineer, who has published a photographic reproduction of the original Latin manuscript preserved in the monastery of Montecassino, about half-way between Rome and Naples, and its reprint in modern Latin; also a translation into English and some explanatory chapters.

The sentiment embodied in the opening paragraphs of Frontinus' first book is so admirable and so equally applicable to the twentieth as to the first century, that I make no apology for transcribing it literally. He says :—

'Inasmuch as every office conferred by the Emperor demands especial attention, and inasmuch as I am moved not only to devote diligence, but even love, to any matter confided to my care, be it on account of inborn zeal or by reason of faithfulness in office; and inasmuch as Nerva Augustus, an emperor of whom it is difficult to say whether he devotes more love or more diligence to the common weal, has now conferred upon me the duties of Water Commissioner, duties contributing partly to the convenience, partly to the health, even to the safety, of the city, and from olden time exercised by the most distinguished citizens. I therefore consider it to be the first and most important thing to be done, as has always been one of my fundamental principles in other affairs, to learn thoroughly what it is that I have undertaken. There is, indeed, no better foundation for any business, nor can it in any other way be determined what is to be done and what omitted; nor is there for a fair-minded man so debasing a course as to perform the duties of an office entrusted to him according to the direction of subordinates; a course, however, which must be followed whenever an inexperienced official takes refuge in the practical knowledge of his assistants, whose services, though necessary for rendering help, should nevertheless be only a sort of hand and tool of the principal in charge. It is for this reason that I have set down in this commentary all that I could gather as bearing on the subject-matter, after having arranged it and codified it in accordance with my habit so that I might consult it as a guide in the duties of this.'

I think you will agree with me that this is admirably put by the fine old Roman gentleman who did his honest and conscientious work as *Curator Aquarum* over 1800 years ago, and that his words are worthy to be recorded in our transactions.

From the foundation of Rome in 754 B.C., for 441 years—that is, to 313 B.C.—the citizens were content with using water which they drew from the Tiber or from wells or from springs, but in that year the Appian water was brought into the city by the censor Appius Claudius Crassus, who also had charge of the construction of the Appian Way from Porta Capina to the city of Capua. He had for his colleague Plautius, who received the name of Venox (the searcher of springs) on account of his search for the springs of this water. Appius appears, however, to have been the smarter of the two, for whilst Plautius was induced to resign his office before the expiration of his normal term, Appius contrived to extend his until he had not only completed the aqueduct, but also the highway. Hence he enjoyed the honour of giving his name to Rome's first aqueduct. The water which this conduit brought into the city was derived from springs situated about half a mile along a cross road, leaving the Prenestine Way between the seventh and eighth milestones from Rome. Beginning at the springs and entering the city at the Porta Trigemina, its length was about 10·6 miles, of which all but 300 ft. was laid underground, the remainder being on a masonry substructure above ground or on arches. Its cross section was 5 ft. high by 2·5 ft. wide, and probably rectangular. It delivered water at a comparatively low level, *i.e.*, about 55 ft. above the sea in the city, but its height at the springs Frontinus does not state, nor have I been able to ascertain it from any other source.

The second of Rome's aqueducts was a more ambitious, much longer, and consequently much costlier undertaking than the Appia. In the year 273 B.C. the censor Manius Curius Dentatus contracted to have the waters of the River Anio rising in the Apennines brought into the city for the sum realised by the sale of the spoils taken from Pyrrhus. Two years later Curius and Fulvius Flaccus were elected water commissioners, but Curius died five days after, and Fulvius finished the work. This aqueduct, the *Anio Vetus*, had its intake from the river up-stream from Tibur at the twentieth milestone outside the Baranean Gate, and early on its course a branch was taken off to supply Tivoli. Above the point of abstraction the River Anio has a length of about twenty-one miles, and a drainage area approximating to 151 square miles. There is no record showing that any subsiding reservoir was constructed at the intake; but it would ill become us modern engineers to criticise our predecessors of 2,000 years ago in this respect, for it is only a short time since there was little more than a pretence of such reservoirs on the works of the London companies, and at Philadelphia the water is to this day taken direct from the tidal rivers Schuylkill and Delaware into the service reservoirs and distributing mains of the city.

The Anio Vetus had a length of 40·7 miles, mainly underground, there being only 1,100 ft. above ground on a masonry substructure, and, apparently, no arches. The cross section of the conduit was 8 ft. high by 3·7 ft. wide, but we have no authentic record of the fall between the two termini, nor how that fall was distributed throughout the length.

In 145 B.C., when the Appia and Old Anio had become leaky by reason of age, and water had been diverted from them by unlawful takings, the Senate commissioned Marcius—who at that time administered the law as Prætor—to restore these aqueducts to usefulness and to protect them, and because the growth of the city seemed to demand an increased supply, he was also empowered to investigate whether he could bring other additional waters into the city. He seems to have made a report on the subject recommending a source near to the thirty-eighth milestone on the Sublascensian Way, 'where numberless springs gush forth from caves in the rocks immovable like unto a pool, and of a deep green hue.' Before, however, instructions were given to carry out the work, a discussion arose among the Council of Ten, who, consulting the Sibylline Books for another purpose, found that it was not right for the Marcian waters—and still less for those of the Anio—to be brought to the Capitol. It was a little late in the day to make this latter discovery, because the Anio water had been used in the city at that date for over 160 years. The matter was then discussed in the Senate, and revived three years later, but ultimately the popularity of Marcius Rex carried the day, and it was decided to utilise these beautiful springs.

Fenestella says that 180 million 'sestertii' were appropriated for the works of the Marcian Aqueduct—equal, if the basis of calculation is correct, to over 1,600,000*l.* This sounds like a big estimate for such a work in those days, and possibly there is some mistake. Its length was about 58·4 miles, of which 5·3 were below ground—what we should now call cut-and-cover work contouring the hillsides—0·5 of a mile on a substructure of masonry above ground and 6·6 miles on arches. It would have been intensely interesting to have seen a longitudinal section of this or any other of the ancient aqueducts, and the instruments with which the engineers did their levelling so as to maintain the gradients of their conduits. The cross section of Marcia was 5·7 ft. in height and 3·5 ft. in width, and it delivered water in Rome at an elevation of 200 ft. above sea-level.

Thirty years ago the use of the Marcian springs water was resumed in Rome under a concession granted to an English company by Pope Pius IX., and the name given to the modern aqueduct is 'Acqua Pia.' The engineer who has the honour of effecting this revival is Colonel Bernard Blumenstihl, who, in his little book entitled 'Brevi Notizie sull Acqua Pia (Antica Marcia), 1872,' gives a full account of his search for and discovery of the ancient Marcian springs. He says that these springs are now called the second and third 'Serena' situated on the north side of the Anio, a short distance down stream from Agosta. He has found the ancient masonry conduit leading the water from the springs towards Rome.

In the year 127 B.C., that is eighteen years after the Marcia, the Tepula aqueduct was constructed by the Censors Servilius Coepio and Cassius Longinus. The source of the water utilised by this aqueduct was certain volcanic springs situated nearly two miles to the right of the Latin Way as one comes from Rome, and near the tenth milestone, on the slopes of Mount Albani. This is about half way between Frascati and Rocca di Papa. It will be noticed that the first and third Roman aqueducts received the names of the men chiefly responsible for their construction, viz., Appius and Marcius. In this case the name Tepula was adopted on account of the slightly warm or tepid character of the water of the springs (63 deg. Fahr.), which are now called Sorgenti dell' Acqua Preziosa, on account possibly of their possessing some curative properties. Up to the time of the building of the Tepula conduit, these structures had been made principally of dimension masonry, but in this one concrete was almost exclusively used. What the exact length of Tupela was I cannot make out, but it was probably a mile or two less than Julia, which was made next, and of its whole length nearly half must have been on arches. Its cross-section was 3·3 ft. high by 2·7 ft. wide, and it delivered water to the city a few feet higher than Marcia, or probably about 208 ft. or 210 ft. above sea-level.

In the year 35 B.C., Agrippa, when he was Aedile, appropriated certain springs in the neighbourhood of the Tepula, but further up towards Rocca di Papa, these springs—the Julia—having three times the volume of Tepula, and yielding water of 13 deg. lower temperature. The Tepula was taken into the city for ninety-three years, after which time, viz., in 33 B.C., Agrippa brought the water by a branch conduit from the Julia springs into the Tepula Aqueduct, and thus produced a mixture which, having regard to relative volumes, had a temperature of probably 53 deg. or 54 deg. This water flowed in one and the same channel for four miles, and was then divided into two and went on by the old Tepula and the New Julia conduits, and entered the city near the present Porta Maggiore, Tepula being in the middle and sandwiched vertically between Marcia below and Julia above. The Julia conduit was 4·6 ft. high and 2·3 ft. wide; its total

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length was 14·6 miles, of which 0·5 of a mile was above ground on a concrete base, 6·13 miles on arches, and the rest below ground.

In 33 B.C. Agrippa rebuilt the nearly ruined aqueducts of Appia (280 years old), Anio (240 years old), and Marcia (112 years old), and furnished the city with a large number of ornamental fountains. He also, thirteen years later, took in hand the utilisation of other springs found on the estate of Lucullus in the valley of the Anio, and only a short distance up-stream from the Appia springs. The story goes that these springs were pointed out to the soldiers who were searching for water by a young girl of the district, and that, on opening out the ground all around, a great quantity was discovered, justifying the making of still another aqueduct, to which was very appropriately given the name of Virgo. A little temple was erected near the intake, and in it a picture was placed representing the incident. The source was on the Collatian Way, near the eighth milestone. The cross-section of the conduit was 6·6 ft. high by 1·6 ft. wide, and its length 13·35 miles, of which 12·18 miles were underground, 0·51 mile on a masonry base, and 0·66 mile on arches. This was a low-level supply delivering the water into Rome only 67 ft. above sea-level.

It would appear from the foregoing records that in the time of Agrippa, shortly before the commencement of the Christian era, the city of Rome must have been magnificently furnished with water, for Agrippa had restored Appia, Anio Vetus, and Marcia, and Tepula was probably in good working condition. He had also constructed Julia and Virgo, so that the whole six aqueducts—five carrying spring water and one that of the River Anio—were all contributing to the supply. What the quantity delivered into the city daily actually was must necessarily be a matter of the vaguest conjecture, for, first, we have no data as to the yield of each source; second, we know nothing of the ruling fall in any of the aqueducts, so cannot estimate their discharging capacity; third, we have no information as to the quantity legitimately disposed of en route; fourth, we cannot tell how much was surreptitiously abstracted by unauthorised or 'winked at' tappings of the conduits; and fifth, we do not know the amount of leakage through structural defects.

Of the seventh aqueduct bringing water to Rome, known as the Alsietina, our friend Frontinus has nothing but adverse criticism, and he wonders how so exceedingly cautious a ruler as Augustus could have taken the trouble to supply a water which was so unwholesome that it could not be used at all for domestic purposes. The only excuses he can make for the projector were, first, that he had undertaken to establish a 'Naumachia' (a sort of glorified Earl's Court marine circus). and wanted to avoid wasting good water to fill it; and second, that this water, coming in as it did on the opposite side of the Tiber to that where all the other aqueducts delivered, could be used at times when no water could be got from that side, owing to repairs of the bridges. The source of this supply was the Alsietinian Lake near a cross road, 6·16 miles from the Claudian Way at the 14th milestone. The aqueduct was 21 miles in length, of which 19·71 miles were underground, and 0·34 mile on arches. The water was delivered in the city at only 55 ft. above sea-level, so that there was a fall of 625 ft. in the aqueduct, for the altitude of Lake Alsietina is 680 ft. Augustus, however, did a small but useful work by the building of a conduit about ¾ mile in length, bringing in water to supplement the Marcian springs in times of drought, and to this conduit he gave the name Augusta.

After this, and because the seven aqueducts were not sufficient to meet either the public needs or the demands of private luxury, Tiberius began, in the second year of his reign, A.D. 36, the construction of two aqueducts, one taking water from the Cerulian and Curtian springs, and the other from the river Anio. These works were completed in the most splendid manner by Claudius fourteen years later, that is, in A.D. 50, the former being named after himself, Claudia, and the latter Anio Novus. The Claudian springs rise about 500 yards to the left of the Sublascensian Way, near the 38th milestone, and in addition to the two above-mentioned, the water from a very pure spring called Albudinum was taken into the Claudian conduit. This aqueduct had a cross section 6·0 ft. high and 3·3 ft. wide, and its length was 43·9 miles, of which 34·3 miles were underground, 0·58 mile above ground on masonry base, and 9·06 miles upon arches. The water was delivered at the Porta Maggiore at 230 ft. above sea level. Claudia followed very nearly the course of Marcia, but some thirty-six years after completion it was shortened by driving a tunnel about three miles long under Mount Affliano, not far from S. Gregorio. This tunnel was undertaken by a contractor named Pasquedius Festus, and must have been a difficult work when even black powder for blasting purposes was unknown.

Three hundred and fifty-nine years after the Anio Vetus was built—that is, in A.D. 86—the river Anio was again tapped at a point near the forty-second milestone on the Sublacensian Way in the Simbruinum. This intake is five miles above that of the old Anio, and, consequently, at a higher level, and the drainage area above it is about eighty-seven square miles. Here the river runs through rich cultivated lands and has loose banks, so that the water was normally muddy and discoloured (like the Medway about Tonbridge), and worse, of course, after rain. To take out this suspended matter, a settling reservoir was constructed below the intake, but this was evidently of insufficient capacity, and being unaided by any process of filtration, the water was delivered in a discoloured condition into the city in times of rain. The Herculaneum brook, which has its source also near the Sublascensian Way at the thirty-eighth milestone opposite the springs of Claudia, was tapped and taken into the Anio Novus. This was a clear stream, but its contribution was not of sufficient volume materially to improve the quality or appearance of the Anio water. The cross section of this aqueduct was 9 ft. high by 3·3 ft. wide, its length was 55·6 miles, of which 46·7 was below ground, and in its upper reaches a length of 2·18 miles was on masonry foundations above ground or arches, and nearer the city 0·58 of a mile on masonry and 6·14 miles upon arches, some of these being the highest of all the aqueducts, rising as they do to 109 ft. above the ground.

After Frontinus' time two other aqueducts were made, viz., the 'Trajana,' taking its water from springs near Lake Bracciano, N.W. of Rome, and the Alexandrina (also called Hadriana), built by Severus Alexander A.D. 226, and utilising springs near the Via Prenestina. All these old aqueduct waters were very hard. There do not appear to have been at the city termini of the aqueducts any large service reservoirs containing from one day to six days' supply of the quantity dischargeable by each aqueduct, as would be the case nowadays, but merely small tanks (piscinæ), and from which pipes of lead or earthenware fortified with concrete were taken off to provide water to separate private consumers, baths, fountains, &c. All the aqueducts bringing in water from the east appear to have crossed the north-east side of the city towards the Diocletian baths—that is, to the neighbourhood of the present Central Railway Station.

We have been accustomed to hear of the enormous volumes of water brought into Rome by the aqueducts which existed about the beginning of our era, and described by Frontinus, and I have always thought there must be some exaggeration about the figures. In those days it is clear the full volume of water was not gauged either at the intake or the delivery ends of the aqueducts, and no one seems to have understood the methods of calculating the quantity from the slope and sectional area. Frontinus' estimations were based on the discharge of a number of ajutages or apertures of various sizes, and he did not appreciate the difference between the discharge of, say, 100 separate 1-in. apertures, and that of one aperture whose sectional area was the sum of the aggregated 100. His standard ajutage or unit of measurement for water in motion was a 'quinaria," or circular aperture 0·632 of an English square inch.

Mr. Herschel claims to have discovered that Prony was at the bottom of the erroneous estimations of the total quantity delivered, as in the 'Memoires de l'Academie Royale, A.D. 1817,' Prony says: '*If* we assume that the head acting on the quinaria was equal to its length—this being the custom in Rome in 1810 with respect to the 'oncia Romana'—and *if* we assume a discharge freely into the air, the value of the quinaria will be so many gallons per twenty-four hours. Every writer since then, except Blumenstihl and Belgrand, has ignored the two *ifs* of Prony; then, using his conjecture as a fact and otherwise exaggerating quantities, has stated the consumption in Rome to have been about 312,000,000 gallons in twenty-four hours. But these figures are absurd, for they would necessitate velocities in the aqueducts which could not possibly exist, and after a painstaking study of all the conditions of the sources, conduits, and distributing appliances, Herschel finally comes to the conclusion that instead of the 312,000,000 gallons, a more likely quantity to be carried daily by the nine aqueducts of which Frontinus had charge was about 70,000,000 gallons, 25,000,000 gallons being lost or utilised *en route*, and 45,000,000 gallons delivered into the city. But we know, both from Frontinus and Pliny, that the nine aqueducts were seldom all in working order, two or three generally being out of use for repair. For this fact it will be right to make a still further deduction, probably to 32,000,000 gallons, or, on the assumed population of that date, of 1,000,000, 32 gallons per head per day. This may not seem a very large quantity, considering the great volumes undoubtedly used for baths and fountains; but, on the other hand, we must remember that for purely domestic purposes the greater part of the people used only such water as was carried to their homes in jars upon the heads of slave and other women, and that many local sources were also available."

ARCHITECTURAL SOCIETIES.

DUNDEE INSTITUTE OF ARCHITECTURE.—Under the auspices of the students' section of the Dundee Institute of Architecture, Mr. G. S. Aitken, architect, Edinburgh, lectured on Saturday last in the Technical Institute on "Some By-paths in Architecture." Mr. James P. Bruce, President, occupied the chair. The lecturer, after prefatory remarks, submitted that a knowledge of landscape gardening was a very good thing for an architect to have. It was a trite remark that the house an architect built might be made or marred by its surroundings. How needful for him, therefore, to understand the setting as well as the jewel, so that there might not only be accordance between them, but an enhancement of the one by the other. Passing on to speak of flower gardens, he said it would generally be conceded that while a certain amount of irregularity of plan and contour was advisable on that part of the grounds furthest away from a house, the immediately adjacent parts should be of a formal character, and in consonance with the architecture of the building. That admitted, it would not be difficult to determine the arrangement of the flower borders. Another by-path which the architect could follow with much profit was that o geology, because it was absolutely impossible that he could be fully equipped for his profession or be a competent judge of the materials he was called upon to handle without some precise information as to their origin and constituents. Water-colour drawing formed another by-path in architecture. It was quite needless to prove that every architect should be a colourist. Archæology was another instructive by-path, and in speaking on this subject Mr. Aitken illustrated how much valuable knowledge could be acquired by the study of ruins and ancient buildings. He subsequently referred to the study of heraldry as being still another useful by-path for the architect, and concluded by stating that there were special reasons why the architect should make a study of music. His own work would require rhythm and grace, and his studies on the mechanical side of music would qualify him to speak with authority when called upon to do so. The architect should no more step aside when, in the course of his practice, he was called on to design an organ chamber in house or chapel or to devise a space for the bells which were to ring out from tower or steeple, than that he should withdraw from the consideration of sanitation and such other departments, which were too often considered mere by-paths in architecture. But any or all the by-paths to which he had referred were not to be so absorbingly followed as to interfere with the attention which was due to the weightier matters of skilful planning, soulful design, sound construction, and healthful arrangements.

LIVERPOOL ARCHITECTURAL SOCIETY.—The second ordinary meeting of the fifty-third session of the Liverpool Architectural Society was held on Monday at the Law Library, Castle-street, Professor Simpson presiding. Mr Sebastian Pugin Powell was elected Fellow to the Society, Messrs. Frederick G. Barker and

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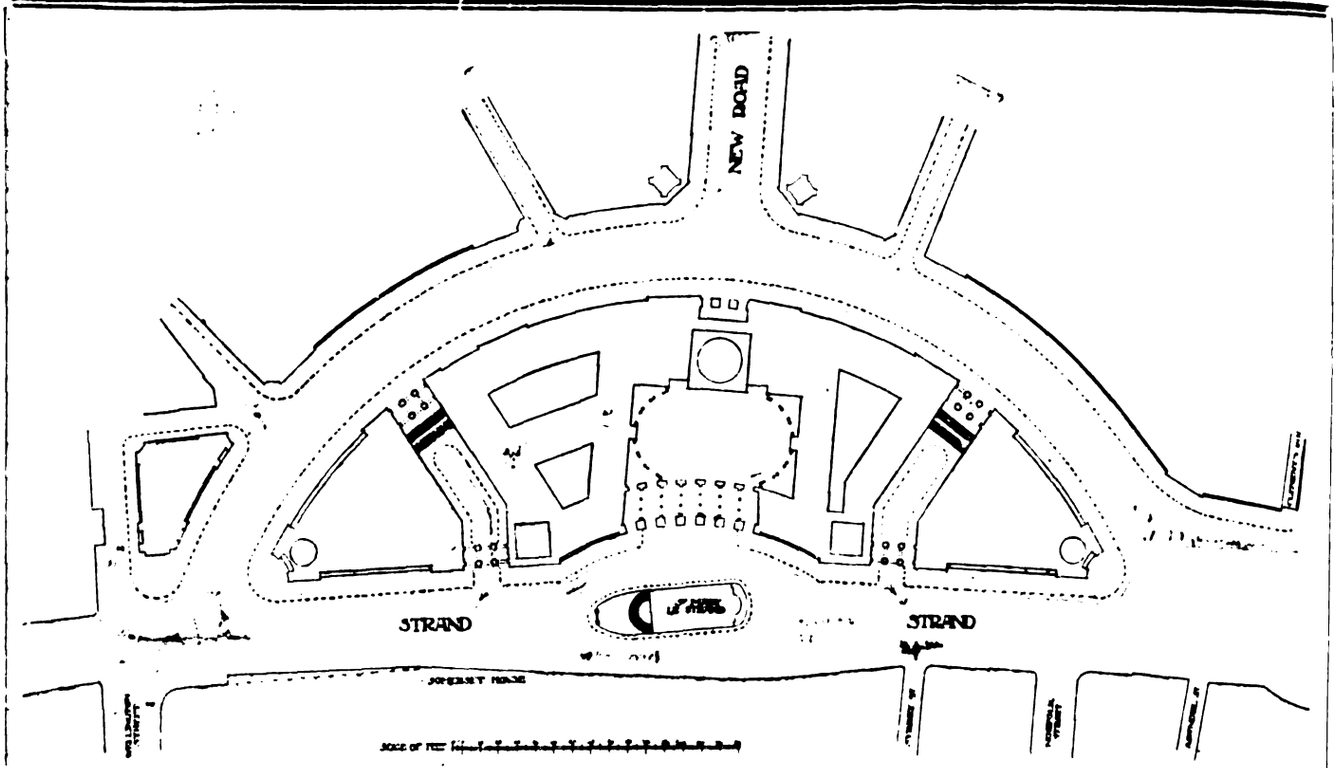

Design for New Street for the London County Council. No. 19. Plan.

Matthew Honan were elected Associates, and Messrs. Elliott Irvine Bingham, E. W. Evans, J. Anstice Harrison, T. Alwyn Lloyd, Edgar Quiggin, student members. After the business of the meeting had been transacted, Mr. Halsey Ricardo read a paper on "The Revival of Gothic Architecture," which he illustrated by limelight views. Subsequently a discussion took place, and, after a vote of thanks to the lecturer, the meeting closed.

Illustrations.

THE BEAUCHAMP CHANTRY, TEWKESBURY ABBEY.

THIS illustration is from a pen-drawing by Mr. Beresford Pite, and represents what he has called the Beauchamp Chantry, but which is more often called the Warwick Chantry, under which name it appears in the plan in our series of "Abbeys of Great Britain" (see *Builder*, December 1, 1894).

It was erected by Countess Isabel Despencer in memory of her first husband, Richard Beauchamp, who was killed in France in 1421. It stands in the bay of the presbytery next the tower pier, on the north side.

DESIGNS FOR NEW STREET FOR THE LONDON COUNTY COUNCIL.

WE publish this week two of the designs for the new streets in connexion with the Holborn to Strand street—those numbered 26 and 19. We have already commented at some length on all the designs (see our last week's issue), and therefore need not add further remarks on them here. We should have been glad to have published the Reports sent in by the authors of the designs in explanation of their views, which would be only fair to them; but the County Council have declined to divulge these.

In the case of No. 26 we have given two of the enlarged scale drawings, which form in fact detail elevations, as they are worked out with especial care and finish. We have not space to do this with all of the designs. The plan of No. 26 furnishes no special feature of interest; it is pretty nearly an acceptance of the London County Council block plan; but that of No. 19 we give in order to show the ingenious manner in which the difficulty of the different axes in the Strand and the crescent street has been met.

As a matter of form we do not give the names of the architects, because they are still held, officially, as a secret; and our practice has always been, in such a case, to respect the official ruling in the matter.

BURNLEY TECHNICAL INSTITUTE COMPETITION.

MR. A. W. S. CROSS, the assessor in this competition, writes that our statement in the article in our last issue, that "the Corporation wanted too much for its money, and this is proved by the issue of instructions for a second competition in which less accommodation was required, although the proposed expenditure remained the same," is incorrect, and that the schedule of accommodation required was identical in both competitions. Our representative had not at the time the opportunity of seeing both schedules; we have since seen both, and Mr. Cross's statement is, as might be expected, quite correct. Our representative appears to have fallen into a misapprehension on the point, which we regret.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE second meeting of the session was held at 56, Great Marlborough-street, W., on the 2nd inst., Mr. C. H. Strange, Chairman of the Section, in the chair. The paper of the evening, on "Church Bells," was read by Mr. H. Rose, who, at the opening of his address, entered at some length into the history of bells and their origin, and described the process of casting in vogue at the present day. He drew attention to the different methods adopted in this country and on the Continent for hanging them, the main point being that, whilst we hang them to swing as pendulums, our Continental friends treat them as a weight and counterpoise to be set in motion by a lever. The former method enables the bells to swing right up and "ring a peal," getting the fullest possible volume of sound from the metal, which is not obtainable in any other way. Some State regulations in force in France relating to the use of church bells for secular purposes were quoted, and the author read several inscriptions from old bells, some of which were illustrated by rubbings. Diagrams were exhibited showing the construction of different types of church bells and the various methods of hanging them.

Mr. Geoffry Lucas opened the discussion, and proposed a vote of thanks to the author for his paper. Mr. F. G. W. Buss seconded, and the discussion was continued by Messrs. C. H. Strange, J. H. Pearson, W. A. Forsyth, H. P. G. Maule, H. A. Satchell, G. H. Smith, and F. C. Eden. The paper elicited a brisk discussion, and considerable interest was taken in the reference made by the author to the ancient custom of ringing the Curfew, and three places were mentioned where this still prevails during the winter months—viz., Hythe, Hitchin, and Gray's Inn.

Mr. Buss reminded the meeting that danger attached to the practice of bell ringing, saying that when a bell is once off the balance in the direction of its swing it is quite beyond the ringer's control, and that he has to allow the rope, after drawing the bell off, to pass freely up or down, resuming his grasp towards the end of each revolution.

Mr. Pearson mentioned that bells usually have to be tuned after leaving the mould, and briefly described the process as follows:—To flatten a bell—that is, to reduce the number of vibrations per second—the tuner must cut off a sufficient amount of metal uniformly all round the inside of the sound-bow. To sharpen it—a process to be avoided if possible—he must remove a portion of the metal from the lip of the bell externally and uniformly round the circumference. The common way of tuning is to chip away the metal with a chisel and finish with a file, but the superior and more modern method is to make use of a vertical lathe, the bell being clamped to the face-plate and made to revolve against a cutter-bar fixed to the slide-rest saddle. Any part of the inside of the bell can be reduced as required in this manner.

Mr. Eden was of the opinion, which was shared by other speakers, that oak was the most suitable material for the construction of frames for the support of church bells. He deprecated the use of iron or steel for this purpose, on account of the great amount of vibration to which a frame is subjected.

Mr. G. H. Smith explained that a muffled bell has a leather covering on its clapper.

Mr. H. Rose having replied, the Chairman announced that the next meeting will be held on November 16, when there will be a general debate on the subject of "Party-Walls."

"FRONT, NO. 59, BATH-STREET, GLASGOW."—We mentioned that the architect's description of this building, illustrated in our last issue, had not reached us through the post. Mr. T. L. Watson, the architect, has since sent us the information that the building consists of offices for letting, and that the principal contractors were Messrs. George Barlas & Son, masons, and Mr. Mathew Henderson, joiner.

ANCIENT REMAINS IN BUCKLERSBURY.—In the course of some excavations now being made at the east end of Cheapside there has been found a passage or tunnel, extending some 15 ft. beneath Bucklersbury, and having at its remoter end an archway opening into a chamber or vault about 8 ft. square. That the tunnel is, as some conjecture, of Roman origin does not seem to be probable, inasmuch as its floor, strewn with loose stones and debris, lies only 10 ft. below the roadway. The Roman causeway which was found beneath St. Mary-le-Bow lies 20 ft. or more under the pavement of Cheapside.

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MAGAZINES AND REVIEWS.

THE *Quarterly Review* for October, though a good and varied number, contains no article on any subject demanding special comment in these columns.

The *Edinburgh Review* contains an article on "Municipal Trading," based chiefly on a Report from a Joint Select Committee of the House of Lords and the House of Commons on the subject. Both the policy and to some extent the morality of entrusting municipalities with trading powers are discussed at some length. The writer quotes with approval an opinion of the Lord Provost of Glasgow, to the effect that municipalities might safely be entrusted with the supply of things which were in their nature suitable for a monopoly, which were articles of necessity, and which required control of the streets or portions of the public property of the municipality; but that their trading powers should be confined to these. He instanced water supply, which implies user of the streets, and which is a necessity; and so with tramways and gas; though in fact these two are not necessities in the sense that water is. This distinction, it seems, has been practically recognised by the Corporation of Birmingham, which makes no profit out of water, as being a necessary of life which they are bound to supply, but does make profit out of gas. On the other hand, there seems no valid reason why a corporation which has installed a great water supply scheme should not sell its surplus to a smaller municipality. It is difficult to draw the line. Power to supply bathing tents was applied for by one corporation and refused. Yet, we may ask, if an inland corporation supplies and works swimming-baths, why should not a seaside corporation supply bathing tents? We could name one small seaside town, much frequented as a watering-place, where the corporation supply bathing machines, worked by their servants, with the result that the machines are larger, better, cleaner, and better served than those of most seaside resorts. Lord Morley drew one line, in his evidence on the subject, to the effect that he never would support a water or electricity supply Bill for a corporation which authorised also the supply of the fittings, and the House of Lords adopted this principle at his instance; but similar proposals are constantly made, as if in hope that they would escape notice. The objection to them is that the result would be to discourage improvement and invention, and lead to the adoption of stereotyped methods. It is important that the boundaries of municipal enterprise should be carefully watched and guarded, and we concur in the opinion of the reviewer that Lord Crewe's Committee should be reappointed next year with the view of taking further evidence on the subject. The same number of the *Edinburgh* contains an article on Helmholtz, an interesting summary of the life and work of that rarely-gifted scientific seer.

In the *Art Journal* Mr. F. Miller contributes an article on "The Decoration of London Restaurants"; in some of which better work has been done, and by better men, than is generally realised. An article on "The artistic position of Du Maurier," by Mr. Lewis Lusk, is partly directed against Mr. Pennell's attacks on that artist, with which we do not sympathise, but at the same time we cannot agree that Du Maurier was to be placed on at all the same level with Keene. Mr. Lusk thinks he is "among the greatest of those who rendered the gentlewoman into art." We are afraid it was rather the "would-be gentlewoman" with whom he specially succeeded.

The *Magazine of Art*, in an illustrated article on "The Queen's Treasures of Art," opens our eyes to the number of beautiful and artistic pieces of furniture to be found in Buckingham Palace. An article on the "Grands Prix for Painting at the Paris Exhibition" is accompanied by a fine separate plate of Hébert's beautiful half-length, "La Lavandara." The editor inserts a protest in regard to the manner in which three artists, M. Dagnan-Bouveret, Mr. Whistler, and M. Stevens, have quietly been allowed to break the rule that only pictures painted since 1889 were admissible, and have received honours for works painted before that time, and exhibited in defiance of the rule. We may feel sure that no such concession would have been made to English artists; who, however, have scrupulously complied with the regulation. It is not a pleasant incident in connexion with the exhibition.

The *Studio* (October 15) contains the first of a series of articles on "Garden Making" by Mr. E. S. Prior. It runs on pretty much the same lines as Mr. Blomfield's book on the subject. In continuing the consideration of the "improvement of design in sporting cups and trophies" our attention is directed to a coloured illustration of a yachting cup designed by Mr. A. Fisher, and which is a curious example of the perversity of taste which seems to be thrust upon us by some of the school of reforming artists and critics. As colour it is admirable; as a piece of design, apart from the colour, it is absolutely devoid of beauty or grace of line, and seems almost defiantly ugly and crude. Mr. Appleyard's "Cup in silver and enamel" is a very graceful design; also the simple but effective "sporting tankard" by Mr. A. H. Smith.

In the *Architectural Review* (Boston) the geometrical drawings of the new Chickering Hall, Boston, by Messrs. Peabody and Stearns, show a most refined piece of architectural design and detail, worth the attention of our architectural students. To the literary portion of the last issue (Vol. VII., No. 10) Mr. E. R. Smith contributes an article on "Architectural Classics," consisting of a kind of *résumé* of the prominent books on architecture. The list ends with Bibiena (1793); whether it is to be continued to the present day we are not informed.

In the *Berlin Architektur-Welt* the designs by Herr Reuters, of Wilmersdorf, especially that for the Charlottenburg bridge, though perhaps unpractical from the point of view of the present day, show the hand of an original genius in architecture.

The *Antiquary*, continuing Mr. Haverfield's "Quarterly Notes on Roman Britain," gives also, under "Notes on Some Kentish Churches," some interesting facts and illustrations as to the Church of St. Mary Cray.

In the *Engineering Magazine* Mr. M. Cokely goes into the question of "Piecework as an Agency in Machine-shop Cost Reduction." He characterises piecework as "purely a merit system, tending to excite ambition in the workman," and consequently productive of a large day's work; which is the common sense of the matter. Among other remarks in the article we may draw the attention both of employers and workmen to the following:—

> "If workmen were more familiar with business methods they would be in a better position to realise why their demands cannot always be granted. If the employer who considers himself right in his own views and contentions on account of his superior intelligence would only take the trouble to enlighten his helps on the methods, risks, trials, and troubles of conducting a successful business generally, they might see things in the same light as he does."

The same number contains articles on "Centralised Steam-condensing Plant," and on "Locomotives at the Paris Exhibition."

The *Monthly Review* contains an article by Mr. Paul Waterhouse on "The Modern Study of Gothic Architecture," in the guise of a review of Leader Scott's "Cathedral Builders" and Mr. Prior's "History of Gothic Art in England." Mr. Waterhouse compares the spirit in which Gothic architecture was studied at the commencement of the revival, when the aim was the collection and classification of materials, with the spirit in which it is studied now, which is rather to learn the causes of its development and the spirit and intent which underlies it. As may be expected, he does not give much faith to Leader Scott's exaggerated claims as to the importance of "The Comacine Masters," though he thinks that both her book and Mr. Prior's have assisted us towards arriving at a true conception of the subject. The one strongly emerging truth is "the centrality and catholicity of the Church's power in this matter;" "the one fact undeniably certain is that, had it not been for the Church's European sway, the comparative homogeneity of the growth of Gothic architecture would have been impossible." The same number contains an illustrated article by Mr. C. J. Holmes on "Some Chinese Masterpieces." The most important works noticed in the article are the early bronze vases at South Kensington, of which three illustrations are given. As to the force and barbaric power of these designs we quite concur with the author. In regard to some other classes of production the artistic importance of the Chinese seems rather exaggerated.

The *Westminster Review* contains an eloquent article on "The Art of the Brothers Van Eyck," by Katherine W. Elwes. The writer's remarks about "finish" in the Van Eyck school are worth attention. She suggests that the power of giving perfect finish of every part without weakening the whole is the special quality by which they are distinguished from the moderns, who fear to spoil the spontaneity of the effect by too much finish. But is it not to some extent a question of time? More pictures are demanded of the painter now, in a shorter time. The finish of the Van Eycks meant abundant time spent over a work; no such result can be got quickly.

In the *Nineteenth Century* we find another article on the Van Eycks, by Mr. W. H. J. Weale, which is mainly an attempt to discriminate between the works of John and Hubert Van Eyck. With one or two exceptions, he believes that those with landscape backgrounds now ascribed to John are by the elder brother, and those with architectural interiors by John.

In *Scribner* there is an interesting article on the great Siberian railway, with a map and a good many views of towns and buildings on the track of the railway, which is probably in some senses the most remarkable railway in the world. For one portion of its course it runs for 800 miles over a perfectly flat plain with no diversification of any kind. "What you see for days from the Siberian express" is the subject of one of the illustrations; for days, since the speed is slow, owing in part to the initial false economy of laying down too light rails, which will not stand a high speed. "The Cross Streets of New York" is another picturesque article. Under "The Field of Art" is a short description of two pictures by Old Masters in Mexico, one an "Assumption" by Murillo, on his usual lines, the other a large "Entombment" which has been ascribed to Titian. The first is in the Cathedral at Guadalajara, the Chapter of which sent a large subscription to Spain at the time of Napoleon's invasion of the Peninsula, and received this picture as an acknowledgment. The "Entombment" is at an Indian village called Tzintzúntzan, once a large native city, and has been there ever since the time of the Spanish occupation, but its history is unknown. The writer of the article, however, thinks its ascription to Titian more than doubtful.

In the *Century* Mrs. Van Rensselaer writes a short article on "A New Sculptor," Mr. H. Christian Andersen, an American sculptor who (of course) studied in Paris. The illustration of the portrait bust which faces the article does not give one a high idea of Mr. Andersen's feeling for beauty or sculpturesque quality. Cole's "Engravings from the Works of Old English Masters" is illustrated in this number by an engraving from Wilkie's expressive picture "The Refusal."

The *National Review* contains an admirable article by Mr. Vernon Harcourt on "Civil Engineering as a Profession." It forms a kind of summary of the scope of an engineer's work, together with advice as to the course to be pursued by those who would succeed in the profession. It is worth the attention of all young men (and of their "parents and guardians") who think of following the profession. Mr. Harcourt notes that in spite of the immense importance of the place taken by engineering now, the profession, as a distinct one, is only of very recent origin. Smeaton is believed to have been the first person who called himself a civil engineer; but the general adoption of the phrase as defining a special profession only dates from the introducton of railways. Perhaps no profession has made such a progress in so short a period.

The *Contemporary Review* contains a long article on "Gas Light," which gives a historical account of the development of gas lighting, and ends with an enthusiastic pæan on the benefits which have accrued to the world from the Welsbach system of lighting. We should have attached more importance to this article had it been signed. With an anonymous article of this kind one never knows what may be the interests of the writer in the invention he praises; and there is something peculiar in the fact that this article alone is anonymous, every other one in the number being signed (as usual) with the writer's name.

The American magazine, the *Forum*, contains an important article on the American coal supply.

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The *English Illustrated Magazine* contains an article on "The Queerest Streets in England," which it seems (according to the writer) are the narrow "Rows" of Yarmouth; judging from the illustrations, they may seem to deserve the name; the article at any rate serves to direct attention to a peculiar feature of the town which is worth record.

The *Revue Générale* publishes the first portion of an interesting article by Dr. Julien Buse, "L'Habitation Ouvrière," a sketch of the general state of artisans' dwellings in various countries. The author, in referring to such artisans' towns as Mulhouse and Pulman City, gives some reasons for questioning the economic wisdom of this wholesale building by capitalists for the workman.

The *Gentleman's Magazine* includes an article by Mr. J. Ellard Gore on "The Evolution of Stars," a popular statement of the development of the nebular theory, which may be considered now to be the accepted theory; and one on "Two Remnants of Paganism," by Mr. Goodbody; a literary description of Pæstum and of the Grotto of Cumæ.

The *Pall Mall Magazine* contains an article on Dunrobin Castle, its history and contents, illustrated from special photographs.

Knowledge contains some excellent illustrations of the great telescope at the Paris Exhibition, which in themselves give special value to the number. An article on "Stone Implements on the Gold Coast," with illustrations, will be interesting to archæologists. The authors, Mr. Bristowe and Mr. Marriott, have been making a fresh collection of prehistoric implements from this part of the world.

The *Genealogical Magazine* is continuing its illustrations of arms of towns (which it appears are intended as a Supplement to the "Book of Public Arms"), giving this time Todmorden, which we quite agree is effective as well as simple; and it is a true symbolical coat, without realistic pictures on it.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loan.—On the recommendation of the Finance Committee, it was agreed to lend the Wandsworth District Board 400*l.* for wood paving works.

Rates of Wages and Hours of Labour.—The same Committee reported as follows, the recommendation being agreed to:—

"We have received a notification from the London Master Builders' Association that by agreement between masters and men an advance of ½d. per hour has been made, as from November 3, 1900, in the rates of wages paid to stonemasons. We therefore recommend that the rates of wages inserted in the Council's list of rates of wages and hours of labour as payable to stonemasons be amended as follows: masons, 10½d. per hour; masons (fixing), 11½d. per hour; masons (granite work), 11½d. per hour."

Accommodation for the Council's Staff.—It was recommended by the Establishment Committee that a sum of 16,250*l.* be authorised for the acquisition of the interest of the superior lessee in the premises, 25, Cockspur-street.

Mr. Smith said that this 16,000*l.* was to be expended for the accommodation of the Council's staff, and he thought that it raised the whole question of the better accommodation of the staff. Possibly the time had arrived when the Council might consider whether steps should not be taken to find accommodation suitable for the transaction of its vast business.

Mr. Beachcroft welcomed such votes as that proposed, as it would all tend to press on the matter of finding better accommodation for the Council.

The recommendation was agreed to.

Widening London Wall and Blomfield-street.—The Improvements Committee recommended, and it was agreed, that the City Corporation be informed that the Council is not prepared to contribute any part of the cost of the widening of the portion of London Wall between Albion-place and Circus-place.

It was also agreed after a long discussion that the Council do to contribute on the usual conditions one-half of the net cost of the widening of Blomfield-street and London Wall between Finsbury House and Circus-place, proposed to be undertaken by the City Corporation, such contribution not to exceed the sum of 5,000*l.*, and to be in addition to the contribution promised by the Council on March 7, 1893, in respect of the widening of Blomfield-street to merely 45 ft.

Widening of Millbank-street.—In regard to the widening of Millbank-street, it was suggested by Mr. McKinnon Wood that a decision should be deferred until the new Westminster Borough Council had defined its position; but it was decided to proceed with the acquisition of property, in which connexion an estimate of 51,443*l.* was approved.

Tenders.—The following tenders for work at fire stations were agreed to:—

Lighting by Electricity at Redcross-street Station.—Barlow Bros. & Co., 270*l.*

Lighting by Electricity at Shepherd's Bush Station.—Barlow Bros. & Co., 260*l.*

Painting, Repairs, &c., at Dulwich Station.—R. Harding & Son, 56*l.* 12s. 6d.

Street Widening, Clapham.—It was agreed that the Council should contribute on the usual conditions one-third of the net cost of the widening of North-street and Rectory-grove, Clapham, such contribution not to exceed 3,000*l.*

New Park at Sydenham.—On the recommendation of the Parks Committee, the Council agreed to contribute not more than 2,800*l.*, as half the cost of acquiring eight acres of land known as the Home Park Estate, Lower Sydenham, as a recreation ground.

Drainage By-laws.—The Public Health Committee reported last week as follows:—

"On February 20 last we reported to the Council that the Local Government Board were not prepared to confirm the Drainage By-laws in the form in which they had been made by the Council, and we submitted a revised draft. The Council, however, was not satisfied with the clause relating to the size of ventilating pipes, and referred the by-laws back to us for further consideration. We have since been in correspondence with the Local Government Board on the subject, and they have now agreed to this clause being altered so as to read as follows:—

8 (iv.)—He shall cause every pipe or shaft which may be used in connexion with any of the arrangements hereinbefore specified to have an internal diameter of not less than four inches.

The Council will observe that the clause as amended does not require any ventilating pipe to exceed four inches in internal diameter, and that it thus meets the objection taken to the by-laws when last they were before the Council.

The only other point as to which the Council was not in agreement with the Local Government Board was the question of inserting a clause to exempt the City from the operation of the by-laws. We have thought it well to take the opinion of Mr. Macmorran, Q.C., as to whether the Council could make by-laws applicable to the City, and he has advised in the negative. . . . We have informed the Local Government Board of the purport of his advice, and stated that in the circumstances we considered an exempting clause unnecessary. The Board, however, reply that they are not prepared to approve the by-laws unless either clause 23 is retained or a clause is substituted providing that the by-laws shall extend to the whole of the administrative county except the City of London. We have accordingly retained clause 23 in the by-laws. ['The by-laws shall not extend to the City of London.']

An amendment of the clause relating to the composition of concrete has been made at the desire of the Council's architect, and the Local Government Board are prepared to approve this alteration.*

Subject to the amendments above referred to, the by-laws which we now submit for adoption by the Council are the same as those made on May 2 and 16, 1899, and confirmed by the Council at a subsequent meeting on July 25.† It will now be necessary for the Council to repeal the latter and to make the amended by-laws appended to this report and confirm them at a subsequent meeting before making formal application to the Board for their approval. We may say that a question has been raised by the Islington Vestry as to their power to enforce the by-laws, but we are advised that the by-laws will be binding upon all parties, and that it will be the Vestry's duty to see that they are observed. We recommend—(*a*) That the Council do repeal the by-laws made on May 2 and 16, 1899, under Section 202 of the Metropolis Management Act, 1855, and confirmed on July 25, 1899. (*b*) That the Council do, pursuant to the provisions of Section 202 of the Metropolis Management Act, 1855, make by-laws in the terms set out in Appendix II. to this report, and that the seal of the Council be affixed to copies of such by-laws."

The recommendations were agreed to, and on Tuesday the same Committee brought up the following report, which was adopted:—

"On the 30th instant the Council made by-laws under Section 202 of the Metropolis Management Act, 1855, in relation to the drainage of buildings. In accordance with the statute it is necessary that the by-laws should be submitted to, and confirmed at, a subsequent meeting of the Council. We accordingly submit them, and recommend—(*a*) That the by-laws made by the Council on October 30, 1900, under Section 202 of the Metropolis Management Act, 1855, in relation to the drainage of buildings be confirmed, and that copies of the by-laws, as confirmed, be sealed and sent to the Local Government Board for their approval. (*b*) That the Clerk of the Council be instructed to take the steps prescribed by the Metropolis Management Act with regard to the printing and publication of the by-laws; and that a sufficient number of copies of the by-laws, when approved by the Local Government Board, be sealed to enable the Council of each metropolitan borough to have a sealed copy for production in cases of legal proceedings."

The by-laws were printed in full in our issue for April 1, 1899. See also the *Builder* for May 6 and 27, and July 29, 1899, and February 24, 1900.

District Surveyors' Districts.—The Building Act Committee reported as follows:—

"We have under consideration the question of the desirableness of making certain alterations in the districts of the district surveyors under the London Building Act, 1894, consequent upon the alterations of boundaries made under the London Government Act, 1899, and we propose to report upon this matter at an early date. In the meantime it is necessary that a district surveyor should at once be appointed in respect of South Hornsey, which has been added to the County of London to form part of the parish of and the metropolitan borough of Stoke Newington. We are not yet prepared to submit a formal recommendation to the Council as to the permanent supervision of the area in question, and we have therefore, under the powers delegated to us by the Council, appointed Mr. J. D. Mathews, the district surveyor for Stoke Newington, as interim district surveyor pending any arrangements which may subsequently be made. We report the fact for the information of the Council."

District Surveyor for North Battersea.—The same Committee recommended, and it was agreed to give consent to Mr. H. J. Hansom, the district surveyor under the London Building Act, 1894, for the district of North Battersea, appointing as his deputy Mr. W. H. Woodward, of No. 69, Kennington Oval, to perform all the duties of such district surveyor for the period of six months from November 10, 1900.

Having transacted other business, the Council adjourned.

METROPOLITAN ASYLUMS BOARD.

THE fortnightly meeting of this Board was held at the Board Room, Thames Embankment, on Saturday, Sir E. Galsworthy presiding.

The Works Committee reported that they had approved amended plans, which had been submitted by the architect, of the gate piers, steps, &c., to the main entrance, and of the exterior railings of the head office. In submitting these plans the architect reported that the total cost of the work would amount to 420*l.*, of which 220*l.* would, in his opinion, represent an extra on the contract, after making allowance for the payment of the District Railway Company for the abandonment of the tower and the closing of the ventilating shaft outside the official premises. The amount of contract was 47,532*l.*, and the amount of extras previously reported was 1,176*l.* 10s. 6d. The Board approved of the Committee's action.

The same Committee submitted plans and descriptive report prepared by Messrs. H. E. Milner & Son, landscape architects, for laying out the grounds of the North-Eastern Hospital. The estimated cost of the work was 2,830*l.* The Committee's recommendation that the plans and descriptive report be approved and forwarded to the Local Government Board for their formal sanction was agreed to.

The same Committee reported the circumstances which led them to reconsider the estimate of the probable cost of the Southern Hospital. In June last they submitted an approximate estimate amounting to 310,400*l.* as the probable total cost of the erection, and in forwarding this estimate the Committee expressed their preference that the issue of the Local Government Board's order should be postponed until a definite tender for the erection of the buildings had been received. A fortnight later the Local Government Board intimated that they would not be prepared to assent to the erection of a hospital composed of one-story buildings at such a cost,

* See our issue for February 24, 1900, p. 188.
† See our issue for July 29, 1899.

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and returned the plans with a view to a large reduction being effected in the cost. Since then, however, the Chairman and the late Chairman of the Works Committee had conferred with the permanent officials of the Local Government Board, and proposals were made which, it was thought, would not interfere in any way with the carrying out of the scheme and plans already approved by the managers, and the Committee recommended that they be instructed, in consultation with the architects, and the managers' other professional advisers, to reconsider the estimate of the probable cost, with a view to such reduction being effected as would be compatible with the works being carried out in the simplest manner consistent with efficiency and stability.—This course was approved of.

With regard to Tooting Bec Asylum, the Works Committee reported that, pursuant to instructions of the managers, they submitted plans and descriptive report (prepared by Messrs. A. and C. Harston) for the erection of a receiving home for imbecile children at this asylum. The plans provided accommodation for fifty-six patients and a staff of ten officers and servants, and were based upon a scheme adopted by the managers. The approximate estimate of the cost of the buildings was 13,775*l.*, exclusive of electric lighting and telephones. The plans were approved and ordered to be sent to the Local Government Board.

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—The opening meeting of the eighty-second session of the Institution of Civil Engineers was held on Tuesday evening last, at the Society's house, Great George-street, Westminster, Sir Douglas Fox, the retiring President, in the chair. The Chairman introduced his successor, Mr. James Mansergh, who thereupon assumed the chair, and delivered his Presidential address, a considerable portion of which we print on another page. The medals and premiums awarded last session were subsequently delivered to the recipients, after which the new President held a reception in the library of the Institution.

THE INSTITUTION OF JUNIOR ENGINEERS.—On Saturday, November 3, a large party of the members of this Institution visited the Millbank-street Station of the London Hydraulic Power Company. They were shown over by the superintendent, Mr. George Cochrave. The company have four pumping stations in operation, and a fifth is in course of erection; when completed, the total horse-power provided will be 6,000. Over 4,000 hydraulic machines are working from the mains, of which 120 miles are laid, the largest being 7-in. bore, and the smallest 2-in. At the Millbank Station there are seven vertical inverted compound triple three-cylinder condensing engines of 200 h.-p. each. The boilers are fitted with Vicars' mechanical stokers. The water is pumped from the river and wells by hydraulic pumps, and delivered into high-level tanks, from which it is passed, after treatment with lime, through filters to other tanks at a lower level. From these tanks the water is pumped into the street mains. There are two accumulators, and the pressure employed is 780 lbs. per square inch.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

THE following applications under the 1894 Building Act have been dealt with by the London County Council. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. The buildings are new erections unless otherwise stated:—

Lines of Frontage.

Clapham.†—Five dwelling-houses, with bay-windows, on the east side of Queen's-road, Battersea (Mr. J. S. Cooper for Mr. A. E. Balls).—Consent.

Greenwich.—One-story lavatory and water-closet addition to No. 11, Kidbrook Park-road, Lee, to abut upon Hervey-road (Mr. T. Hollis for the Bowater Decorating and Sanitary Company).—Consent.

Wandsworth.—A block of residential flats, with shops on the ground floor, on the south side of Lower Richmond-road and east side of The Platt, Putney (Messrs. Palgrave & Co. for Mr. G. Crowden).—Refused.

Chelsea (Detached).†—An additional story to part of No. 28, Kilburn-lane, Kensal Green (Mr. C. Ellyat for Mr. C. Woollons).—Refused.

Lewisham.—Houses on the north and east sides of Southend-lane, Lower Sydenham (Mr. F. J. Smith).—Refused.

Projections.

Newington, West.—That permission be given to Mr. W. F. Russell to retain a projection (an illuminated sign) at the Swan public-house, No. 218, Great Dover-street, Newington, extending beyond the general line of buildings in that street.—Agreed.

St. George, Hanover-square.†—A four-story bay-window in front of No. 1, Charles-street, Berkeley-square (Mr. R. G. Hammond for Mr. J. Garlick).—Refused.

Width of Way.

Southwark, West.—A one-story shop on the forecourt of No. 1, Emerson-street, Southwark, at less than the prescribed distance from the centre of the street (Mr. W. H. Woodroffe for the corporation of wardens of the parish of St. Saviour, Southwark).—Consent.

Haggerston.†—An addition at the rear of Nos. 50 to 62, Kingsland-road, Shoreditch, at less than the prescribed distance from the centre of Union-walk (Messrs. Ford, Son, & Burrows for Messrs. John Carter & Sons, Limited).—Refused.

Islington, West.†—A van factory and stabling at Albert Works, York-road, King's Cross, at less than the prescribed distance from the centres of Albert-mews and Tile Yard-road (Messrs. Potts, Son, & Hennings for Messrs. Herbert Clarke, Limited).—Refused.

Deviations from Certified Plan.

St. George, Hanover-square.—Certain deviations from the plan certified by the District Surveyor, under such Section of the Act, so far as relates to the proposed rebuilding of No. 1, Charles-street, Berkeley-square (Mr. R. G. Hammond for Mr. J. Garlick).—Refused.

Lines of Frontage and Width of Way.

Deptford.—Houses with one-story shops on the east side of a house known as Tremorvah, Lewisham High-road, and to the erection of one-story shops in front of that house, also to the erection of one-story shops southward of such house, on the east side of Tyrwhitt-road (Mr. E. Petters for Messrs. G. R. and C. C. Story).—Consent.

Dulwich.—Houses with shops on the east side of Church-road, Upper Norwood (Mr. A. S. Gover for the House Property and Investment Company, Limited).—Consent.

Bermondsey.—A dwelling house, to be let in flats, on the western side of Cherry-garden-street, Bermondsey (Mr. A. J. England for Mr. H. M. Courage).—Refused.

Width of Way and Projection.

Deptford.—A cornice and facia on a shop-front at the flank of No. 203, Lewisham High-road, abutting on Lucas-street (Mr. J. Webster for Mr. E. Plummer).—Refused.

Lines of Frontage and Construction of Buildings.

Hackney, North.—An iron and glass roof, partly supported on iron columns, in front of a coach-house at No. 29A, Woodberry-grove, Green-lanes, Stoke Newington (Mr. R. Midworth for Mr. E. Barnett).—Refused.

Marylebone, East.—A wooden summer-house and a wooden bicycle-shed on the forecourt of Mme. Tussaud's Exhibition on the north side of Marylebone-road, at the corner of Allsopp-place (Messrs. Gordon & Gunton for Mme. Tussaud & Sons, Limited).—Refused.

Lewisham.†—That Mr. J. Warnock be informed that the Council is not prepared to accede to his request for consent to the retention of a tool and coal shed adjoining No. 93, Minard-road, Catford, in advance of the general line of buildings in Sandhurst-road.—Agreed.

Formation of Streets.

Clapham.†—That an order be issued to Mr. C. Grey St. John refusing to sanction the formation or laying of a street for carriage traffic to lead from Navy-street to Voltaire-street, Manor-street, Clapham.—Agreed.

Lewisham.—That an order be issued to Mr. W. H. Collier refusing to sanction a deviation from the plan and section sanctioned by the Council on January 25, 1898, as modified by the Council's order of October 4, 1898, for the formation of Undercliff-road, Loampit Hill, Lewisham.—Agreed.

Working-class Dwellings.

Poplar.—A building, to be inhabited by persons of the working class, on the site of Nos. 1 to 13 (odd numbers only), Jeremiah-street, East India Dock-road, Poplar, with an irregular open space at the rear, portions of the building to extend above the diagonal line directed to be drawn by Section 41 of the Act, and to exceed in height the width of Jeremiah-street and a passage-way on the north side of the proposed building. (Messrs. Gordon & Gunton, for the trustees of the Seamen's Wesleyan Mission and Artizans' Dwellings Society.)—Consent.

Bethnal Green, North-east.—That the Council do make an order as follows—Whereas Messrs. Davis & Emmanuel, of No. 2, Finsbury-circus, City, on the 25th day of October, 1900, under the provisions of Section 42 of the London Building Act, 1894, delivered on behalf of the East-end Dwellings Company, Limited, at the County Hall, plans of two blocks of intended dwelling-houses, to be inhabited by persons of the working class and proposed to be erected, not abutting upon a street, on a site between Globe-road and Victoria Park-square, Bethnal Green. . . . . The Council does by this order sanction the said plans so far as Section 42 of the said Act is concerned. . . . . .—Agreed.

Dwelling Houses on Low-lying Land.

Woolwich.—That the solicitor do prepare a licence under Section 122 of the London Building Act, 1894, to Messrs. W. Richardson and J. E. Morgan, for the erection of five buildings, to be used wholly or in part as dwelling-houses, on low-lying land situated on the north side of Bostal-lane, Abbey-wood, Plumstead (Mr. T. J. Young).—Agreed.

The recommendations marked † are contrary to the views of the Local Authorities.

BOOKS RECEIVED.

THE SEWERAGE ENGINEER'S NOTEBOOK. By Albert Wollheim, A.M.Inst.C.E. Second Edition. 3s. 6d. (The St. Bride's Press.)

FORD AND ITS CHURCH. By P. Mainwaring Johnston. (Reprinted from Sussex Archæological Society's Collections.)

LONDON MEMORIES. By Charles W. Heckethorn. (Chatto & Windus.)

Correspondence.

To the Editor of THE BUILDER.

STRAND IMPROVEMENT DESIGNS.

SIR,—To those who have studied the eight sets of designs for the façades of the proposed buildings in and adjacent to the Strand, now being exhibited in Pall Mall East, I think the first feeling must be how very difficult it is to compare one with another.

Some have evidently contemplated that what was required was a design for palatial exteriors irrespective of the intended use of the land. Others have contemplated that, with the exception of one or two sites, the buildings were to be for business purposes, or to specify these more accurately, for shops and offices.

I think there can be no question that the latter is the correct view, for it is perfectly certain that the ratepayers of London are looking to be recouped in large measure for their heavy outlay by the letting value of the new buildings for tradesmen, professional men, &c.

As I have not seen any official announcement of the authors' names, I propose to refer to the designs only by number.

In the palatial category may be mentioned primarily designs Nos. 26, 23, 27, and 29. In the business category may be placed designs Nos. 17, 20, and 21, while No. 19 occupies a position midway.

In the conception of a palace—or shall we say a public building—stateliness is a primary consideration, and considerable masses of plain walling an important feature, while the cost is relatively a secondary consideration. In the business building the primary consideration is plenty of light to all the rooms, reasonable height, and a generally good design, which shall pay an interest on the outlay commensurate with the capital and the risks involved by the investor.

Now I think all of us would be glad to see a street façade somewhat in accordance with design No. 26. Both in mass and in detail it is admirable, but I venture to say it is absolutely unsuited for anything like ordinary commercial shops and offices.

I will not refer to its shop floor. Above this, under the main entablature, there are three other stories. In two of these the glass line is 3 ft. below the ceiling, and in one of the two the windows of the whole story are 3 ft. square, at the glass line, the story being 10 ft. high.

Imagine working all day long in a room, say 10 ft. deep and 12 ft. wide, lighted by a window 3 ft. square (the top 3 ft. below the ceiling), and this on a floor which in the days of lifts is much sought after. The floors above this are behind a parapet in another plane. In design No. 19 the same defect arises. In one story the window head is 4 ft. below the ceiling, in another 4 ft. 6 in., in another (Section E E), on the first floor, in a 14-ft. story, the window is 6 ft. below the ceiling; while in Section D D on the first floor are semicircular-headed windows, the crown being 7 ft. 6 in. below the ceiling!

In design No. 20 the windows on the first and third floors are 4 ft. below the ceilings.

In design No. 21 the necessity for direct light from the windows, for reflected light from the ceilings, and for the ventilation of the upper part of the rooms is realised, and there are no such defects as those to which I have drawn attention.

Design No. 17 is similarly regardful of the purposes to which the land is to be appropriated.

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These two designs, from the inherent necessity of having many windows of adequate size, of course lack the dignity and massiveness which such a design as No. 26 possesses, but it is not fair to compare them. They are for two absolutely different types of buildings, the purposes of one type being absolutely dissimilar to those of the other.

What then is the lesson to the public? Do the authors represented by No. 26 say to the public, "You cannot have a building with the light and air which you require if you will have an architectural façade?" If such is the teaching of their design, is not this a confession of failure to meet imperative modern demands? If, however, the lesson of these designs is to abandon the idea of using this fine site for commercial purposes and devote it to public buildings, then one can understand it.

The question only then remaining is, can London—or, if she can, will she—spend some millions of money to make one spot in the county architecturally worthy of the Metropolis of this great Empire?

COMMON SENSE.

THE STATISTICS OF SAXON CHURCHES.

SIR,—I observe a reference by Professor Baldwin Brown to Saxon vestiges at Kilpeck Church, Herefordshire (p. 384). The fragment in question puzzled me much when I saw the church, and I tried to find a notice of it in the authorities without success. The preservation of a dignified feature, such as a tower or doorway, from an earlier building requires no explanation, but can we suppose the Norman architect, in erecting a complete church of elaborate design, to have carefully saved a small fragment of outer walling?

The church was radically dealt with by Cottingham in 1848. "Murray's Handbook" speaks of it as "rebuilt" stone by stone. Lewis's "Illustrations" were made before this, his drawings being dated 1838 and published in 1842. Unfortunately, his view of the north side is only a conjectural restoration, and shows no special feature at the point in doubt.

This point is the north-east angle of the nave, and the long-and-short work appears in an abutment which here takes the place of the flat Norman buttress found at other points. The wall batters for a width of about 4 ft., and the angle is finished with quoins of a very decided Saxon character. The rest of the battering masonry is also different from that of the adjoining wall, being more regularly sized and bedded.

Work was in progress on the church when I saw it in 1898. A mason to whom I spoke regarded the abutment as probably a reinforcement of the wall, and I noticed a crack over the chancel arch which bears on it. If Cottingham had to strengthen the support, his doing so in such a manner would be an extraordinary freak; but is it impossible?

J. A. RUTTER.

ANCIENT LIGHTS.

SIR,—Will you kindly inform me through your columns if my memory serves me right in imagining that Judges have refused repeatedly to recognise the angle of 45 deg. from the horizontal in "ancient light" disputes? I believe I have read reports of many such cases, or in reports of lectures, in your columns, but I cannot now find them in my back numbers. Kindly refer me to such cases or lectures or articles.

Would it not be legal for the servient owner to exceed that assumed angle of 45 deg. somewhat, providing that he left a clear air space of 10 ft. from the dominant owner's "ancient lights"?

A BUILDERIAN.

*** Our correspondent will find the point in regard to the angle of 45 deg. discussed in several important cases, notably "Parker *v.* The First Avenue Hotel Company." These cases are collected and discussed in Roscoe's "Digest of the Law of Light," third edition, published by Reeves & Turner, 100, Chancery-lane, London. The question in each case is—has the dominant tenement a reasonably sufficient amount of light left?—ED.

BATHS, FULHAM.—The foundation-stone of the new baths and wash-houses in Wilmott-place, Fulham, has just been laid. There are to be three swimming baths—the men's first-class bath being 100 ft. long and 30 ft. wide; the second-class bath, 140 ft. by 33 ft.; and the women's bath, 60 ft. by 20 ft. Accommodation has been provided in the plans for eighty-four private baths, twenty-five of these being intended for the use of women, while in both the men's and women's departments, first and second-class baths will be procurable. Galleries running round both the men's baths will provide space for spectators, and two clubrooms attached to the first-class baths are designed to give cloakroom and dressing-room accommodation for competitors and performers. The public wash-house, to which entrance is obtained in Hartismere-road, contains stalls for sixty-six washers, and a corresponding number of drying-horses, and four hydro-extractors. The new buildings are being erected from the designs and under the superintendence of Mr. H. Dighton Pearson, architect, of Chancery-lane.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

17.—INCANDESCENT LIGHTING—THE MANUFACTURE OF GLOW LAMPS—STANDARDS OF LIGHT—PHOTOMETRY—HIGH EFFICIENCY LAMPS—LIFE—INTERIOR LIGHTING—NERNST LAMPS—VACUUM TUBES.

IF we raise the temperature of a refractory material like platinum sufficiently high, then it becomes white hot and gives out light by incandescence. By sending a sufficiently powerful electric current through a platinum wire we can raise it to any temperature we like, and hence many attempts have been made to produce an electric lamp on this principle. The practical drawback is that when the temperature is high enough to give a good light, then the wire is on the point of melting, and the slightest increase in the current melts the wire and breaks the circuit. Iridium and an alloy of iridium and platinum have also been tried, but the results obtained have not been much better. Recently, zirconia and the oxides of the rare earths ceria and thoria which are used in the manufacture of Welsbach mantles have been found capable of withstanding very high temperatures, and successful attempts have been made to construct a rod of these or similar materials capable of carrying an electric current which will heat it to incandescence. In the Nernst lamp, for example, we have a little white rod which is, when heated, a conductor of electricity, and is also capable of lasting for several hundred hours brilliantly incandesced in the open air.

The ordinary incandescent or glow-lamp of commerce consists of a carbon filament suspended inside a glass bulb which has been exhausted of air. The carbon filament is a conductor of electricity, and when a current of the required strength passes through the filament it becomes heated to incandescence, and owing to the almost perfect vacuum the rate at which energy is taken from it by convection is very small, and so it can last for hundreds or even thousands of hours. At the present time there must be nearly a hundred million of these lamps in use, and so we will give a brief *résumé* of their manufacture.

In Swan's process the material out of which the filament is made is pure cotton, the same as that sold for knitting spun into a thread. It is first of all boiled in soda in order to get rid of any grease, and then washed and dried. After being wound on a drum, it is placed near a basin of sulphuric acid and a lead trough containing water. The cotton is unwound from the drum, passing first through the sulphuric acid and then into the water, where it is wound on another drum generally completely immersed. After coming out of the sulphuric acid the cotton is a transparent jelly-like thread, very similar to celluloid, but when it goes into the water it becomes opaque. This process is a difficult one, as, owing to the weakness of the thread, the tension has to be very carefully adjusted until it is uniform throughout. The time the thread is in the acid is usually from three to ten seconds, and the rate at which it is unwound is about twenty feet per minute. The parchmentised thread is then unwound from the second drum on to wooden frames and carefully dried. It has a rough and uneven surface, and so to make it uniform in section it is drawn through sharp-edged jewelled draw-plates.

The next process is to carbonise the thread. It is wound on a carbon frame and packed in a crucible by means of powdered charcoal. It is then gradually heated to a dull red heat and kept at this temperature for five or six hours. After it has cooled, the filaments, which are now very brittle and easily broken, are carefully taken off the carbon frames. The carbon filaments do not pass through the glass globes, but leading in wires of platinum are always used. It is necessary to use platinum, as it is the only metal whose co-efficient of expansion for heat is approximately the same as that of glass, and also because it will stand the heat of the blow-pipe when the glass is sealed round it. The filament is joined to the platinum wires usually by strongly heating the filament and wire placed in a hydrocarbon vapour or liquid by an electric current. The deposit of carbon upon the heated parts makes an excellent joint.

The last process in the manufacture of the filament is "flashing." It is rendered incandescent in coal gas or benzol vapour. The parts which are thinnest will be at the highest temperature, and hence on those parts there will be the thickest deposit of carbon. By carrying on this process long enough it can be made of almost the same section throughout. "Flashing" is not a necessity for all filaments. Some made by modern methods light up evenly throughout, and so "flashing" is not necessary to get an even section. Most makers, however, think that "flashing" improves the life of a lamp, as the carbon deposited by this process in the form of a coating over the parchmentised thread is of an exceedingly durable kind, and hence probably increases the life of the lamp.

Powerful mercurial air pumps are employed to get the necessary vacuum inside the glass bulb. In the finished lamps the pressure of the air left inside is probably less than fifty millionths of an atmosphere. The method of testing the vacuum inside the lamp is to hold it against one of the terminals of an induction coil. If the vacuum be good, a glow will appear on the inside surface of the glass only. If it be bad, then there will be a glow in the interior of the lamp of a blue or purple colour. We might naturally think that when a vacuum of one-millionth of an atmosphere was obtained, then the number of molecules of gas left in the bulb was, comparatively speaking, small. Dr. Fleming has calculated that even at this low pressure there must be still a million times a billion molecules left in the bulb.

The lamp is finished by putting a brass collar round its socket and adding two sole-plates of brass to the platinum wires, the plates being kept in position by plaster-of-paris. Glow-lamps are now made in an almost infinite number of shapes and sizes. We have microscopic lamps for surgical purposes, and huge lamps for lighthouse work and electric radiators. They are made with clear, frosted or coloured glass, and may be of any shape.

Testing the electric power taken by a glow-lamp is an easy matter. We can either measure the current it is taking by an ammeter, and the volts across its terminals by a voltmeter, the product of the two then giving us the power expended in watts, or we can measure it directly by a wattmeter. To measure the light it is giving out is much more difficult, partly because the light given out is different in different directions, and partly because our methods of photometry are difficult and our standards of illumination variable. Again, to measure the life of a lamp is an expensive and tedious operation. It will consume energy costing from one to three pounds, and will last sometimes a hundred days burning night and day.

The unit of light in this country is the British standard candle, and is a special form of sperm candle weighing six to the pound and burning 120 grs. per hour. As it burns in the open air, the light given out depends amongst other things on the amount of oxygen and the amount of moisture in the air. The same objection can be urged against all the other flame standards, such as Methven screens, pentane, acetylene, amyl-acetate, carcel lamps, &c. The flame standard most often used is perhaps the amyl-acetate lamp. The flame must be exactly forty millimetres high. A variation of only one millimètre above or below this height introduces a three per cent. error, and if the air be very moist it may read eight per cent. low. Hence, when using this standard many precautions have to be taken.

The working standard usually adopted in practice is a glow-lamp, which has been carefully standardised against one or other of the flame standards. The light given out by this lamp when held vertically varies with the angle which the plane of the filament makes with the direction of the horizontal ray whose intensity is measured, and hence it must always be placed in a particular position.

The methods of measuring candle-power adopted are modifications of Bunsen's and Rumford's methods. In Bunsen's photometer we have a screen of paper with a grease spot on it, placed perpendicularly to the line joining the two sources of light. When the illumination on both sides of the screen is the same, then the grease spot is invisible. When, however, the illumination is greater on one side than on the other, then the grease spot appears dark on the brighter side because it reflects less light than the rest of the paper, and bright on

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the darker side because it lets more light through; that is, it is more translucent than the non-oily parts of the paper. When the grease spot disappears it can be proved that the intensities of the two sources of light are as the squares of their distances from the screen. For example, if the standard candle were 1 ft. from the screen, and the lamp were 4 ft. when the grease spot disappeared, then he candle-power of the lamp would be sixteen. When using this method a darkened room is a necessity, and care must be taken that one source of light is not helped more than the other by reflecting surfaces in the background. In Rumford's photometer a wooden rod is placed in front of a paper or ground glass screen, and the two sources of light are so placed in front of it that the two shadows they cast of the rod on the screen are touching one another. The distance of the lamp is so adjusted that the intensity of these shadows is the same. In this case the intensities of the light given out by the two sources are as the squares of their distances from the screen. This photometer can be used in a light room.

Strictly speaking, when the lights sent out by the two sources are different in quality it is almost impossible to compare them. We may compare the intensities of the red rays sent out by each source, and so on for all the colours of the spectrum.

We find, for example, that the illuminating power of the green rays sent out by one source is three times the illuminating power of the green rays sent out by the other source, whilst the illuminating power of the red rays may only be a third that of the other.

It is customary in this case to take colours at equal distances along the spectrum, measure the candle-power for these various colours, and then take the mean of our results. This, however, is not a truly scientific method, and the results obtained are of doubtful value.

If we send a glow-lamp to a scientific laboratory to be standardised for candle-power, we usually get a chart showing the horizontal candle-power of the lamp when placed vertically for various different positions of the filament with regard to the photometer bench. These candle-powers may vary by as much as 10 per cent. between themselves. Hence the question arises, which of these is the true candle-power? The most satisfactory answer would be to take the mean candle-power of all the horizontal rays. As this would be a lengthy and costly process in practice, the following ingenious method of getting directly at this mean candle-power is now the standard method adopted in America. They rotate the lamp at 180 revolutions per minute, and then measure its candle-power by the photometer in the ordinary manner. The result is given as the candle-power of the lamp.

In the early days of glow lamp making there was considerable blackening of the bulb, but in modern lamps this defect is barely noticeable. Nevertheless, after a lamp has been in use for five or six hundred hours there is a noticeable falling-off in its light-giving efficiency. For example, in some recent tests the candle-power of a 16 c.p. lamp was 16 to start with. After a hundred hours it was 18, after two hundred hours it reached a maximum of nearly 19 and then began to diminish rapidly. Five hundred hours after the start it was 15·5, and one thousand hours after the start it was 14·5. Its efficiency to start with was 3·6 watts per candle, after two hundred hours it took only 3·47 watts per candle, but at five hundred hours it took 3·65, and at one thousand hours 3·7. This behaviour is typical of most modern lamps, but in the cheaper varieties the lamp usually attains its maximum brightness after about fifty hours, and its candle power then falls off much more rapidly than in the lamp described above. In a batch of American lamps, for example, the candle power was 16 at the start, 17 after fifty hours, 15 after two hundred hours, 13 after four hundred hours, &c. In these lamps it would certainly not be economical to run them more than four hundred hours.

Makers often advertise "high efficiency" lamps. These lamps are simply ordinary glow lamps run at a higher voltage than usual for that thickness and length of filament. The effect is that we get a candle-power at an expenditure of 2½ watts or even less, but the life is considerably shortened. The following table given by M. Hospitalier illustrates this point. If we had a batch of lamps which would ordinarily be used at 100 volts and use them on circuits where the pressure was different we get the following results:—

Pressure in Volts.	Relative Brightness.	Watts per Candle.	Life-factor.
90	0·53	4·68	—
91	0·57	4·46	—
92	0·61	4·26	—
93	0·65	4·10	—
94	0·69	3·92	—
95	0·74	3·76	—
96	0·79	3·60	—
97	0·84	3·45	—
98	0·89	3·34	—
99	0·94	3·22	—
100	1·00	3·10	1·000
101	1·06	2·99	0·818
102	1·12	2·90	0·681
103	1·18	2·80	0·662
104	1·24	2·70	0·452
105	1·31	2·62	0.374
106	1·38	2·54	0·310

The last column shows the relative life-factor. For example, if the normal life of a lamp at 100 volts be 1,000 hours, then at 106 volts it will only be 310 hours, and so on. At pressures less than 100 volts the life of the lamp would be greater than 1,000 hours.

The amount of the illumination produced in a room depends greatly on the reflecting powers of the walls of the room. It can be proved that if r be the average reflecting power of the surfaces of a room then the illumination produced varies as $\frac{1}{1-r}$. For mirrors and clean whitewashed surfaces r is 0·8, but for brown or chocolate-coloured paper, r may be as low as 0·1, and for black cloth it may be only 0·01, or even less. To get approximately the average reflecting power of the walls of a room is not difficult. Suppose, for example, that the reflecting power of the ceiling was 0·8, of the walls (yellow) 0·4, and of the floor 0·2, then, if the area of the ceiling was equal to the area of the floor, and if the area of the walls was four times the area of the ceiling, then

$$r = \frac{0{\cdot}8 + 4 \times 0{\cdot}4 + 0{\cdot}2}{6}$$
$$= 0{\cdot}43$$

Hence the illumination is increased $\frac{1}{1-0{\cdot}43}$, *i.e.*, 1·75 times, by the reflecting power of the bounding surfaces. If the walls, floor, and ceiling were covered with the best mirrors (r=0·9), then the illumination would be increased ten times.

The high reflecting power of a well-whitewashed surface (0·8) has been utilised for factory lighting by arc lamps. The arc lamps are of the inverted type, and all the light is thrown up on the ceiling, whence it is reflected down. From the floor no direct rays from the arc can be seen, and hence an excellent diffused light is obtained which casts no shadows. A similar method with glow lamps is sometimes employed for house lighting.

Professor W. Nernst, of the University of Göttingen, has recently invented an incandescent lamp which gets rid of the necessity of a vacuous glass bulb. The material he uses is rolled into little white rods whose ends are attached to two platinum wires. This material is a non-conductor of electricity at low temperatures, but when heated it is a conductor. It is an electrolyte and hence, as its temperature rises, its resistance is diminished, and hence a fine wire resistance absorbing about 15 per cent. of the total resistance has to be put in series with it. In this respect it is like an ordinary direct current arc lamp which always has to have a resistance in series with it for steady running. The light the rod gives when incandesced is an exceedingly pleasant light and is perfectly steady. Its efficiency is 1·5 watts per candle or about double that of ordinary glow lamps, hence by its use the meter bill could be halved. On the other hand, the expense of the lamps will be greater; but, as the expense of a new filament will be less than the expense of a new glow-lamp, the advantage will still be on the side of the Nernst lamp. In order to light the first Nernst lamps the filaments had to be heated by a match or a spirit flame, but this difficulty has been got over by many ingenious automatic lighting devices. In the simplest the filament is heated by the current in a fine platinum wire close to the rod and in shunt with it. When the filament lights the current cuts the platinum wire out of the circuit. Mr. Swinburne states that the life of these lamps is 500 hours. The Nernst lamps of large size are much cheaper in first cost than arc lamps; give a very much pleasanter light; and the expense of maintenance is very much less.

In America several attempts have been made to light by vacuum tubes. Dr. D. McFarlan Moore uses a rotator so as to get a current of very high frequency from the electric light supply mains. The tubes, as a rule, are ranged round a room just above the moulding, or there are tubes fixed on the ceiling in various patterns. The light is pleasant and is sufficient to read by, but it is not very bright. The cost is still high, and no work has yet been done on a commercial scale.

OBITUARY.

MR. WILLIAM YOUNG.—We record with great regret the unexpected and rather sudden death of Mr. William Young, Fellow of the Institute of Architects, and architect for the new War Office, the plans for which he had only recently completed. Mr. Young died last week at his house at Putney, after five days' illness, of an attack of pneumonia, which he might have survived had he not been rather weakened by overwork on the designs for the War Office, and neglected the advice of his friends to give himself a few weeks' complete rest and entire change of scene. Mr. Young received his professional education in the office of a Glasgow architect, but came to London some five-and-thirty years ago, with no connexion or professional reputation at the time. The statement in one of the daily papers that he hung out the sign "Buildings planned here" at his first office at Exeter Hall we should take leave to doubt. His first success came through Lord Wemyss (then Lord Elcho), who remained his firm friend through life, and who in the first instance commissioned him to design various pavilions and other buildings for the National Rifle Association. In this work he gave so much satisfaction that other and more important commissions soon followed, and in after years he restored and enlarged Gosford House (a work of the Adams) for Lord Wemyss; the sumptuous marble staircase in this mansion was illustrated in the *Builder* for October 26, 1895. Mr. Young's success and reputation may however be said to have really begun when he gained, about twenty years since, the commission for the Glasgow Municipal Buildings as the result of a competition. There were 125 competitors in this case, and the building ultimately cost over half-a-million, but a good deal of this was expended on improvements and enrichments, in the interior treatment especially, which were developed subsequently. The building was illustrated in our issue of November 11, 1882. It is to the honour of the people of Glasgow that they seem never to have grudged any expense on the building, or to have hampered their architect by any regard for mere economy. Among others of Mr. Young's works may be mentioned the ballroom for Lord Iveagh, illustrated in our issue for January 7, 1899, the rebuilding of Duncombe House, Yorkshire, after the fire in 1879; a mansion at Holmewood; and another, we know not where, of which the hall was illustrated by a model in the last Royal Academy Exhibition, under the title "An Inner Hall of a Country House." Finally, he was appointed architect to the new War Office, though he was not among the eight architects originally recommended for consideration by the Institute of Architects; the Government subsequently asked for two more names; Mr. Young's was one of those sent in to them, and eventually he was selected. He threw himself into the work with the greatest energy, and spared no trouble in preliminary sketches and studies to realise the best result. His design was published in our issue of March 25, 1899; and he may be said to have produced an unexpectedly successful and fine design for an unpromising site. It is melancholy to think that he should have died thus at the pinnacle of success, and not have lived to see the completion of his great building.

MR. C. H. DRIVER.—We regret also to announce the death of Mr. Charles Henry Driver, Fellow of the Institute of Architects and Associate Member of the Institution of Civil Engineers, which took place on Saturday, October 27 (ult.). He was born March 23, 1832, and was elected an Associate of the Royal Institute of British Architects in 1867, and Fellow in 1872. He was a man of very versatile talents, and at an early age was an exhibitor at the Royal Academy. In 1865 he was associated with Sir Joseph Bazalgette in designing the pumping-stations of the main drainage at Crossness and Abbey Mills, and also the architectural work of the Victoria Embankment wall and river stairs. About the same time he also designed many of the stations of the London, Brighton, and South Coast Railway (in co-operation with the late R. Jacomb Hood, C.E.), at Dorking, Leatherhead, Mickleham, Portsmouth, &c., also the whole of the South London stations, from the London Bridge Viaduct to Peckham Rye and Grosvenor-road Stations. For the late Metropolitan Board of Works he designed many of the ornamental lamps and venti-

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lating shafts in London over the metropolitan sewers—the one erected over the subway in Southwark-street was illustrated in the *Builder*, January 14, 1865. He designed and carried out the Santiago Market and Buenos Ayres Stations in co-operation with Mr. Edward Wood; the Llandudno Pier, and the Nice Pier, and the extension and pavilion to the Southend Pier for Messrs. Brunlees & McKerrow; and the Orangery and Aquarium at the Crystal Palace; and quite recently the stations on the Sao Paolo Railway for Messrs. D. M. Fox & McKerrow. Amongst his architectural works were the Dorking Town Hall, Banbury Hospital, restoration of Warkworth Church, the Sir Tatton Sykes and Ellesmere Memorials, and many private residences. He was an active and energetic Freemason, and designed and carried out the Mark Mason's Hall in Great Queen-street. He was likewise an active Volunteer, being Captain in his corps, and will be much missed by all who knew him.

GENERAL BUILDING NEWS.

ST. BARTHOLOMEW'S CHURCH, BATTERSEA.—The foundation-stone of this church was laid on the 1st inst. by Dr. A. B. Stevens. The east end of the church faces Wycliffe-road, and its west end abuts on the old mission-hall, to which another story has now been added for school accommodation. The nave is 87 ft. 6 in. by 27 ft. 3 in., with a north aisle also used as a chapel, the east aisle merely forming a passage and exit to Wycliffe-road. The vestries, with parish room over, are on the north side of chancel. The south wall of the south aisle abuts on the wall of the playground of the Board school, while an open pathway is left on the north side of north aisle, the whole width of the site being only 61 ft. A slight circular projection at the north-west end of the north aisle is provided as a baptistry. A porch is placed at the west end of the north aisle, also communicating with the mission-hall. There is a right-of-way to Wickersley-road on the west. The nave consists of five bays, each having three lancet lights in the clearstory. The piers of arcade are carried up outside, and inside, as pilasters to the clearstory, and arched over the clearstory windows to carry the roof. The clearstory wall is carried by a lower arcade, opening into the aisles. There is a circular traceried window in the west end, over the roof of the mission hall. The nave and chancel roofs have barrel, wood ceilings, the vertical ribs over piers being carried on stone vaulting shafts. The chancel is separated from the nave by a stone and brick arch, and a low panelled stone screen wall. The chancel is lit by a five light traceried east window, and north and south lancet lights. The church throughout is built of brick with stone finishings, and red brick and malm facings. It is seated to accommodate 700 adults, at a total cost of 7,264*l*. Mr. Geo. H. Fellowes Prynne, of Queen Anne's-gate, S.W., is the architect, and Messrs. W. H. Lorden & Sons, of Upper Tooting, are the contractors.

CHURCH OF ST. BARNABAS, GRIMSBY.—This church, in King Edward-street, Grimsby, was dedicated recently. Mr. J. J. Creswell, of Grimsby, was the architect, and Mr. Marrows, of the same town, the builder.

METHODIST CHURCH, BELFAST.—The new Methodist church which has just been erected in Newtownards-road was opened on the 26th ult. The building will accommodate 1,100 people. The electric light has been introduced, the work having been carried out by Messrs. Smith & Parkes. The church has been heated and ventilated by Messrs. Musgrave. The building operations have been carried out by Messrs. Robert Thompson & Sons, to the designs and under the superintendence of Messrs. J. J. Phillips & Son, architects.

ST. JOHN THE EVANGELIST CHURCH, ASHTON HAYES, CHESTER.—Various additions have been made at this church under the direction of Messrs. Douglas & Minshull, of Chester. The decorative work was executed by Mr. Gilbert Gamon, of London.

ST. AUGUSTINE'S CHURCH, CRAYFORD, KENT.—This church was consecrated recently. Mr. R. Philip Day, the Diocesan Surveyor, was the architect.

METHODIST CHURCH, LEICESTER.—A Methodist church at Clarendon Park, Leicester, was opened recently. Mr. Alderman Sawday, of Leicester, was the architect.

CHURCH, EAST HAM.—Sir Edward Clarke, Q.C., recently laid the corner-stone of a new church at Halley-road, Manor Park, to be consecrated to the memory of St. Edmund King and Martyr. The site, on which are also to be built the vicarage and church hall, is situated at the corner of Halley-road and Red Post-lane. The church, when completed, will consist of chancel, gabled chancel aisles—that on the north is planned for a morning chapel, and the south aisle will contain the organ—vestries, nave, aisles, and west porches. The turret for the bell will be situated on the chancel arch gable. The portion of the church now being erected consists of the eastern end—*i.e.*, chancel and chancel aisles, together with two arches of the nave and aisles with a temporary west porch. The whole ground floor will seat 700 people, of which 500 sittings are provided in the first section at a cost of a little over 4,700*l*. The building is being faced with red brick, with Bath stone dressings throughout, and the roofs are covered with red tiles. The extreme length and breadth of the plan (exclusive of the vestries on the north-east corner) are 135 ft. by 61 ft. The height to the ridge of the nave and chancel roofs is 60 ft. from the pavement level, and it is a further 28 ft. to the top of the bell turret. The work is being carried out under the supervision of Messrs. J. E. K. & J. P. Cutts, of London. The builder is Mr. S. J. Scott, of Walthamstow.

PROPOSED CHURCH, PLYMOUTH.—A new site having been secured for the Church of St. Simon at Plymouth, Mr. Harbottle Reed, architect, of Exeter, has been instructed to prepare plans for a building to seat about 1,000 people.

NEW BUILDINGS IN ABERDEEN.—The Plans Committee of the Town Council has passed the plans of the following new buildings:—Alterations and additions in connexion with Free Church Training College, Charlotte-street, for the trustees, per Messrs. W. & J. Smith & Kelly, architects; eight dwelling-houses on the east side of Clifton-road, per Mr. Alexander Long, builder; stable, &c., on the west side of Holland-street, for Messrs. R. Beattie & Son, builders, per Mr. William Beattie, architect; reconstruction of dwelling-house and workshop on the east side of Crown-street, for Mr. John C. Mitchell, per Mr. R. G. Wilson, architect; three dwelling-houses on the west side of Clifton-road, for Mr. Joseph Shirras, builder. The Committee had also before them plan of meat market on the north side of Hutcheor-street, for Messrs. William Murray & Son, per Mr. John Morgan, builder. The Committee approved of the plan. Two dwelling-houses on the west side of Clifton-road, for Mr. Joseph Shirras, builder; two dwelling-houses on the north-east side of Skene-square, for Mr. A. Robertson; two dwelling-houses on the west side of Polmuir-road, for Mr. George Milne, engineer, and Mr. James Milne, engineer, per Mr. George Sutherland, architect; two dwelling-houses on the east side of Mile End-avenue, for Mr. Alexander Milne, per Messrs. Brown & Watt, architects; addition to stores on the west side of Market-street, for Messrs. J. & W. Henderson; two dwelling-houses on the north side of Broomhill-road, for Mr. William Walker, per Messrs. J. Davidson & Watt, architects; cold store at the rear of premises No. 5, Holburn-street, for Mr. William Kennaway, per Mr. R. G Wilson, architect; stone-polishing shed on the south side of Claremont-street, for Mr. Alexander Nicol, granite merchant; dwelling-house on the west side of Pitstruan-place, for Mr. John Cameron, architect; dwelling-house on the east side of Walker-road, for Mr. William Bisset, carpenter, per Mr. Duncan Hodge, architect.

BASINGSTOKE ISOLATION HOSPITAL.—The new isolation hospital built by the Town Council of Basingstoke for the joint use of the Urban and Rural District Councils has just been opened. The new hospital is situate in the Kingsclere-road. Mr. James Gibson, of Basingstoke, was the architect, and his plans were accepted in competition. The tender of Mr. McCarthey E. Fitt, of Reading, in the sum of 5,555*l*., was accepted, and the work was commenced in September of last year. The site covers an area of five acres. The buildings, which are of red brick, comprise an administrative block, a pavilion for fourteen beds, two pavilions for four beds each, and a laundry block, all connected by a covered way 7 ft. wide, and an isolated ambulance shed and mortuary. The administrative block has a vestibule entrance-hall, and extending therefrom are the caretakers' living room, nurses' dayroom, and medical officer's dispensary. The kitchen offices are external to the main building. There are four bedrooms on the first floor for the caretaker and servants, and four on the second floor for nurses. On the landings are linen store and bathrooms, and tanks for the storage of water are fixed to the roof. The large pavilion contains a female ward for eight beds and a male ward for six beds, both heated by central fireplaces. A nurses' duty-room divides the two wards, with observation windows looking into each. There are two bathrooms, and movable baths are placed in the lobby. There are also sanitary offices at either end of the wards. The two small pavilions each contain a female ward for two beds, and a male ward for the same number, with nurses' duty-room, portable baths, and sanitary offices as to the two large pavilions. The laundry block contains washhouse, drying and ironing-room, and steam disinfecting chamber. The ambulance shed and mortuary are at the back of the main buildings. The walls and ceilings of all the pavilions are plastered and distempered in a light green tint.

TRADE UNION CLUB, RUSHDEN.—The new club premises built for the Rushden and District Trade Union Club and Institute were opened recently. The new buildings are situated on the Higham Ferrers-road, Rushden. The architects were Messrs. Sharman & Archer, of Wellingborough, and the builder is Mr. Robert Marriott, jun., whose tender was 1,600*l*.

PARISH ROOM, FELIXSTOWE.—A new parish-room for St. John's, Felixstowe, was opened recently by Captain Pretyman, M.P. The new parish-room is situate at the rear of St. John's Church, and is approached from the Prince's-road. The internal arrangements consist of main hall (about 60 ft. by 30 ft.), committee-room (16 ft. by 14 ft.), kitchen (16 ft. by 14 ft.), and several offices. The building is of red brick with stone dressing, and is roofed with Broseley tiles. The contract, which was carried out by Mr. Linzell, builder, amounted to about 1,650*l*. The work was done under the superintendence of Mr. H. J. Wright, architect, of Ipswich.

THE NEW POST-OFFICE, ABERDEEN.—Aberdeen Town Council has agreed to purchase at the price of 2,400*l*. a property in Dee-street, and hand over the same to the Postmaster-General, so as to allow the line of front of the post-office in Crown-street to be kept back 12 ft., making the street 57 ft. wide. Mr. Robertson, Architect for the Board of Works, Edinburgh, has agreed to this suggestion.

SHELTER, GOLDEN-LANE, CITY.—A shelter for the use of persons during the disinfection of their homes after illness, which has been erected at the City mortuary, Golden-lane, was opened on the 20th ult. The building is of brick, with stone dressings to doors and windows. The floors are of concrete. The work was carried out by Messrs. E. Lawrance & Sons under the superintendence of Mr. D. J. Ross, the City engineer.

COURT-HOUSE, HALIFAX.—The court-house and police-station in Harrison-road, Halifax, were opened on the 20th ult. The buildings have been erected from the designs of Messrs. G. Buckley & Sons, architects, Halifax, at a total cost of 27,000*l*., and occupy the site of the old infirmary. Much of the stone of the old infirmary has been used in their erection. Besides the court-house there is a subsidiary court and rooms for the magistrates and the officials.

THE GRAMMAR SCHOOL, ABINGDON.—Mr. John T. G. West, of Abingdon, has been instructed by the governors of the Grammar School to prepare plans and designs for an enlargement of the school premises. The additions, to cost about 6,000*l*., will consist of a chapel, a gymnasium, four classrooms, and a block comprising a science lecture-room, an art room, and a physical and chemical laboratory. The school, originally founded by John Roysse, citizen and mercer of London, in 1563, was rebuilt in 1808-9, from the designs of Mr. Edwin Dolby, of Abingdon. Three years ago a hostel for three assistant masters was erected, together with a gatehouse, Mr. Harry Redfern being the architect.

CONGREGATIONAL CHURCH, CARDIFF.—Memorial stones were laid recently of a Congregational church in Clare-road, Cardiff. The architects are Messrs. James & Morgan, and the builders are Messrs. Lattey & Co.

SANITARY AND ENGINEERING NEWS.

SOUTHWOLD SEWAGE EXTENSION.—A Local Government inquiry has been held at Southwold in reference to the acquisition by the Corporation of borrowing powers for the extension of the system of bacterial oxidation with polarite for the purification of the town sewage. Mr. Ball, the Borough Engineer, has had a small installation of this system under his supervision for a year and a half, and the Corporation now wish to extend it to deal with the whole sewage of the town. The effluent is collected from the bottom of the two polarite aerobic beds by drains connected with a master channel which discharges into an effluent inspection chamber, whence the effluent flows through the outlet pipe into the Buss Creek, a non-navigable tidal creek. The Borough Surveyor explained that the town is sewered upon the separate system, while the water consumption is small, the consequence being that the sewage is exceedingly strong. Dr. Herbert, the Medical Officer of Health, gave evidence in favour of the system, and stated it would tend further to improve the health of the town. Mr. W. H. Prescott, Borough Engineer to the Reigate Corporation, also gave evidence in support of the system, explaining that at their Redhill Sewage Works they had been testing the process with sewage containing much tannery and brewery refuse liquors with always satisfactory results, the effluent showing from 90 to 97 per cent. of purification and being pronounced by their Medical Officer of Health, Dr. Jacob, as fit to turn direct into the stream without any further treatment; indeed, so satisfied were his Council that they intended to abandon the lime and alumina process of precipitation and sludge pressing. Mr. Prescott further added that he had examined Mr. Ball's plans and estimate as submitted to the Local Government Board and was convinced that the scheme was the best that could be adopted both on the score of efficiency and economy. The Inspector, Mr. North, then closed the inquiry.

HOLMFIRTH SEWERAGE SCHEME.—At Holmfirth, on Friday, an inquiry was conducted on behalf of the Local Government Board respecting the proposal of the District Council to borrow 30,000*l*. for sewerage and outfall works. Mr. Joshua Barrowclough and Mr. Nichols, of Messrs. Beesley, Son, & Nichols, of Westminster, the engineers, gave particulars of the scheme, and it transpired that the matter had been pending seven years, this being the third inquiry. At the first one the proposal was to borrow 19,000*l*., and the inspector pointed out that the great advance in cost of materials and labour in the meantime had practically been a fine on the district to the tune of 10,000*l*. Opposition was offered by three ratepayers, the argument being that

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the amount was too large for a scheme for domestic sewage only. Dibdin's bacteria system is the one adopted.

STAINED GLASS AND DECORATION.

ST. ANDREW'S, HOYLAND, BARNSLEY.—The east and west windows of this church have just been filled with stained glass as a memorial window to two members of the congregation. The east window illustrates the Resurrection, and the west window contains subjects of Our Lord's baptism and Our Lord blessing little children. The windows have been designed and executed by Messrs. Powell Bros., of Leeds.

LONGFORGAN CHURCH, DUNDEE.—Messrs. Clayton & Bell have just placed in the east window of Longforgan Church, near Dundee, a stained glass design representing "The Ascension," the subject extending throughout the three lancet lights. The work is dedicated to the memory of William Brand and his wife Anne by their daughters. The chancel walls and roof have also been enriched by coloured decoration, with the object of harmonising them with the window.

FOREIGN.

FRANCE.—In the Chamber of Deputies there is a talk of placing the Direction des Beaux-Arts, which now depends upon the Minister of Public Instruction, under a General Superintendent, who shall have much more liberty over all matters connected with art.——The Government has given to the Ville de Paris the monumental fountain in grey porcelain made by the Sèvres manufactory, which is now on the Esplanade des Invalides. It consists of a basin decorated with fish and aquatic animals, into which the water flows from six large vases, surmounted by a column round which are naïads.——The Service d'Architecture de la Ville de Paris is now restoring the beautiful Cloister of the Billettes, in the Rue des Archives.——The buildings of the new Sorbonne will be inaugurated in December. ——The new Mairie at Versailles will be inaugurated on November 18. —— The death of Hector Le Roux is announced, at the age of seventy-one. He was a pupil of Picot, and had acquired a certain notoriety by his pictures, which were in a very classical style, notably the "Mort de la Vestale." He had received medals in 1863, 1864, 1874, 1878, and 1889. In 1877 he received the Legion of Honour. The Museum at Verdun possesses one of his pictures, "Frère et Sœur," and he also painted one for the Paris Hotel de Ville, a figure symbolising "l'Eloquence."——M. Eugène Gutelle, chief architect in the town of Cherbourg, has just died at the age of forty-seven.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS. —Messrs. Donald & Tate, architects, have removed their offices from Stokenchurch-street, Fulham, to 63, West Hill-road, Southfields, S.W.

GLASGOW BUILDING TRADES' EXCHANGE.—The annual general meeting of the Building Trades' Exchange of the City and District of Glasgow Limited, was held in the Exchange, 30, Gordon-street, on the 29th ult. Colonel Bennett presided. The secretary, Mr. David Cook, writer, presented the accounts for the year, and read the following report by the Executive Council :—"Your Executive have to submit for your approval the seventh annual report on the affairs of the Exchange, embracing the period for the year ending September 30 last. The treasurer's accounts show an income for the year of 680*l.* 14s. 4d., and an expenditure of 654*l.* 5s. 4d., leaving a net credit balance on the year's working of 32*l.* 9s. The Exchange continues to be largely taken advantage of for the holding of association and other meetings, and the income from this source is on the increase. The sample rooms have yielded about the same rental as in the previous year. Some of the exhibits have been removed, as was only to be expected, but others are being secured to take their place. It will be observed that some of the exhibitors are endeavouring to make their exhibits more attractive. This is a good feature. It will induce competition among the exhibitors, and help to brighten the walls of the Exchange. The catalogue has yielded a good profit. It is now a fairly well known and established yearly volume, and is acknowledged to be a very useful one. It will be kept abreast of the times, and next issue will deal with the new Building Regulations Act. During the past year your Executive carried the Measurement Conference to a successful issue. The regulations for completion of measurements recommended by the conference were finally adjusted and circulated among all architects, measurers, and members of the various branches of the building trades. These regulations may not be absolutely satisfactory to all concerned, but the framing of such, your Executive venture to hope, is a step in the right direction. Your Executive further took part, with the Institute of Architects and Measurers and the Glasgow Landlords' Association, in an endeavour to get the new Building Regulations Bill shorn of what they considered some of its objectionable features. They met with these bodies in conference, and drew up representations which were presented to the Corporation. Thereafter a deputation met the Building Regulations Committee of the Corporation, and supported more fully the contentions contained in the representations. As the result of these efforts matters were finally adjusted, and it was not deemed necessary by any of the bodies mentioned to go further with their opposition to the Bill which has now become law. When the Corporation come to frame by-laws in virtue of the powers contained in the Act, the Executive will require to be on the alert. Your Executive will continue to watch these and any other matters which they consider affect the interests of the building trades, and they trust that the members generally will encourage them in their work by taking an active interest in the affairs and doings of the Exchange." The accounts and report were adopted. After the other business was carried through, Colonel Bennett briefly addressed the meeting. Among other things, he dealt with technical education, and said that efforts were being made to have the Exchange represented on the committee in connexion with the erection of the new technical college.

THE GARDEN CITY ASSOCIATION. — The second annual meeting of the Garden City Association was held at Anderton's Hotel, Fleet-street, on Tuesday evening, October 30, Mr. T. H. W. Idris, J.P., L.C.C., presiding. Letters were read from Mr. James Bryce, M.P., Sir John Leng, M.P., and other gentlemen approving the general principles on which the Association is based. In moving the adoption of the report and accounts, the Chairman said that public opinion was more and more tending to the solution of some of the most pressing of London difficulties by means of such a scheme as the Association advocated. Those experienced in providing homes for the workers—he might mention Sir Sydney Waterlow, for instance—had told him that the success they had achieved was mainly due to their always building close to the industrial centres, so that their tenants might be saved long, tiresome, and costly railway journeys to and from work. Lord Rosebery, too, in his recent speech had pointed out the importance of people living near their work, and had really gone a long way in the direction of advocating proposals like those of the Garden City Association. That statesman said he wished workmen could take the manufactory with them. Then, where land was cheap and almost waste—he spoke as an agriculturist—great manufacturers might transport their works, transport their workmen, and create a manufacturing centre and district of their own.—The report and accounts having been passed, the following resolution was moved from the chair, seconded by Mr. Henry Holiday, and carried unanimously :—

"That the housing problem can be solved and the congestion in crowded centres relieved by a concerted movement of manufacturers, co-operators, and others to new areas, arrangements being made for securing to the migrating people the whole of the increased value which their presence will give to the sites, and the areas being carefully planned so as to make adequate provision for the individual and social needs of the people, especially with a view to securing for all time the combined advantages of town and country life."

The next point involved was the means to be adopted for giving effect to the foregoing resolution ; and to this end financial proposals were brought forward by Mr. Idris, not for adoption but for reference to the new Council, with a view to that body deliberating upon them and submitting them in a more definite and formal shape to a general meeting of members. The proposals are simple in character. First comes the selection of three trustees—men of the highest standing. Then the raising of a fund of 100,000*l.*, to be banked in the name of the trustees, and to remain intact until at least half that sum has been raised. Then comes a proviso that if that amount is not forthcoming within two years the subscriptions are to be returned in full with bankers interest. When 50,000*l.* has been raised the subscribers will elect a board of management, who will then select a large and suitable site, and prepare a financial scheme involving the formation of a joint stock company or other suitable organisation, and the raising by loan or otherwise the necessary capital for the development of the estate. Then manufacturers, co-operators, traders, and others, whose interest will have been awakened by the steps already taken, will be offered sites on terms to be mutually agreed upon, and an undertaking will be entered into by the organising body to apply all the rents derived from the tenants and all profits and income from its undertakings or investments (with the exception of what may be necessary to provide interests and sinking fund) in such manner as in the opinion of the directors is conductive to the permanent interests of the estate and the well-being of the inhabitants. The board of management will after a period, say, of seven years sell to trustees on behalf of the inhabitants the whole of its undertaking—not interfering with its tenants' rights in any way—at a price which will admit of all subscribers to the undertaking getting their money back together with some reasonable rate of interest.—In the absence, through indisposition, of Mr. C. M. Bailhache, hon. secretary of the Association, Mr. Howard seconded the reference of these proposals to the new Council, and this was agreed to. The question next arose as to the constitution of a council for dealing with such proposals, and the members present agreed to pass the following resolution instead of electing the new council there and then :—

"That in view of the magnitude of the work which lies before the Association, and the importance of electing a Council and officers of a fully representative character, a committee of five, with power to add to their number, be now elected for the purpose of receiving and suggesting nominations and of submitting to a general meeting to be called for the purpose eighteen or such other number of names as they may deem expedient for election as members of the new Council."

This resolution was moved by the Treasurer, Mr. Alexander W. Payne, and seconded by the Rev. C. Fleming Williams, who said the work of the Association was bound to be either large or nothing. Any nibbling at it would be simply a waste of time and of money. If this were to be anything it must be attempted on a scale commensurate with the importance of the project and of the ideal ; and if they banded themselves around Mr. Howard it must be for nothing less than the great scheme he proposed, and which had won the sympathy and commanded the respect of so many people all over the land. In order to accomplish such a result a Council combining the very highest collective wisdom must be secured.—A small committee was then elected, and the Executive Committee was requested to continue the work of the Association.

APPOINTMENT OF AN ARCHITECT.—At a meeting of the Lancashire County Council, held at Preston on the 1st inst., Alderman Guthrie submitted the recommendation of the Finance Committee that Mr. Henry Littler be appointed County Architect at a salary of 1,200*l.* per annum. He said the question of such an appointment was considered some years ago by the three committees concerned—the Standing Joint Committee, the Finance Committee, and the Asylums Board—and that led to the appointment of Mr. Littler to be Architect to the Standing Joint Committee at a salary of 600*l.* a year, with all the expenses of his office provided by the county. Since then the erection of other buildings, notably the Sessions House at Preston, and the extension of the headquarters of the constabulary, and the alterations to the general county offices, had become necessary. In regard to the Sessions House, a special arrangement was made with Mr. Littler, and terms were arranged which were a great deal less than would have been the case if an outside architect had been engaged. The joint committees had come to the conclusion that on the ground of economy and on all other grounds it was desirable to make this appointment. Mr. Johnston, the late County Auditor, had prepared a report in which he showed that 50,000*l.* might have been saved to the county in architects' fees if they had had an officer of their own. The proposal was opposed and an amendment moved. The amendment was lost by 45 votes to 26.

THE CHURCH CRAFTS LEAGUE.—This society, which was inaugurated in February last by a number of clergymen and artists under the presidency of the Bishop of Rochester, announces its first annual general meeting for the evening of Tuesday, November 20. The meeting will be held at Bishop's House, Kennington Park.

TRURO CATHEDRAL.—The Executive Committee of the Building Fund of Truro Cathedral met on the 5th inst., under the presidency of the Earl of Mount Edgcumbe, Lord-Lieutenant of Cornwall, and decided that sufficient money had been subscribed to justify them in giving orders for the completion of the nave and west front. This will complete the portion of the structure which has been erected in memory of the late Archbishop Benson. At the conclusion of this work over 150,000*l.* will have been spent upon the cathedral, and there will only remain to be added the great central tower and two western towers, estimated to cost a further 15,000*l.* —*Morning Advertiser.*

NEW FRESCOES AT THE ROYAL EXCHANGE.— Two frescoes have been added to the walls of the Royal Exchange. One panel is from the brush of Mr. Ernest Normand, and represents the sealing of Magna Charta by King John. The second panel is by Mrs. Normand. The scene she depicts is Richard Whittington, Lord Mayor of London, assisted by his family, in the act of bestowing charity upon London's poor at the gateway of his residence.

ADDITIONS TO KING'S COLLEGE, LONDON.—We should have mentioned in our description last week of the additions to King's College that Messrs. Gough & Co., of Hendon, were the contractors.

THE SLATE TRADE.—The Festiniog Quarry proprietors met on the 2nd to arrange prices for the coming year. The new list will show a slight rise in old vein, and to meet foreign competition some of the cheaper sizes have been slightly lowered. There is a rumour that the stocks of all the quarries have been purchased by one company. The Carnarvonshire quarries have been very busy for some time, and prices have an upward tendency.

ESSEX MANUFACTURERS' EXHIBITION.—An Essex Manufacturers' Exhibition in aid of the Essex disabled soldiers will be held in the Shire Hall, Chelmsford, on the 12th, 13th, and 14th prox. Essex is usually considered an agricultural county, but the promoters of the Exhibition will endeavour (*a*) To show that the manufactures of Essex are more important than the public have imagined, and (*b*) To

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stimulate and improve the many manufacturing industries carried on in the county, by bringing them prominently to the front. No charge will be made for space. All exhibits sent (except machinery, as stated below) to be given to the fund, and to be for sale during the exhibition. In the case of machinery or other exhibits, which obviously cannot be given to the fund, intending exhibitors are requested to communicate with the hon. secretary, when arrangements may be made for the exhibitions of such productions, provided a satisfactory donation is made to the fund. In this case carriage both ways, as well as the cost (if any) of erection and removal, must be borne by the exhibitor. It is requested that the entry form be sent as soon as possible, but in any case not later than December 3, to Mr. F. A. Fawkes, the Red House, Chelmsford. All exhibits must be labelled with the name and address of the exhibitor, and must be sent so that they are received not later than December 8, consigned to Mr. W. C. Girdlestone, Shire Hall, Chelmsford, carriage paid. The exhibition will be opened by Major-General Sir William Gatacre.

CAPITAL AND LABOUR.

STOCKTON PLUMBERS' DISPUTE.—The operative plumbers in Stockton, who are now out on strike for an advance of wages, declined to accept one of the conditions laid down by the masters for the suggested conference between the parties. Recently the men had a meeting at their club rooms, when the master's reply, adhering to their previous resolution, was laid before them, and the following resolution was passed and ordered to be forwarded by the secretary, Mr. E. Smith, to the master plumbers: "That we agree to the suggestion for a conference, with the exception of the lines reading 'consisting of three employers, two operatives now on strike, and either the president or secretary from the Executive Council of the Operatives,' and respectfully remind you that you objected to one of our local officials appointed on our last deputation to meet the master plumbers, your reason being that he was not affected by the present dispute. We fail to see where you could reasonably expect us to bring either our general Secretary or our President, as we consider our lodge (local) officials are more affected by the dispute than any of our Executive Council, and the fact of our Executive Council supporting us is, we think, sufficient in itself to show that they consider our local officials fully qualified to deal with the present dispute. We suggest that in place of the lines we take exception to, the following be inserted:—'That the Conference consist of three employers, three operatives, and a chairman.' We are agreeable that Alderman Hind be such chairman, either in a neutral capacity or otherwise as requested by you. I am asked to express regret at the masters dictating to the operatives whom they must send on their deputations."

DISPUTE AT THE PENRHYN SLATE QUARRIES.—The discontent which has been smouldering for some time at the Penrhyn Quarries came to a crisis last week, when some of the officials and contractors were seriously assaulted and driven out of the quarry, the cause alleged being the reintroduction of the system of letting a large amount of work to one contractor (who employed a large gang) instead of to small gangs or "bargains," as is customary in other quarries. This was one of the grievances at the time of the last strike, owing to the alleged sweating on the part of the contractors, and it was then done away with. On Sunday and Monday troops were brought to Bangor to assist in keeping order. Warrants were issued against the men charged with assault. By an arrangement between the Mayor of Bangor and the leaders of the men, the men accused were escorted by a police-sergeant to the magistrates court at Bangor on Tuesday, and were remanded for a week. There is a very grave state of affairs; on one side we have Lord Penrhyn, who is known to be a kind and considerate employer and landlord, and on the other a large body of intelligent and well-conducted quarrymen, and it is a pity for all concerned that an understanding cannot be arrived at. The quarry has been closed for fourteen days, probably longer.

THREATENED LOCK-OUT IN THE NORTH OF ENGLAND BUILDING TRADE.—Trouble upon trouble follows in the building trade. The question which now arises is whether the Northern Centre of the National Building Trades Employers' Federation shall take up, on behalf of the masters at Newcastle, the dispute with the operative bricklayers on Tyneside. On June 1 the bricklayers in Newcastle, Gateshead, and district struck work for an advance of wages from 10d. to 11d. per hour, and as the highest rate at present paid throughout the country is 10d. per hour, the employers could not see their way to grant the men's demands. To do so would be to establish a precedent. They, however, offered to guarantee the continuance of the existing rate of wages for two years, and to submit the dispute to arbitration. The proposals were rejected by the operatives. Since the rejection of these terms representatives of the parties to the quarrel have met on several occasions, and the present aspect of the dispute may probably lead to a serious disturbance of the building trade in the North of England, unless within the next fortnight or so the men withdraw or modify their requirements. The question is to be voted upon by the operatives. It is hoped for the sake of industrial peace that the ballot will not reveal a desire to insist upon the full demands. The Northern centre of the Employers' Federation embraces Northumberland, Durham, Cumberland, Westmoreland, Yorkshire, Lancashire, Cheshire, and the Isle of Man, and steps are, we understand, being taken to ascertain what support the masters in this wide area will be prepared to give to the Newcastle employers in the event of the conflict continuing after the 21st of this month.—*Yorkshire Post.*

LEGAL.

IMPORTANT CASE AS TO ARCHITECT'S LIABILITY.

THE case of Vaux *v.* Wimperis and Arber came before Mr. Justice Grantham in the Queen's Bench Division on the 3rd inst., an action in which the plaintiffs, engineers and manufacturers of heating apparatus, carrying on business in Sunderland, sued the defendants to recover 238*l.*, balance of an account for hot-water pipes placed in the Palace Theatre at Blackburn, Lancashire.

Mr. Montague Lush appeared for the plaintiffs, and Mr. Statham for the defendants.

Mr. Lush said that during the construction at Blackburn of the Palace Theatre by a company called the London and Lancashire Company, Limited, his clients were asked by the people engaged in the work to send in an estimate for the hot-water pipes.

Mr. Statham said that the defendants were architects to the London and Lancashire Company, who were the real people interested in the promotion, and the company had a contractor named Davidson. Defendants were not liable because they had given certificates for the work done.

Mr. Lush said there could be no suggestion that the goods were ordered on the part of the company. He would satisfy his lordship that the plaintiffs knew nothing about the London and Lancashire, Limited, and it was only after the work was done and they tried to get their money that the defendants denied responsibility, and referred them to a company which was now in liquidation and had not got a shilling. Messrs. Vaux sent in an estimate for the work for 320*l.*, and the defendants replied: "We beg to inform you that we accept your offer of 320*l.* for hot-water pipes," &c.

Mr. G. N. Vaux, a member of the plaintiff firm, gave evidence to the effect that they never heard of the existence of the London and Lancashire Company until they sought to get their money.

Cross-examined:

The original contract for the building of the theatre was for 17,000*l.* He had not seen a board on the works stating that the theatre was being built by the London and Lancashire, Limited. His firm applied to defendants for certificates on several occasions and got them. They had Mr. Davidson's cheque for one payment. At the end of the work they applied to Davidson for extras, and were referred to the London and Lancashire Company.

Mr. Statham said this was really a test case, and was a matter of interest to the Institute of Architects, because if it was held that the architects were liable simply because a contractor came to grief, it would have a very great effect on the profession.

Mr. Justice Grantham, in giving judgment, said he had no doubt the defendants were liable. It might be unfortunate, but architects should be careful when they gave orders to make it clear that the goods were not for themselves. Architects often did things for which they had no authority. In the great majority of cases the matter came out all right, but when it happened that was not so, the plaintiffs had no alternative but to look to the man from whom they received the orders.

His lordship accordingly gave judgment for the plaintiffs for the amount claimed with costs, and refused leave to appeal.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

13,909.—PIPE UNIONS AND JOINTS: *W. J. Henning and L. L. Higgs.*—For pipes that are rigidly mounted and have different diameters the screw-union is formed with a sleeve which is screwed on to one pipe and is held by means of a collar to another sleeve. The former sleeve fits loosely around the other pipe to which it is fastened with packing pressed round the pipe with a gland-like cap or collar that is screwed on to the other sleeve.

14,023.—BURNERS FOR INCANDESCENT LAMPS: *J. E. Tatham and J. L. Cope.*—Low-pressure gas-burners are provided with air-inlets that are placed below the gas nozzle's outlet and are directed upwards at an angle of about 30 deg. to the burner's axis. The burner is mounted, with an adjustment, upon a cone-shaped mixing tube, and there are also provided more openings for supply of air, which a hit-and-miss valve regulates—the valve being held in the position desired with a set screw.

14,024.—A STOP-GEAR FOR CRANES: *R. W. Monahan and H. Barsdorf.*—The inventors furnish means for showing when a derrick jib or other kind of crane has been overloaded. A casing, which contains a strong spring, constitutes a link of the lifting-chain or tie-rod, a compression of the spring by an excess of weight will operate some signalling apparatus, a steam-brake, &c. In one shape of the contrivance the spring carries a cross-bar, which will engage with a stop upon a rod that moves lengthwise, and the rod's movement is communicated by means of a bell-crank lever, a bell circuit can be set up by the closing of an electrical contact carried by a spring-plate which is caused to engage with an inclined surface fitted upon the cross-bar.

14,034.—SOLDERING-IRONS: *G. Kettman.*—The soldering-iron consists of a four-sided piece which is bent at a right-angle and is bolted on to a support which is secured adjustably, by means of a set-screw, to the burner-tube, and either end of the iron can be brought into use. As the gas flows through the handle it draws in air through holes cut in a socket, or the gas and air may be admitted through separate tubes at the handle's end. A tube having a spherical cap and a slip constitutes the burner.

14,061.—A TOOL FOR SCRAPING AND SMOOTHING WOOD: *J. J. Bryant.*—The blade, whose edges are turned forwards, is clamped on to a cross-bar, at each end of which is a handle fashioned like that of a spokeshave; horizontal arms which carry guiding-bars project from the ends of the crossbar, and will run over the wood as well as afford a support for the tool. In order to secure a variation in the blade's inclination to the wood one of the guiding-bars is (or both of them may be) mounted upon slides which are held adjustably with thumb-nuts in vertical grooves cut in the horizontal arms at the cross-bar's ends.

14,068.—ANTI-FOULING PREPARATIONS: *G. D. Coleman.*—A compound for coating the wooden surfaces of submerged structures consists of a soluble paste arising from the decomposition of comminuted copper or its alloy when laid upon the indented surface of the wood. After the paste has been washed away the surface is coated with an anti-fouling paint or some paint made of a material—such as poisonous salts of copper—that will become poisonous when exposed to sea water in the presence of copper. For submerged surfaces of metal, granulated or comminuted lead, tin, or zinc is applied, with a blower, to a moist layer of paint upon the surface; when that has become quite dry, a thin coating of paint is laid over the granulated lead, tin, or zinc, and then a layer of comminuted copper is rolled over the second coating of paint, whilst more finely divided copper should be applied by the blast process in order to fill up the interstices. Electrolytical action will not ensue, since the copper is free from contact with the structure's metallic surface.

14,128.—MEANS OF ESCAPE FROM FIRE: *E. W. Fickler.*—Two sets of "lazy-tongs" frames, to be extended with winding-ropes joined to the windlass barrels, carry a platform which is turned upon a vertical axis, or traversed with a screw, and also carries a bridge; a lever serves for extending the frame, and a bent lever for adjusting the bridge's inclination. A sudden collapse of the platform is prevented by means of a hollow telescopical pillar provided with valves; struts and a crank afford further support to the platform and bridge respectively, and a rack and pinion serve for extending the four legs of the frame of the base.

14,166.—A METHOD OF SECURING DOOR AND GATE HINGES IN WALLS: *H. Merryweather.*—For mounting the hinges of gates and doors in brick and other walls, their parts which are to be fastened against the wall are fashioned with plates which are joined with bolts and pins that are built vertically into the wall; the hinge-hook may be made in one piece with one of the bolts. For catches and latches, the latter are to be secured by the turning up of a hook, no separate bolts being needed, and the invention comprises a catch-piece that can be engaged with a latch and bolt at one time.

14,169.—AN ELEVATOR FOR BUILDERS' USES: *J. Candlish and C. Goddard.*—Rollers, which carry a belt worked with a crank, are mounted within a portable frame. Carriers for bricks and other materials are fitted at intervals upon the belt. A strut is attached to the frame at a point near its upper end, and a foot is provided for its extensible base.

14,222.—APPARATUS FOR HEATING WATER: *C. O. Paul.*—The boiler comprises two or more double-walled cylinders which are joined to one another and also to a double-walled semi-cylinder. The current of gases from the furnace through the boiler is directed and controlled with baffles and an arch. In another shape rings are employed for joining together the boiler sections, the water spaces communicating through apertures. Cast-iron flanges should be substituted for the rings if the boiler sections are made of cast-iron.

14,231.—SAFETY WINDOWS: *J. W. Sheppard.*—The inventor's object is to prevent the spreading of fire; he makes windows and roof-lights with double panes of wire-glass and fastens them in sashes or frames constructed of hollow metal, whilst the free circulation of air between the panes is provided for, openings in the bottom rail and hollow stiles communicate with the air within the apartment, and the air, having been heated in its flow through the frame and between the panes, finds an escape through openings cut in the window head or frame to the air outside.

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14,250.—A CASING FOR ELECTRICAL CONDUCTORS: *A. Hudson and C. F. Wightman.*—A casing, constructed of wood, is put within another metal casing fashioned in two parts, that are strapped together when the metal casing is laid in its place; junction boxes, similarly put together, are further provided with openings in their sides through which the wooden casing for the main and branch leads can be inserted.

14,266.—A GUARD FOR CIRCULAR SAWS; *G. E. Mennell, H. V. Mennell, and T. Walls.*—A guard which can be applied to circular saws and similar cutters of different sizes, has a hood wherein is a V-groove which rests upon the lower edges of two plates; at one end of one plate are pivotted two links for clamping purposes, whilst a wire holds it to a slot cut at the plate's other end, the wire has two ends which are fastened to a rod that projects from the sides of the other plate; the two plates are pivotted together, and a slotted lever provides for the due regulation of the height of the hood's fore-end with the first-named plate, the other plate's end being passed through a slot cut in the saw-bench and pivotted on to a sliding block; a thumb-screw upon a bolt effects the necessary angular adjustment, and a screw's handle serves for moving the slide both forwards and backwards.

14,277.—COVERINGS FOR WALLS, &C.: *Composite Veneering Company.*—The panels or coverings are intended for decorating walls, wainscots, pillars, articles of furniture, and so on. They consist of sheets of veneer that are cemented or glued together, the grains having been laid in different directions, the top sheet, made thinner than are those beneath, is glued on to a sheet of leather, and the panel is then enclosed for the pattern or ornamentation, the sheet remaining in the embossing press until the glue has become quite hard.

14,282.—AN APPARATUS FOR COOLING, HEATING, AND PURIFYING AIR: *W. F. Millington.*—The apparatus comprises a rotating framework in the shape of a cylinder, which has an envelope made of gauze and is encompassed with a set of L-shaped tubes through which, as they are turned together with their central nave or boss, hot and cold water is caused to flow from a common supply-pipe; the air is forced through the gauze sprinkled with water, whence it passes through a metallic screen, and so to the exhaustion ducts, a vessel receiving the waste water.

14,290.—A LIFT-VALVE: *C. S. Frishmuth.*—The valve's tubular portion is placed around a tubular seating, the fitting within a recess in the cap is made water-tight, and the cap can be readily removed for a re-facing of the valve-seating, the turning spindle is joined with a T-head to the valve, or it may be separately detached.

14,291.—A FLUSHING CONTRIVANCE: *F.S. Winser.*—An air pipe and a valve to be worked with a float are arranged within the space between the trap in the siphon's longer arm and the siphon itself, the cock becomes closed when the water level rises, then with the sinking of the filled float the valve opens, so that the air escapes and flushing ensues, in order to secure a repetition of the flush a small siphon is provided which empties the float.

14,292.—CONVERTIBLE STOVES: *W. Youlten.*—The stoves are intended for use with both gas and coal. To the base-plate of a revolving stove is attached a semicircular socket that rests upon the semicircular top of the base-plate's pivot; two grates are provided—one for gas, and another larger one for coal or other solid fuel—and between them is inserted a partition of fireclay with a layer of asbestos; a passage in the base-plate's pivot conducts the gas, which, when the gas stove is turned outwards, flows through a tube to the burners, and when the coal stove is turned outwards through another tube to Bunsen burners under the bars that it may ignite the fuel. An opening in the soot-guard plate leads to the flue, there are openings in the top pivot plate, of which one is placed at the back under the solid portion of the covering plate, and the other is under the opening which communicates with the flue. The hinged cheeks may be adapted for use as screens, or for adjustment against the front edges of the stove's revolving part. In a modified application of the invention the stove is closed altogether, thus constituting a closed gas stove and a slow-combustion stove, provided with a middle water chamber pierced for the escape of steam.

14,303.—A METHOD OF UNLOADING TRUCKS: *W. H. Wall.*—As the waggons arrive upon the rails they are arranged in a line upon a traverser whence they are shunted on to parallel rails, and are then unloaded into the shoots. Hinged dogs, working in guide-rails and attached to the end of a piston in a cylinder, propel the trucks along the several rails, their premature passing on to the traverser being checked with stops that are worked by the hand. As each truck takes its place in front of the parallel rails a stop upon the traverser becomes automatically liberated, and a piston and cylinder thereupon impel the truck, a separate piston and cylinder are provided for moving the traverser.

MEETINGS.

FRIDAY, NOVEMBER 9.

Architectural Association.—Mr. L. L. Macassey on "The Legal Position of the Architect." 7.30 p.m.

Glasgow Technical College Architectural Craftsmen's Society.—"Specification for a Roof:" (1) "Timber," by Mr. D. Ritchie; (2) "Slating and Plumbing," by Mr. J. M. Bowman; (3) "Glazing," by Mr. J. Marshall. 8 p.m.

SATURDAY, NOVEMBER 10.

British Institute of Certified Carpenters (Carpenters Hall.—6 p.m.

MONDAY, NOVEMBER 12.

Royal Institute of British Architects.—Professor Lanciani on "Architectural Results of the Latest Excavations in the Forum at Rome." 8 p.m.

Surveyors' Institution.—Opening address by the President, Mr. John Shaw. 8 p.m.

Bristol Society of Architects.—Mr. Harold Smith on "The Architects of the Court and Capital of England in the Seventeenth Century," with limelight illustrations. 8 p.m.

London Institution.—Professor Sir Robert S. Ball on "The Earth's Beginning," illustrated. 5 p.m.

TUESDAY, NOVEMBER 13.

Institution of Civil Engineers.—Messrs. G. A. Hobson and E. Wragge on "The Metropolitan Terminus of the Great Central Railway." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor Henry Robinson on "Sewage Disposal." 8 p.m.

WEDNESDAY, NOVEMBER 14.

Sanitary Institute (Lectures for Sanitary Officers).—8 p.m.

Institute of Sanitary Engineers.—General Purposes and Finance Committee at 3.30 p.m. Election Committee at 5.0 p.m. Council Meeting at 7.0 p.m.

Northern Architectural Association.—Opening meeting of session. Address by the President, Mr. W. Glover. 7.30 p.m.

THURSDAY, NOVEMBER 15.

Sanitary Institute (Lectures for Sanitary Officers).—Professor Henry Robinson on "Scavenging, Disposal of House Refuse." 8 p.m.

FRIDAY, NOVEMBER 16.

Sanitary Institute (Lectures for Sanitary Officers).—8 p.m.

Institution of Mechanical Engineers.—Mr. J. D. Twinberrow on "Capacity of Railway Wagons as Affecting Cost of Transport." 8 p.m.

SATURDAY, NOVEMBER 17.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Knacker-yard, Winthrop-street, Whitechapel, E. 3 p.m.

Dundee Institute of Architecture.—Visit to Leuchars Church and Earlshall, Fife.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

October 25.—By STEPHENSON & ALEXANDER (at Cardiff).

Llancadle, Glamorgan.—The Green Dragon Inn, f. £730

By HEPPER & SONS (at Leeds).

Bramley, Yorks.—Bramley Hill, Kirkstall Hall and 1 a. 0 r. 14 p., f. 650
Leeds-rd., enclosure of land, 4 a. 2 r. 30 p., f. 250

October 26.—By HEPPER & SONS (at Wakefield).

Ardsley, Yorks.—Fall-lane, a plot of building land, area 2,692 yards, f. 337

By F. MILLER & REID.

Holborn.—68A, Leather-lane, u.t. 12 yrs., g.r. 56*l.* 265

By ALFRED PREECE.

Pimlico.—20, Cumberland-st., u.t. 32½ yrs., g.r. 9*l.*, e.r. 55*l.* 510

October 29.—By FIELD & SONS.

Blackfriars.—6, Queen's Arms court, c. 230
Camberwell.—90 and 92, Westmacott-st., and 1 and 1A, Notley-st., f. 920
New Cross.—29, Eckington-gardens, u.t. 75 yrs., g.r. nil 330
Hendon.—Sunny-gardens, Enfield and Cranbourne Lodge, u.t. 68½ yrs., g.r. 16*l.*, r. 107*l.* 10s. 1,050
56, Church-lane, u.t. 64½ yrs., g.r. 4*l.*, r. 45*l.* .. 450

By A. H. TURNER & CO.

Shepherd's Well, Kent.—Hazling Dane and 10 a. 0 r. 10 p., f. 3,325

By WEBB & MILTON.

Bayswater.—32, Westbourne-gardens, u.t. 48½ yrs., g.r. 15*l.* 750

By THOMAS WOODS.

Battersea.—6, 8, 36, 38, 44 and 46, Aliwal-rd., u.t. 84 yrs., g.r. 39*l.* 1,700

October 30.—By BEADEL, WOOD, & CO.

Little Thurrock, Essex.—Four blocks of land, 45 a. 0 r. 33 p., f. 4,150
A plot of building land, 32 p., f. 140
Fifteen cottages and 1 a. 2 r. 18 p., f. 1,850
Three blocks of land, 16 a. 2 r. 12 p., f. 910
Six blocks of building land, 54 a. 0 r. 35 p., f. .. 4,540
Blackshott's Farm, 33 a. 1 r. 35 p., f. 1,100
Three blocks of land, 60 a. 2 r. 22 p., f. 1,265

By W. A. BLAKEMORE.

Canonbury.—12, Compton-rd., u.t. 44½ yrs., g.r. nil, r. 55*l.* 630
Peckham.—35, Choumert-rd., f., r. 28*l.* 430
Camberwell.—186, The Grove, f., e.r. 65*l.* 680
City of London.—56, Basinghall-st., area 900 ft., f., e.r. 260*l.* 4,050
Royal Exchange, moiety of rent-charge of 15*l.* per annum 250
Pimlico.—72 and 74, Hanover-st., u.t. 24 yrs., g.r. 16*l.* 520
Kensington.—134, Greyhound-rd., f., r. 40*l.* 530
Willesden.—8, Osborne-rd., u.t. 90 yrs., g.r. 6*l.* .. 315
New Southgate.—Beaconsfield-rd., f.g.r. 10*l.*, reversion in 94 yrs. 250

By DEBENHAM, TEWSON, & CO.

Holloway.—18, Carleton-rd., area nearly ½ a., u.t. 52 yrs., g.r. 2*l.* 10s. 2,000
St. Luke's.—364 to 370 (even), Old-st., area 2,870 ft., f., r. 287*l.* 6,800
City of London.—39, 40, and 41, Wood-st., area 2,880 ft., building lease for 99 yrs., let at per annum 750

By G. F. HARRINGTON.

St. George's East.—170, St. George-st., f., r. 33*l.* £365
199 and 200, St. George-st., f., r. 69*l.* 6s. 1,025
12, 13, 16, and 17, Ship-alley, f. 2,340

By G. HEAD & CO.

Hampstead.—26, Fellowes-rd., u.t. 64 yrs., g.r. 15*l.*, r. 105*l.* 750

By WALTON & LEE.

Orpington, Kent.—Church Hill, The Priory and 14 a. 2 r. 9 p., part f. and part u.t. 20¼ yrs., g.r. 1*l.* 4,800
Speldhurst, &c., Kent.—Burr's Wood Estate, 676 a. 1 r. 24 p., f. 28,000

By FREDERICK WARMAN.

Highbury.—87, Highbury-quadrant, u.t. 50 yrs., g.r. 7*l.*, 10s., e.r. 50*l.* 540
17, Highbury-quadrant, u.t. 49 yrs., g.r. 18*l.* 18s. 1,200
Finsbury Park.—2, Somerfield-rd., u.t. 66 yrs., g.r. 7*l.* 480
Highgate.—13 and 15, Lulot-st., u.t. 79 yrs., g.r. 10*l.* 400
Crouch End.—76, Barrington-rd., u.t. 95 yrs., g.r. 6*l.* 10s. 550

By WESTON & SONS.

Brixton.—24 to 30 (even), Flaxman-rd., u.t. 64 yrs., g.r. 31*l.*, r. 167*l.* 1,385
106 and 108, Lothian-rd., u.t. 63 yrs., g.r. 13*l.* r. 62*l.* 725
10 to 16, Elfin-rd., u.t. 63 yrs., g.r. 28*l.* 8s. 1,020
Camberwell.—77, Picton-st., f. 450
Wandsworth.—1, Portslade-rd., u.t. 26 yrs., g.r. 5s., with policies for 200*l.* 160

By EDWARD WOOD.

Ilford, Essex.—23, 25, and 27, Windsor-rd., u.t. 97 yrs., g.r. 15*l.* 600
Loughton.—Algers-rd., a block of building land, f. 295
Kensington.—6, St. Andrew's-rd., u.t. 83 yrs., g.r. 7*l.* 10s. 360
Barnsbury.—31, Wellington-rd., u.t. 60 yrs., g.r. 6*l.* 275
Kensal Town.—7 and 8, Middle-row, u.t. 60 yrs., g.r. 10*l.* 10s. 425
Kilburn.—70, Willesden-lane, u.t. 86 yrs., g.r. 14*l.* 14s. 660

By FLEURET, SONS, & ADAMS (at Masons' Hall Tavern).

Fareham, Hants.—The Railway Hotel, f., r. 200*l.* 9,920

By J. & L. LEA & SONS (at Birmingham).

Solihill, &c., Worcester.—Forshaw Farm, 101 a. 2 r. 15 p., f. 2,825
Birmingham, Warwick.—40, Hurst-st., u.t. 36 yrs., g.r. 10*l.*, r. 80*l.* 850

October 31.—By JOHN BOTT & SONS.

Streatham.—27 to 33 (odd), Gleneagle-rd., f., r. 175*l.* 2,195
Herne Hill.—41, Dulwich-rd., u.t. 54 yrs., g.r. 4*l.* 10s., r. 40*l.* 400

By J. G. DEAN & CO.

Wandsworth.—5, Ouseley-rd., f., e.r. 45*l.* 650

By HARMAN BROS.

Clapton.—2 and 4, Walsingham-rd., f. 840
Southminster, Essex.—Foxhall-rd., two blocks of building land, 24 a. 0 r. 11 p., f. 255

By FRANK JOLLY & CO.

Bethnal Green.—1 to 5, Edgar-pl., f. 1,100
Leytonstone.—94, Crownfield-rd., u.t. 78 yrs., g.r. 5*l.* 275

By WAGSTAFF & SONS.

Dalston.—43 and 45, Shrubland-rd., u.t. 42 yrs., g.r. 8*l.* 12s. 9½d., r. 64*l.* 595

By T. B. WESTACOTT.

Hornsey Rise.—18 and 20, Mulkern-rd., f., r. 74*l.* 2s. 735
Hampstead.—39, Fleet-rd., u.t. 50 yrs., g.r. 6*l.*, r. 42*l.* 375

By N. EASTON & SON (at Hull).

Coniston, Yorks.—A freehold farm, 87½ a. 3,000

By BEARD & SON (at Bridgwater).

North Petherton, Somerset.—Moorland Court and New House Farms, 202 a. 0 r. 4 p., f. 8,800

November 1.—By ALDRIDGES.

Croydon.—2, Sydenham-rd. North, f., e.r. 70*l.* .. 1,100
Wallington.—Harcourt-rd., Glenmore, u.t. 68 yrs., g.r. 8*l.*, e.r. 65*l.* 550

By A. PREVOST & SON.

Old Ford.—63, 65, and 67, Ford-st., u.t. 88 yrs., g.r. 34*l.* 1,000

By WALTER SIMMONDS.

Streatham.—Babington-rd., The Beeches and The Poplars, u.t. 81 yrs., g.r. 3*l.*, e.r. 125*l.* 835
Camberwell.—119, Shenley-rd., u.t. 76 yrs., g.r. 6*l.*, r. 38*l.* 400

By STIMSON & SONS.

Abbey Wood, Kent.—Bostall-lane, three enclosures of land, 30 a. 3 r. 17 p., f. 3,220
New Charlton, Kent.—22, 24, 25, 26 to 40 (even), and 40A, Gurdon-rd., u.t. 70 yrs., g.r. 50*l.* 10s. 2,775
25 to 35 (odd), Dupree-rd., u.t. 70 yrs., g.r. 27*l.* 1,500
New Cross.—48, New Cross-rd., u.t. 85¾ yrs., g.r. 7*l.* 10s., r. 45*l.* 455
Tooting.—23, Dafforne-rd., u.t. 82 yrs., g.r. 9*l.*, r. 40*l.* 305
Merton.—27 to 30, High-path, f. 715
Wealdstone, Middx.—5 to 15 (odd) and 21, 23, and 25, Shelley-rd., f. 2,070

By TRAFFORD & CARTER.

Forest Gate.—74, Cranmer-rd., u.t. 75 yrs., g.r. 5*l.*, r. 32*l.* 340
Wanstead.—Cambridge Park, Cheops, f., e.r. 70*l.* 1,270
Plaistow.—49, Whitwell-rd., and a plot of land, f. 390

By T. N. TURNER.

Kensington.—73, Church-st., u.t. 43 yrs., g.r. 9*l.*, r. 70*l.* 1,240
Notting Hill.—4, Telford-rd., u.t. 67½ yrs., g.r. 8*l.*, r. 40*l.* 500
71, Portland-rd., u.t. 49 yrs., g.r. 7*l.* 355

November 2.—By BEDFORD & CO.

Camberwell.—22, 24, and 26, Havil-st., f., r. 78*l.* . 1,400

By LEOPOLD FARMER.

Brondesbury.—Shoot-up-Hill, Berkeley Lodge, u.t. 68 yrs., g.r. 27*l.* 14s., e.r. 175*l.* 2,150
Kilburn.—13, Rudolph-rd., u.t. 63½ yrs., g.r. 8*l.*, e.r. 45*l.* 340
7, Rudolph-rd., u.t. 63½ yrs., g.r. 7*l.* 340

By MONTAGUE HIBBARD & CO.

Hackney.—28, Dagmar-rd., u.t. 38 yrs., g.r. 4*l.*, r. 28*l.* 285
Eynsham, Oxon.—High-st., Toner Cottage, f. 135

[See also next page.

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COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Slop and Material Carts, Water Vans, &c.	Willesden District Council	Engineer, Public Offices, Dyne-road, Kilburn, N.W.	Nov. 13
Cottage, Culham, Oxfordshire	Great Western Railway Company	G. K. Mills, Paddington Station, London, W.	do.
Cottage, Symonds Yat, Herefordshire	do.	do.	do.
Chapel, Sligo Asylum	Committee	T. Deane & Son, Architects, 15, Ely-place, Dublin	do.
Filter Bed	Worcester Corporation	T. Caink, Civil Engineer, Guildhall, Worcester	do.
Wrought-iron Fencing	Rugby U.D.C.	D. G. Macdonald, Civil Engineer, Council Offices	do.
*Granite Kerb, &c.	London County Council	Parks Department, 11, Regent-street, S.W.	Nov. 14
Road Works, &c., Poulton-road	Fleetwood (Lancs.) U.D.C.	E. Frobisher, Civil Engineer, Town Hall	do.
Sewerage Works	Herne Bay (Kent) U.D.C.	Baldwin Latham, Civil Engineer, Victoria-street, Westminster	do.
Renovation of Church and Schools, Pontnewydd	North-Eastern Railway Company	Rev. G. H. Fauthall, Albion-road, Pontypool	do.
Twenty-four Cottages, Tweedmouth	Bridlington School Board	W. Bell, Architect, Central Station, Newcastle-on-Tyne	do.
Alterations to School, Hilderthorpe	Carlisle Corporation	J. Earnshaw, Architect, Bridlington Quay	do.
Four Residences, Buncrana, Ireland	Croydon R.D.C.	R. E. Buchanan, Civil Engineer, Castle-street, Londonderry	do.
Additions to Slaughter Houses	High Wycombe R.D.C.	H. C. Marks, Civil Engineer, 36, Fisher-street, Carlisle	do.
Streets, &c., Lower Sleaford-road, Newark	Mr. R. H. Done	Sheppard & Harrison, Architects, Bargate, Newark	do.
Making-up Wandle-road, Beddington		J. Wilson, Fell-road, Croydon	do.
Schools, Sutton-on-Sea, Lincolnshire		Mortimer & Son, Architects, Corporation-street, Lincoln	Nov. 15
Sewers, &c., Wendover		Taylor, Sons & Santo Crimp, C.E., 27, Great George-street, S.W.	do.
Business Premises, Wrexham		J. E. Lash, Architect, Gresford	do.
Restoration of Church, Bickington, Devon		Tait & Harvey, Architects, Exeter	do.
Six Houses, Butts Beck, Dalton, Lancs.		Mr. Butler, Architect, Cornwallis-street, Barrow	do.
Three Houses, Hipperholme, Yorks.		R. Berry, Architect, Commercial-street, Halifax	do.
Additions, &c., to Houses, Sadler-street	Durham R.D.C.	G. Gregson, Surveyor, Weston-hill, Durham	Nov. 16
Alterations to Thorpe School, Idle	Bradford School Board	W. Bailey, Architect, 9, Market-street, Bradford	Nov. 17
Flint Road Metal	Newhaven U.D.C.	E. Knightley, Council Offices, Newhaven	do.
Drainage, &c.	Newton-in-Makerfield U.D.C.	A. Bowes, Civil Engineer, Town Hall, Earlstown	do.
Street Works, Athol-street, Earlstown	do.	do	do.
Villa, Whitchurch, Tavistock		T. A. Clark, Architect, New Town-chambers, Plymouth	do.
Repairing Olinda-place	Bridlington Corporation	Borough Surveyor, Town Hall	do.
Street Works	Urmston (Lancs) U.D.C.	J. Heath, Surveyor, Council Offices, Urmston	Nov. 19
Pier, Cowes, Isle of White	Cowes U.D.C.	R. E. Cooper, Civil Engineer, 8, The Sanctuary, S.W.	do.
Street Works, Queen's-road, &c.	Urmston (Lancs) U.D.C.	J. Heath, Surveyor, Urmston	do.
Making-up Devonshire-road	Burnham-on-Crouch U.D.C.	E. Dilliway, High-street, Burnham	do.
*Sewering, Levelling, Paving, &c.	Bromley U.D.C	Surveyor, Council Offices, Bromley, Kent	do.
Alterations to Grammar School, Dundalk		W. Beck, Architect, Dundalk	Nov. 20
School Buildings	Upper Neath School Board	J. C. Rees, Architect, Church-place, Neath	do.
Groynes	Bridlington Corporation	Borough Surveyor, Town Hall	Nov. 21
*Two Cottage Homes, &c.	Woolwich Guardians	Church, Quick & Whincop, Architects, William-st. Woolwich	do.
*Engine House and Boiler House, &c.	Darlington Corporation	Borough Surveyor, Town Hall, Darlington	Nov. 22
*Pumping Engine, &c.	do.	do.	do.
Reconstruction of Refuse Destructor	Eastbourne Corporation	R. M. Gloyne, Civil Engineer, Town Hall, Eastbourne	Nov. 23
Steel Rails (1,050 tons)	Stockport Corporation	J. Atkinson, Civil Engineer, Town Hall, Stockport	Nov. 24
Drainage Works, Contract No. 3	Dublin Corporation	G. Chatterton, Civil Engineer, 6, The Sanctuary, Westminster	Nov. 27
*Iron Fencing	Walthamstow School Board	School Board Office, High-street, Walthamstow	do.
*Board Room, Offices, &c.	Easington Union	See Advertisement	Nov. 28
*Technical School	Watford U.D.C.	W. H. Syme, Architect, 4, High-street, Watford	Nov. 29
Cottage Homes, Ponteland	Newcastle-upon-Tyne Guardians	Oliver, Leeson & Wood, Archt., Mosley-st., Newcastle-on-Tyne	Nov. 30
*Car Depôt and Workshops	Salford Tramways Committee	Tramways Engineer, Town Hall, Salford	do.
*Stations, &c.	L. & N. W. and G. W. Railways	Joint Engineer, Woodside Station, Birkenhead	Dec. 4
*Schools, Gainsford-road, Walthamstow	Walthamstow School Board	G. E. T. Lawrence, 22, Buckingham-street, Adelphi, W.C.	do.
*Board Room and Offices in Harrow-road, W.	Paddington Guardians	F. J. Smith, Architect, Parliament Mansions, Victoria-street, S.W.	do.
*Technical Schools	Southend-on-Sea Corporation	Town Clerk, Southend-on-Sea	Dec. 6
Sewage Outfall Works	Withington (Lancs) U.D.C.	A. H. Mountain, Civil Engineer, Town Hall	Dec. 13
House, &c., Wesley Chapel, Harrogate	Horwich Indus. Co-op. Soc., Ltd.	W. J. Morley, Architect, 269, Swan-arcade, Bradford	No date
Business Premises	Mr. A. Farrar	F. W. Dixon, Architect, Trevelyan-buildings, Manchester	do.
Greenhouses, &c., Burnside, Ilkley	Lowestoft School Board	Hodgson & Priestley, Architects, Old Bank-chambers, Bradford	do.
House, Boston Spa		Bedford & Kitson, Architects, Greek-street-chambers, Leeds	do.
Hall and Classrooms, Gladstone-st., Scotholme, Notts		H. J. Price, Architect, 24, Low-pavement, Nottingham	do.
Alterations to Schools, Oulton		F. W. Richards, Architect, Lowestoft	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Application to be in
*Clerk of Works	Burgh of Partick		Nov. 14
*Clerk of Works	Essex County Council		Nov. 17
*Manual Training Instructor	School Board for London	100*l.* per annum	Nov. 19
*Assistant Instructor	Croydon School Board	90*l.* per annum	No date

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. —. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xviii. xix. & xxi.

By Mullett, Booker, & Co

Bayswater.—105, Inverness-ter., u.t. 38½ yrs., g.r. 8*l.*..... £1,010

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

**** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 16 0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 12 0	,,	,, ,,
Smooth Bright Facing Stocks..	2 18 0	,,	,, ,,
Shippers	2 2 0	,,	,, ,,
Flettons.....	1 10 0	,,	,, ,,
Red Wire Cuts ..	1 15 0	,,	at railway depôt.

PRICES CURRENT (*Continued*).

	£ s. d.		
Best Fareham Red	3 11 6	per 1,000	at railway depôt.
Best Red pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,, ,,
Do., Bullnose	4 12 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 6	,,	,, ,,
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,

PRICES CURRENT (*Continued*).

	£ s. d.		
One Side and two Ends	15 0 0	per 1,000	at railway depôt.
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.		
Thames and Pit Sand	8 0	per yard,	delivered.
Thames Ballast	6 9	,,	,,
Best Portland Cement	38 0	per ton	,,
Best Ground Blue Lias Lime..	24 6	,,	,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.

Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube,	deld. rly. depôt
Bath ,, ...	1 7	,,	,,
Farleigh Down Bath ..	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,, ...	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Dacley Dale ,,	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York ,,	2 10	,,	,,

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PRICES CURRENT (*Continued*).

STONE.

Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 7	per ft. super. at rly. depôt.	
" " 6 in. Rubbed Ditto..	2 10½	"	"
" " 3 in. sawn both sides slabs (random sizes)	1 3	"	"
" " 3 in. self-faced Ditto	0 9	"	"

SLATES.

in. in.	£ s. d.		
20X10 best blue Bangor..	11 5 0	per 1000 of 1200 at rly. dep.	
" best seconds "	10 15 0	"	"
16X 8 best "	6 8 6	"	"
20X10 best blue Portmadoc	10 18 0	"	"
16X 8 best blue Portmadoc	6 0 0	"	"
20X10 best Eureka unfading green.....	11 2 6	"	"
16X 8 " "	6 15 0	"	"
20X10 Permanent green	10 0 0	"	"
16X 8 " "	5 12 6	"	"

TILES.

	s. d.		
Best plain red roofing tiles...	41 6	per 1,000 at rly. depôt.	
Hip and valley tiles....	3 7	per doz.	"
Best Broseley tiles	48 6	per 1,000	"
Hip and valley tiles....	4 0	per doz.	"
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	"
Do. ornamental Do.	60 0	"	"
Hip tiles.....	4 0	per doz.	"
Valley tiles.....	3 9	"	"
Best Red or Mottled Staffordshire Do. (Peakes).	50 9	per 1,000	"
Hip tiles	4 1	per doz.	"
Valley tiles.....	3 8	"	"

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0	" "

	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
" " 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens.....	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens.....	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens.....	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
" " " 3 in. by 9 in. ..	14 0 0	15 0 0
Battens.....	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
" " " 3 in. by 9 in.	13 0 0	14 0 0
" " battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small " "	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
½ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6
Compound Girders " "	12 5 0	13 10 0
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	11 7 6	12 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	9 15 0	10 5 0
Staffordshire Crown Bars, good merchant quality	10 10 0	11 0 0
Staffordshire "Marked Bars" ..	13 0 0	- - -
Hoop Iron, basis price.....	11 0 0	11 10 0
" " galvanised	17 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 5 0	- - -
" " to 24 g.....	12 10 0	- - -
" " to 26 g.....	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	14 15 0	- - -
" " 22 g. and 24 g.	15 5 0	- - -
" " 26 g.....	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 0 0	- - -
" " 22 g. and 24 g.	18 10 0	- - -
" " 26 g.....	20 0 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 15 0	14 10 0
" " 22 g. and 24 g.	14 10 0	15 10 0
Cut nails, 3 in. to 6 in.....	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 5 0	- - -
Pipe in coils	20 15 0	- - -
Soil Pipe..	23 15 0	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	28 0 0	- - -
Silesian.....	27 10 0	- - -
COPPER—		
Strong Sheet..... per lb.	0 1 1	- - -
Thin ..... "	0 1 3	- - -
Copper nails ..... "	0 1 3	- - -
BRASS—		
Strong Sheet..... "	0 0 11	- - -
Thin " ..... "	0 1 1	- - -
TIN—English Ingots ..... "	0 1 6	- - -
SOLDER—Plumbers' ..... "	0 0 8	- - -
Tinmen's ..... "	0 0 10	- - -
Blowpipe ..... "	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3½d. " "
" " fourths.....	3d. " "
26 oz. thirds	4½d. " "
" " fourths	4d. " "
32 oz. thirds	5½d. " "
" " fourths	5d. " "
Fluted sheet, 15 oz.	3½d. " "
" " 21 "	4½d. " "
½ Hartley's Rolled Plate.....	3d. " "
⅝ " " "	3½d. " "
¾ " " "	4d. " "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes.....per gallon	0 3 1
" " " in barrels ..... "	0 3 2
" " " in drums ..... "	0 3 4
Boiled " " in pipes..... "	0 3 4
" " " in barrels ..... "	0 3 5
" " " in drums ..... "	0 3 7
Turpentine, in barrels ..... "	0 2 7
" in drums..... "	0 2 9
Genuine Ground English White Lead ...per ton	27 5 0
Red Lead, Dry..... "	24 10 0
Best Linseed Oil Putty.....per cwt.	0 9 6
Stockholm Tar ..... per barrel	1 10 0

VARNISHES, &c.

	per gallon. £ s. d
Fine Elastic Copal Varnish for outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work.....	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

J. B.—B. B.—M. M. (Amounts should have been stated). R. W. & Co.—R. & M.—J. B.—C. & Sons (Received). H. P. (Shall have attention).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BROMSGROVE.—For the erection of an engine-house, &c., Washingstocks, Catshill, for the East Worcestershire Waterworks Company. Mr. E. B. Marten, engineer, Church-street Chambers, Stourbridge:—

George Law..	£1,979 10 3	W. H. Gibbs..	£1335 10 0
Whitehouse & Son	1,546 8 0	Guest & Son..	1,331 0 3
Thos. Vale ..	1,523 10 6	Dorse & Co...	1,285 8 5
A. H. Guest..	1,433 10 1	Joseph Tilt, Bromsgrove*	1,236 0 0
J. & A. Brazier	1,364 10 0	C. A. Horton	1,204 0 0

CHESTER-LE-STREET.—For the construction of outfall and other sewers, Usworth and Washington, for the Rural District Council. Mr. J. H. Mole, Surveyor, Chester-le-Street. Quantities by Surveyor:—

J. Thompson..	£2,995 15 10	Hudson & Son	£2,306 0 0
W. Craig	2,482 17 9	T. Robinson, Washington, R.S.O.....*	2,229 11 9
J. Carrick	2,388 0 0		
M.A.Armstrong	2,363 14 3		

CHESTER-LE-STREET.—For the construction of sewers, Fatfield, Harraton, for the Rural District Council. Mr. J. H. Mole, Surveyor, Chester-le-Street. Quantities by Surveyor:—

John Thompson	£578 18 3	Wm. Rutter ..	£405 10 4
T. C. Starkey ..	510 18 6	Thos. Robinson, Washington, R.S.O.*....	356 15 9
Walter Craig ..	443 10 7		
John Carrick ..	427 13 0		

CROYDON.—For the erection of two shops. Messrs. F. & W. Stocker, architects, 90 and 91, Queen-street, Cheapside, E.C.:—

Gathercole Bros.	£1,961 0	W. Pearce	£1,600 0
The Lyle Co.....	1,891 2	W. Walker	1,598 0
Richardson Bros.	1,795 0	J. W. Jones	1,590 0
S. Harwood	1,792 5	H. C. Wills	1,430 0
F. W. Green	1,700 0	Freeman & Son..	1,375 0
Cadman & Son ..	1,647 0	Sutton & Styles..	1,370 0
Worsfold & Sons	1,630 0	Veale & Carter, Brixton Hill*..	1,350 0
J. Watt	1,610 0		

GUILDFORD.—For the execution of sewerage works (2,803 lineal yards) for the Rural District Council. Mr. J. Anstee, C.E., Commercial-road, Guildford:—

H. Roberts ..	£4,672 11 6	Wilkinson Bros.	£3,250 0 0
F.W.Trimm..	4,181 0 0	Clift Ford	3,164 0 0
George Bell ..	3,639 0 0	A.&A Streeter, Godalming*	3,126 0 0
J. Jackson ..	3,634 0 0		

KIRKCALDY.—For the erection of tenements at Balfour-street, Kirkcaldy, for the Kirkcaldy District Lodge of Free Gardeners. Mr. D. Forbes Smith, architect, Kirkcaldy:—

Masonry.—Wm. Kilgorn*	£580 0
Joinery.—David Simpson*	392 10
Plastering.—J. Shoolbraid*	73 0
Plumbing.—H. Hutchison*	65 0
Slating.—Currie & Cant*	50 19
Total.....	£1,161 9

[All of Kirkcaldy.]

KIRKCALDY.—For the erection of stabling, van sheds, committee-rooms, &c., at Mid-street, Pathhead, for the Pathhead and Sinclairtown Reform Co-operative Society, Limited. Mr. D. Forbes Smith, architect, Kirkcaldy:—

Masonry.—Henry Masterton, Sinclairtown*	£865 0 0
Joinery.—Andrew Carmichael, Pathhead*	323 0 0
Plastering.—Wm. Easten, Kirkcaldy*	88 10 0
Plumbing.—Jas. Crombie, Gallatown*	77 15 4
Slating.—David Stark, Kirkcaldy* ..	39 3 0
Total.....	£1,393 8 4

LITHERLAND (Lancs.).—For the construction of passages, Towcester, and other streets, for the Urban District Council. Mr. W. B. Garton, surveyor, 25, Sefton-road, Litherland:—

F. Ireland, Sepforth ..	£43 9 6	..	1 passage.
" "	107 0 3	..	2 "
" "	23 14 11	..	3 "
T. Horrocks, Aintree	.. 43 8 0	..	1 "
" "	..109 12 1	..	2 "
" "	23 17 3	..	3 "
J. Ireland, Fleetwood ..	60 17 2	..	1 "
" "	..142 16 10½	..	2 "
" "	.. 30 9 3	..	3 "
Exec. W. F. Chadwick, Liverpool.....	44 19 6	..	1 "
" "	..112 5 0	..	2 "
" "	.. 25 13 4	..	3 "
P. Tyson, Liverpool	75 0 0	..	1 "
" "	....156 0 0	..	2 "
" "	.... 34 0 0	..	3 "
Surveyor's estimated cost	44 12 3	..	1 "
" "	" 106 2 8	..	2 "
" "	" 27 2 4	..	3 "

LOUGHBOROUGH (Leicester).—For the erection of two houses, Middleton-place, for Mr. J. White. Mr. A. E. King, architect, Baxter-Gate, Loughborough:—

Barker & Son	£930	W. Tailby, Ward's End*	£779
A. Faulks.....	890		

[*See also next page.*

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LONDON.—For extension of stores, workshops, and offices, Electricity Department, Hoxton-square and Coronet-street, Shoreditch, for the Vestry of the Borough of Shoreditch. Mr. J. Rush Dixon, Engineer, Town Hall, Old-street. Quantities by Mr. J. R. Hunt, Bridge House, 181, Queen Victoria-street, E.C. :—

		Allowance for old material.	
Gibbs & Co.	£12,242	£242	£12,000
Wallace & Co.	11,912	27	11,885
Renshaw & Co.	11,903	50	11,853
J. L. Holloway	11,600	—	11,600
Clift Ford	10,670	—	10,670
Chessum & Son	10,650	10	10,640
Wall & Co.	10,245	25	10,220
Weibking & Son*	9,980	—	9 980

MARGATE.—For making up the following roads under the Private Street Works Act, 1892 : (1) Road in rear of southerly side of Milton-road, (2) Milton-square, (3) Ventnor-lane, (4) Grotto Gardens, (5) Grange-road (part of), (6) footpath at northerly end of Addiscombe-road, for the Town Council. Mr. Albert Latham, Borough Engineer, Municipal Buildings, Margate :—

Tuff & Miskin	£1,046 10
Paramor & Sons, Margate*	955 0

OXSPRING (Yorks).—For additions, &c., to schools. Messrs. Senior & Clegg, architects, 15, Regent-street, Barnsley :—

Masonry.—Charles Lockwood, Penistone, near Sheffield*	£338 10 0
Joinery.—Hawley & Sons, Penistone, near Sheffield*	185 10 0
Plumbing and Glazing.—Snowden & Son, Barnsley*	51 10 0
Plastering.—Hey & Waterhouse, Thurlstone, near Sheffield*	16 16 8
Slating.—M. Fleming, Barnsley*	32 10 0
Painting.—Snowden & Son, Barnsley*	9 15 0

PLYMOUTH.—For the erection of a shop, &c., Ebrington-street, for Mr. A. Rohrer, Plymouth. Mr. F. A. Clark, architect, New Town Chambers, Plymouth :—

Wm. Stephens	£1,255 0 0	A. N. Coles	£1,060 0 0
F. J. Stanbury	1,211 0 0	Lethbridge & Son	1,055 0 0
Pearce Bros.	1,189 0 0	F. G. Ambrose	1,022 0 0
C. W. H. Fox	1,158 2 9	Steer & Pearce	1,009 0 0
W. Trevena	1,157 0 0	W. S. Stevenson	995 0 0
W. E. Blake	1,150 0 0	Pearn Bros.	990 0 0
Thos. King	1,149 0 0	G. B. Turpin	983 0 0
Stratford & Otto	1,101 10 0	Allen & Tozer, Devonport*	929 0 0
W. H. Lethbridge	1,085 0 0		
Jno. Davy	1,068 0 0		

SALISBURY.—For the erection of a public-house, York-road, Fisherton, for Messrs. J. Folliott & Son. Messrs. J. Harding & Son, architects, Salisbury. Quantities by Mr. Ingalton Sanders, Southampton :—

Grace & Son	£1,380	G. Harris, Fisherton Salisbury*	£1,211
Wort & Way	1,327		
Vincent & Folland	1,285		

SHARDLOW (Derbyshire). — For the execution of sewerage works, Normanby-by-Derby, for the Rural District Council. Mr. T. A. Fuller, F.S.I., Surveyor, The College, All Saints', Derby :—

S. Saunders	£19,435 0 0	J. Tomlinson	£10,584 0 0
W. Jowett	13,186 16 0	S. Richmond	9,998 11 4
George Bell	13,175 0 0	G. F. Tomlinson, Derby*	9,570 0 0
Bower Bros.	11,450 0 0		

SOUTH WOODFORD.—For proposed mission hall, Maybank-road and Gordon-road, South Woodford. Mr. A. W. Hudson, surveyor, London :—

C. W. Houchen	£779	Hawkey & Oldman	£639
J. W. & T. Inkpen	749		

STAINES.—For the supply of 350 tons 1½ in. broken Guernsey granite, for the Urban District Council. Mr. E. J. Barrett, C.E., Town Hall, Staines :—

	Per ton delivered in trucks at Staines Junction. s. d.
Griffiths & Co.	17 6
Mowlem & Co.	17 2
A. & F. Maunelle	16 7
Fry Bros., Greenwich, S.E.*	15 10

WILLESDEN.—For the erection of superstructure of the new infirmary, Acton-lane, for the Guardians of the Poor of Willesden Parish. Mr. A. Saxon Snell, architect. Quantities by Messrs. Northcroft, Son, & Neighbour :—

McCormick & Sons	£94,790	Spencer, Santo, & Co.	£88,300
W. Gibson	93,500	Chessum & Sons	87,500
Patman & Fotheringham	00,200	Cowley & Drake	86,400
Holloway Bros.	88,300	Godson & Sons, Kilburn-lane, W.*	83,918
Lawrance & Sons	88,700		

WOLVERHAMPTON. — For the erection of new special school for the Wolverhampton School Board. Mr. J. H. Fleeming, Architect to the Board :—

Tildaslay	£2,520	Herbert	£2,231
Skett	2,410	L. Jonas	2,191
Cave	2,302	Willcock & Co.	2,170
Bilson	2,289	Speake & Son, Wolverhampton*	2,135
Gough	2,235		

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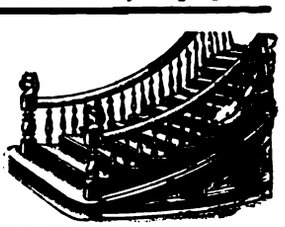

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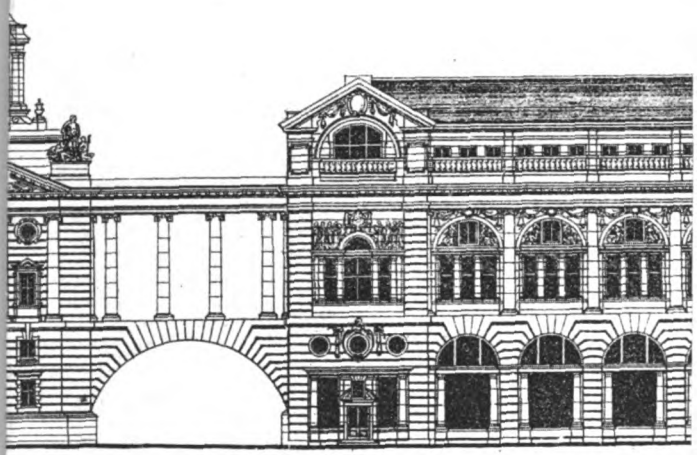

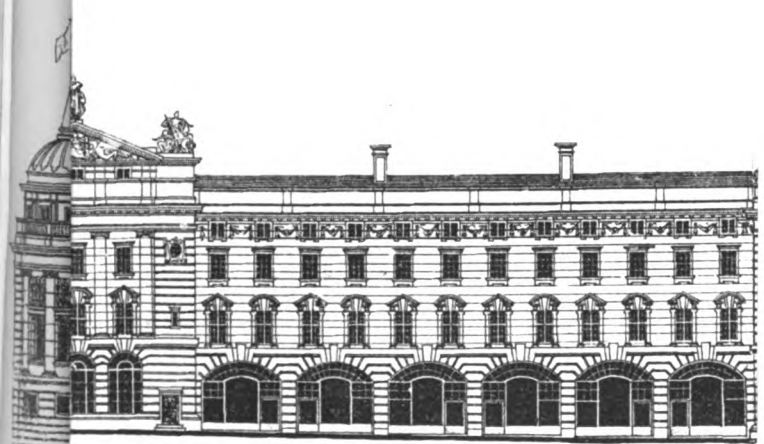

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The Builder.

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Ecclesiastical Dilapidations.

LORD GRIMTHORPE has recently published a Bill which he has drafted on the subject of Ecclesiastical Dilapidations. He is to be congratulated upon sticking to law and not venturing on architecture, for his very acute, if aggressive, intellect can do good service if it is applied to right purposes. But it is impossible for Lord Grimthorpe ever to refrain from having a tilt at some one, and on the present occasion he falls foul of the Diocesan Surveyor. Lord Grimthorpe plumes himself on having discovered that "the only three parties interested in a dilapidation question are the new incumbent, the outgoing one or his representatives, and the patron." This, he says, "nobody seems to have discovered before it occurred to me last year." This is a pleasant way of suggesting that the existing law is in some measure one for the benefit of diocesan surveyors rather than for that of the persons interested in a benefice. The main principle of Lord Grimthorpe's proposed measure is, therefore, to do away with the Diocesan Surveyor, with official interference and official fees. It has certainly the great merit of simplicity, and we willingly admit seems, with some modifications, capable of being turned into a useful measure; although, as we shall see, the proposal to extinguish the Diocesan Surveyor is futile.

Briefly stated, the operative part of the Bill is to this effect: as soon as a benefice is vacant the patron may inspect the buildings which belong to it. In other words, the surveyor will ascertain what is the extent of the dilapidations, if any. Thus he safeguards himself. Next, the new incumbent is to send to the patron and to the diocesan registry "a full description of the repairs and alterations, if any, which he proposes to do . . . . and may proceed with the same unless the patron, within a month after receiving the description, objects to any of the proposed alterations being made without a faculty." Assuming that there is no objection on the part of the patron, "the incumbent may proceed with the alterations as well as the repairs at his own expense, and when he has either paid or contracted to pay for them he may claim from the last incumbent so much of the cost of the works as he thinks himself entitled to . . . . with a statement of the grounds of the claim verified by affidavit." If there is further dispute the matter is to be settled by the Diocesan Chancellor. As the Diocesan Chancellor is not a surveyor it is obvious that the matter must, after all, really be disposed of by the Diocesan Surveyor.

The really desirable point in this proposed legislation is that the parties interested should, in the first place, come together themselves. The Diocesan Surveyor should be an umpire called in when parties cannot agree. But if this is to be so, then the new incumbent should send to the late incumbent or his representative a description of the dilapidations at the time when he sends his description to the patron, together with the cost of the same. It may be that the outgoing incumbent will pay the amount demanded; if so, there is no more to be said. If, on the other hand, he will not do so, then the surveyors of the two incumbents should meet and survey the building together; and if after that they cannot agree, then the Diocesan Surveyor should be called in as an arbitrator. Lord Grimthorpe does not forget that the incoming incumbent would like to have the cash wherewith to pay for the cost of repairs from the outgoing clergyman. If this is to be obtained it is pretty clear that the cost of the repairs must be sent to the late incumbent before the new incumbent has even "contracted to pay" for the required repairs, otherwise he will probably have to wait for some time before much work can be done.

We do not see the least advantage either in affidavits or in sending a description to the Diocesan Chancellor. What is needed is a practical and businesslike settlement of a purely technical building question, with as little expense, with as few fees, and as small an amount of ecclesiastical red tape and delay as is possible. If this object is to be gained, ecclesiastical officers and officials must be avoided. At the present time, when the incomes of the clergy of the Church of England are so greatly reduced from what they used to be, it is more than ever needful that the question should receive careful attention. In many cases the new incumbent has no money of his own with which to pay for repairs, and the late incumbent, or it may be his widow or his children, are still less able. Therefore, we have to bear in mind the sound old maxim that prevention is better than cure. The most practical way of dealing with this question of dilapidations is as far as possible to prevent them from arising. This is not impossible. If there were no dilapidations—or next to none—the now numerous cases would not arise of the representatives of a late incumbent being unable to pay the amount due from them. The English parson is not a person of much foresight, and he does not trouble himself, in many instances, much about the future—at least in the shape of dilapidations. The remedy seems to be easy. The patron, advised by means of a skilled agent, surveys the buildings of the benefice every second year, and such work as is required to be done should be notified to the incumbent, and he should thereupon either execute the work, or the patron should do it at the incumbent's expense. By this means a small periodical expenditure would prevent the demand for a considerable sum when the benefice becomes vacant. Some will say that the incumbent of to-day can often hardly make both ends meet. But sooner or later these expenses have to be met; it is more merciful to the clergy that they should be paid for in instalments, and it is much to the advantage of the buildings. In some cases a comparatively small expenditure early in the day would prevent a much greater expenditure in the shape of dilapidations.

If, after one of these periodical sur-

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veys, the incumbent appeals against the patron's demand on the ground that the work is unnecessary, then—but not before—the Diocesan Surveyor should be called in as arbitrator. He is usually an architect, and a great deal of the work required to be done after a periodical survey would be of so small a kind that the survey would be better placed in the hands of a person of less importance. The functions of the Diocesan Surveyor should be almost entirely those of an arbitrator.

In discussing this question of periodical surveys, no mention has been made of those sections which deal with the question of the Ecclesiastical Dilapidations Act, 1871—but for a very good reason, that they are ridiculous. Section 12 enacts that "it shall be lawful for the bishop, on the complaint in writing of the archdeacon, or of the rural dean, or of the patron of a benefice, that the buildings of the benefice are in a state of dilapidation, or at the request of the incumbent, to direct the surveyor to inspect the buildings." Thereupon a great deal of circumlocution may result in some repairs. But not only does this Section make no provision for periodical surveys, it practically prevents them, because such a survey as that referred to in Section 12 is the result of a complaint by an ecclesiastical superior. Therefore all concerned will try to avoid such a survey, resulting, as it necessarily does, in fees and expenses. What is needed is not a kind of punitive survey, but one of a business nature, not reflecting on the incumbent, but which he will regard as a business matter, in the same light as the annual inspection of the elementary school, its pupils, and its buildings by the Government Inspector. Of the Bill, which seems to have its rise in the Diocese of St. Albans and which has also been published, we say nothing, because it appears altogether unreasonable. The basis of it is an annual payment of 20 per cent. on the rateable value of the buildings, which shall go to a special fund, out of which dilapidation shall be paid. But why should an incumbent pay in advance? Why have more official machinery when it is so desirable to have as little as possible?

Lord Grimthorpe's Bill, with some amendments, might be made a useful measure; but as an incumbent is in principle bound to keep the buildings of his benefice in proper order, it is in the highest degree unbusiness-like not to take practical measures when incumbents shall allow them to fall out of repair. In other words, dilapidations should be prevented. That is a much more pressing and practical matter than how best to settle the question of dilapidations when an incumbent quits the benefice. There are hundreds of clergymen of the Church of England to whom this matter is of vital importance, and it is one which demands a practical remedy.

THE SCIENTIFIC STUDY OF ELECTRICITY.

PROFESSOR PERRY, in his Presidential address to the Institution of Electrical Engineers, gave a well-deserved rebuke to those electricians who are in the habit of sneering at mathematics. Some years ago, when mathematicians began to work out the theory of the new electrical apparatus that was coming into vogue, many of the results arrived at were erroneous, founded as they were on insufficient data or inaccurate assumptions. The practical man, finding their results of little use, preferred to waste thousands of pounds in workshop experiments rather than assist the mathematicians by publishing experimental data which would enable them to arrive at the correct theory. It has been the habit of many members of the Institution to sneer at theory, to point out how the usual vector diagrams were drawn wildly out of scale, and to assert that the best course for the youthful electrician was to be apprenticed straight from school to some well-known firm of engineers, where he would get a good workshop training. This course has been widely followed, and, as might have been expected, with disastrous results. There are many young working electricians now making laborious efforts to master the theory of their profession, which they could easily learn if they had a slight scientific and mathematical training, such as the Institution of Civil Engineers rightly insists that its junior members must have.

The scoffing tone in which so many electricians have in past years indulged when referring to theory has done the younger generation a great deal of harm. Most of the English electricians at the Paris Exhibition were astonished at the progress foreigners have made in the standardisation of electrical apparatus. Nearly all the dynamos were of the revolving fly-wheel type, and steel instead of cast-iron was nearly always used for the field magnets. That peculiarly English product, the two-pole continuous current dynamo, was not to be seen, and every machine gave evidence of the mathematical training of the designer. Professor Perry said that there is hardly one engineer of eminence in Switzerland, France, or Germany who has not passed with honour through the classes of one of their great science universities. Whilst many of our electrical firms have been blundering on trying to improve designs drawn up many years ago, many foreign companies, like the General Electric Company of America, have kept thoroughly abreast of the scientific progress of the age by means of their experts, whose reputation is world-wide. One has only to read foreign electrical journals to see how thoroughly they are awake not only to every advance in our practical knowledge but to every advance in theory. It is astonishing to find also that the highly mathematical papers appearing in these periodicals are often written by members of the staff of engineering firms or central stations.

Professor Perry said a great deal about the teaching of mathematics with which we agree, but we must dissent from his disparaging remarks about schoolmasters. His experience at Clifton must have shown him that it is not the schoolmasters who are to blame, but the system. So long as Civil Service and University examinations are conducted as they are at present, so long will the masters train the best boys in their present manner. No public school would keep a headmaster long who failed to keep up the record of university and other successes. We quite agree with what he says about "our wretched system of weights and measures," and the pity of it is that it is still necessary to go on pointing out the unnecessary brain labour we compel ourselves to undergo.

The President referred with justifiable pride to the new method of teaching mathematics that has recently been introduced into nearly all evening classes in science schools throughout the country. Most of the reforms introduced are those he advocated in a paper read before the Society of Arts in January 1880. It is a pity that when educational reforms were being accomplished something could not have been done to wipe out the teaching of statical electricity in evening schools. It is a subject of exceeding complexity, and the questions set are horribly puzzling and useless.

Professor Perry made a spirited appeal to the members not to allow the Society to degenerate into a mere trades-union, but to set up a high professional standard, encourage scientific research, and recognise the past services of scientific observers with gratitude and respect. To the outside public it must seem strange that such an appeal should be necessary to electricians whose everyday work utilises the discoveries of Franklin, Volta, Ohm, and Faraday. Yet perhaps it was necessary. We have heard appeals made to members not to be disloyal to the profession by pointing out, in the Press and elsewhere, some of the drawbacks, for example, of electric traction; any one who hinders the progress of the applications of electricity to industrial purposes being regarded as a kind of traitor. Again, some amongst what Professor Perry would call the "Calibans" of electrical engineering cynically consider that the object of the Institution is to promote legislation to enable members to make money as rapidly as possible. The President was unsparing in his condemnation of such soulless ideals, and he pointed out that, even from the commercial point of view, it was a very short-sighted policy to rush forward cheap and ill-considered schemes simply "because of the ignorance of legislators and of gas and water companies."

What the President was referring to was well if somewhat quaintly described by Mr. James Swinburne at a meeting of the Society last May:—

"The next element of cost that I do not think tramway people ever consider nearly enough is the eating of pipes. Of course, generally, the pipes are not ours and the cost need not be included. I suppose Tramway Companies fully understand the advantages of the English law on the question of eating pipes. The law, as far as I understand it, is this: if you are a private individual and eat anybody else's pipes, you are liable for damages; but if you are a public company or under an Act of Parliament, then you can eat pipes as much as you like, provided you take ordinary precautions and do not eat more pipes than you can help."

What Mr. Swinburne was referring to is, of course, the corrosion or eating away of gas and water mains by leakage currents from the tramway rails. This can be avoided altogether by having an insulated return for the current, but this is more expensive.

Professor Perry gave an eloquent justification of the action of the Royal Society Committee in insisting that the electric tramways in the neighbourhood of Kew Observatory should work on a system that would not disturb the magnetograph observations that were commenced there forty-five years ago. An eminent electrician, he said, had recently stated that it was an injustice to hamper the

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progress of electric tramways "for the sake of making observations that never have given and never may give to the world any important results." Considering the money and ungrudging labour that have been already spent in the endeavour to probe the secret of the earth's magnetism, it is no wonder that Professor Perry waxed indignant over the contemptible utilitarianism of this statement. "Surely I need not appeal to your cupidity, but it is quite possible that our knowledge of this secret may enable us to tap a tremendous store of Nature's energy." Altogether the opening meeting of the session was a most successful one, and it augurs well for the profession that the Institution has a thoroughly popular President, who is unsparing in his condemnation of our shortcomings as electrical engineers.

NOTES.

The London Water Question.

AFTER a long discussion, the London County Council on Tuesday decided again to promote a Bill in the forthcoming Session for the purchase of the Water Companies. It does not appear that even those who voted in favour of the measure have any belief that it will be passed. Mr. H. P. Harris, in moving an amendment that a Bill should be introduced to give effect to the main principles of the Report of the Royal Commission, said that in his opinion a Bill for purchase and a joint authority would have a much better chance of going forward than any such Bill as was now proposed, but his amendment was lost by 70 to 44. A further amendment by Mr. Campbell, to the effect that the matter of initiating legislation on the subject should be left to the Government, who should be asked to bring in a Bill on the whole question, was also lost, and finally the original recommendation of the Water Committee was carried by 71 to 43. It is pretty obvious that the real motive of the County Council in proposing a Bill which, in view of the Report of the Royal Commission, they obviously cannot expect to carry, is a desire not to be left out in the cold. They have been especially stung by the fact that the Royal Commission, in sketching out their ideal of a joint authority for water supply, only proposed to allot them a proportion of one-third in the representation. There is no doubt some reason in their attitude in regard to this point, as the Water Committee urge in their Report—"Seeing that three-quarters of the population supplied by the Companies reside in London, and that of the rateable value upon which water rate is charged 84 per cent. is within the county, we cannot believe that members representing London, whatever their views as to the general question of a Trust, can assent to this proposal which so manifestly ignores the predominant interests and rights of the metropolitan ratepayers." It would seem reasonable that the Council, which represents the majority of ratepayers concerned in the water question, should in any such scheme have a larger representation than this. But the fact is that the Parliamentary as well as the public mind has been seized with a decided scepticism as to the ability of the London County Council to deal with the water question; a scepticism certainly not without basis. The ostensible argument put forward for the Council's proposed Bill—that of keeping the purchase question alive in Parliament,—is however not without its point. Purchase of the Water Companies, on some terms at all events, is not only desirable but practically inevitable; and it is no doubt true, as the Water Committee again urge, that the longer it is delayed the more it will cost. There may therefore be something to be said for the policy of keeping the spur applied, and ensuring that there shall at all events be a purchase Bill before Parliament, even though its failure be a foregone conclusion.

The President of the Local Government Board.

THE Local Government Board is a Department which is so much concerned with details and so little with policy that it is one largely ruled by the permanent officials. The President is, therefore, of less importance than in some other offices. But the resignation of Mr. Chaplin and the appointment of Mr. Long are certainly in the public interest. Mr. Chaplin is a sporting country gentleman, about the last person in the world to preside over a Department concerned with sanitation, working-men's dwellings, London water supply, and similar matters. Mr. Long is something of the same kind, but more of the administrative country gentleman, such as are doing good work on County Councils. He is younger than his predecessor and more likely to desire to make a name for himself, and has also had some administrative experience, and has shown some independence both administratively and politically. It is probable, therefore, that he will exercise a more personal influence than Mr. Chaplin; and if he is moved to press any point on Local Authorities, whether rural or urban, he is not likely to let it drop. It is to be hoped that Mr. Long will give special attention to the carrying out by Local Authorities of existing laws. As we have said many times, it is not new legislation which is needed so much as the putting into force of the present law.

Sir F. Bramwell's Street Proposal.

IN suggesting, in the *Times* of Wednesday, an application to new London streets of a modification of the method adopted in the Rows of Chester, Sir F. Bramwell has rather misled his readers as to the precise conformation of the Chester Rows. They do not supply, as he suggests, two tiers of first-class shops one above the other, and two lines of foot passengers' pavement. On the road level at Chester there is either no foot-walk or only a very narrow one, and the space beneath the Row is not available for shops—it is not high enough; only for stores and trade entrances. Sir F. Bramwell's proposal is for first-class shops and a broad pavement on the street level, while the upper walk, answering to the Chester "Row," would necessarily be some 15 ft. higher, involving a flight of some twenty-five to thirty steps to reach it. The Chester Rows are reached by flights of only ten or a dozen steps. The admirable architectural effect of the Chester Rows, with their open gallery, would be entirely ruined by Sir F. Bramwell's "one variation" from them, by which the upper part of the buildings projects part way over the "Row," with no visible support. There is no constructional difficulty in this, but the appearance of a whole length of shops with the upper part overhanging to this extent would be anything but satisfactory in an architectural sense, while the shelter afforded in stormy weather would be but very partial. The Chester Rows are no doubt, both in regard to architectural appearance and comfort to the public, an almost ideal form of city street. From the point of view of the shop-keepers there is the drawback of an interference with light and air; but on the whole the Chester Row in its entirety would be far better worth carrying out than Sir F. Bramwell's proposed modification of it. There is one point that must be remembered, however, viz., that in such a city as London the employment of two-storied streets would necessitate the doubling of the police patrol. The foot-passenger bridges which form part of Sir F. Bramwell's scheme are no new idea; they have often been suggested for London; but they could be carried out by the provision of special stairs at each end of them, without involving the adoption of the Row system.

Proposed Widening of London Bridge.

ACCORDING to a statement in the *City Press*, the Bridge House Estates Committee are recommending the widening of London Bridge by granite corbelling on which the footpaths will be projected so as to be increased from 9 ft. to 14 ft. This is not so bad as the former proposal to have an iron balcony, but it is hardly possible that it can be carried out without spoiling the appearance of the bridge, and the design ought to be publicly exhibited before anything definite is done about it. Considering that the whole clamour about the inadequacy of the bridge has been made hitherto in reference to the vehicular traffic and the roadway, it seems really preposterous that we are now to be asked to allow the disfigurement of the bridge by a scheme which will not relieve the vehicular traffic, but will leave the roadway just as it was.

The Memorial Bridge, Washington.

IN preparing designs for the National Memorial Bridge to cross the Potomac River at Washington, the successful competitor, Professor W. H. Burr, voluntarily adopted the course which we have consistently advocated as the proper one to be followed in all such cases. Two distinct designs were submitted by Professor Burr, who received assistance in architectural matters from Mr. E. P. Casey. The difficulty which the modern engineer appears to find in conforming with artistic requirements is emphasised by the fact that although Professor Burr was awarded the first premium, neither of his schemes was accepted in its entirety. As a matter of fact, the judges decided that the engineering features of one design, and the architectural features of the other should be adopted, and it is considered that the result will be an extremely dignified and beautiful structure. Briefly described, the bridge will consist of a bascule span, of 159 ft., for the navigable waterway, and on each side three concrete and steel arches, each of 192 ft. span. The Washington approach will comprise 550 ft. of embankment, and twelve 60-ft. semicircular concrete and steel arches. On the Arlington side of the river the approach is to include 1,450 ft. of embankment and fifteen arches of similar form and construction to those on the Washington bank. The heavy Roman arches originally intended to surmount the

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bascule piers are, fortunately, to be replaced by piers more in keeping with the main structure and its situation. Other advantageous modifications are to be found in the adoption of curved instead of straight lower chords in the bascules; and in the employment of a curve of greater radius for the bascules than for the side arches, thus preserving in the bascule span a form appropriate to its natural uses. The piers in and near the navigable channel are to be built on "bed-rock" by the pneumatic process, the caissons being filled with concrete, and the remaining piers will be built up within coffer-dams. Masonry arches and towers will mark the principal divisions of the bridge, and they are to be decorated with bas-reliefs and statuary commemorative of the foundation and development of the American Republic. The bascule arms, supported on trunnions, will be counterpoised by backward extensions and weights, and they are to be operated by electric motors. Instead of following the original idea, which involved upper and lower roadways, the new bridge will have a single deck, with a roadway 60 ft. wide, for tramway and ordinary vehicular traffic, and two paths 12 ft. wide for foot passengers.

Rural Cottages.

A CORRESPONDENT of the *Times* "E. D. T.," gives some details of a scheme on which he and others are engaged in Kent with a view to some kind of solution of the housing problem in rural districts. It is proposed to purchase land at 50*l.* per acre, and divide an acre into five parts, and sell each plot. On this is to be erected a bungalow cottage, which, together with the land, it is estimated will cost 150*l.* It is pointed out that a payment of 6s. a week would enable a man to obtain a life policy of 150*l.*, repayable in twenty years, so that for this annual sum he could insure his life and pay off his mortgage. In other words, for about the same sum as he now pays as tenant for a cottage he would eventually become an owner. There is no doubt that these bungalow cottages, and others of various kinds, of iron, might be erected in country districts, but it is doubtful if in all cases they would be passed by the Local Authority. The question of local by-laws in regard to buildings is one which requires investigation. These by-laws do not prevent jerry-building, and yet at the same time they often prevent the erection of convenient outhouses and additions which would add much to the habitability of small dwellings.

Mr. Albert Goodwin's Exhibition.

THE title, "In Praise of all the Churches," which is applied to the collection of drawings by Mr. A. Goodwin at the Society of Fine Arts Gallery, merely shadows forth the fact that in nearly all the subjects a church or cathedral is introduced. They are a beautiful collection of over sixty pictures showing a great variety of style and colour, and some of them suffer from that over-refining of effect which gives a scene more the look of dreamland than of open-air Nature, though their charm is undeniable. Among the best are "Torre Annunziata" (9), with its Classic dome; "Thun" (10); "Durham" (33), and "Wells (Twilight)" (39). There are others of a less dreamy character, such as "Rye Church and Town" (2), and "Hastings" (8). The large painting of "Vanity Fair" (58), with the Celestial City seen above, beneath two immense bridges which span the valley, is a fine ideal scene. Considering how long this artist has been drawing architecture, it is surprising to find that there are oversights in regard to perspective; in "The Jews' House, Lincoln," for instance (19), the west towers are not quite right in relation either to each other or to the central tower; in "Durham" (33) the centre tower is not in line with the western ones; in "The Domes of Pisa" (34), the baptistry leans as well as the "leaning tower," though not quite so much; and in "Wells" (39), the north tower appears considerably lower than the south one. Among the sketches in which a powerful landscape effect is the principal object, "Sunset after a Storm" (36), is a fine effect, and also "The Sultan Discovering the Palace of the Young King of the Black Isles" (54), an Arabian Nights illustration, and weird enough for the subject.

The Modern Gallery.

OF the collection of drawings of cathedrals by Mr. Herbert J. Finn, at the Modern Gallery in Bond-street, some have we think been exhibited before; we seem to remember, at any rate, "Morning, Canterbury Cathedral," and "The Cloisters, Canterbury;" the latter one of the best, giving very well the effect of the time-worn masonry. The exhibition includes a number of mostly rather large water-colours of Lincoln, Canterbury, and Ely; that of the west front of Ely is a fine and effective drawing, but does not give the true character of the side tower. Generally speaking, Mr. Finn's style of treating architecture pictorially is not exactly satisfying to architects; there is too ragged and washy an effect about his buildings. "Lincoln Cathedral, Morning" (43) is one of the most satisfactory, because it represents a misty morning in which the general composition only can be seen, without much of the detail. In most cases the effects are good, but there is a want of the texture of stonework and the solid structural appearance of a building.

The New Gallery.

THE exhibition of the "Society of Portrait Painters" at the New Gallery contains no portrait of the highest order, and there are a good many rather hard and commonplace paintings; but there are some works marked by individuality of style and treatment, and some very good ones of the class of well-painted portraits with good execution of dress and accessories; satisfactory as pictures and probably as likenesses, though not calculated to arouse enthusiasm. Among those distinguished by special character may be named Mr. C. H. Shannon's conventionally arranged group in the old style, "The Bunch of Grapes" (32), portraits of a mother and daughter; Mr. Guthrie's "The late Alexander Osborne" (48), a grim kind of likeness of a grim elderly gentleman; Mr. Kennington's decorative picture of "A Lady in a Venetian Dress" (59); Mr. Brough's of "The Hon. Bernard Maxwell" (62) in a hunting costume—a very broad and free piece of work; Mr. F. Carter's "Miss Jessie Phelps" (116), a very expressive portrait which might have been more prominently hung; and Mr. Jack's "Ron" (122), a boy in a red hat with a dog at his side. All these have something special in character or treatment which gives them an individual interest. Among those which, without possessing special character, are excellent specimens of portrait painting, we may class Mr. Lavery's "Mrs. Stewart Clarke" (8); Mr. Collier's "Joyce" (26), a girl in a red dress; Mr. Jack's "Mrs. Donald Smith" (52); various portraits of ladies by Mr. Blake Wirgman; and Mrs. Jopling's expressive head of "Lady Danvers" (68). A small picture by Mr. Watts, "A Study" (87), hangs among the portraits as a kind of voice from another world.

The New English Art Club.

WE fear the New English Art Club, whose twenty-fifth exhibition is now open at the Dudley Gallery, is almost ceasing to be an artistic event of any importance. It still retains Mr. Furse, who exhibits an equestrian portrait of a huntsman and a vigorous sketch for a portrait of Lord Roberts. Miss Alice Fanner hardly equals her previous efforts in vigour and freedom, though the group of houses in her "Richmond on the Thames" stands out finely. The most noticeable things after these are certain studies of sunlight on foliage, as in "The Avenue" (63) by Professor Brown; "A Wooded Lane" (86), by Mr. W. W. Russell; and "A Sewing Lesson" (43), by Mr. Hugh Carter, which adds the interest of two pleasing and expressive figures. Mr. Rich's "Shoreham" and "Closing Day" (19 and 20) are small landscape studies with an individuality of style; Mr. Kneen's "Beach at Aber" (52) shows a fine sky; Mr. J. Henry's "Kent Cornfields" (54) and "The Mill-pond" (112) are good sketches; and though Mr. Wilson Steer's "The Home Meadow" (98) appears a mere blotch on a close view, we must admit that from the opposite side of the room it really looks quite like a landscape with an atmospheric effect. This is not much, however, to pick out of 126 pictures, and none even of these we have mentioned can really be called important works. As to some of the performances among which one has to grope in search of art, we commend the visitor's attention to (among others) Nos. 11; 34 (a collection of colour blots); 35 (this looks like a child's early effort at drawing a scene); and 39, of which the title and the intention are alike unintelligible.

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

VIII.—CATALOGUE RAISONNÉ OF EXAMPLES.

(Concluded.)

DISTRICT VIII. A.—DURHAM and NORTHUMBERLAND.

WE follow here the arrangement explained in the last paper, and notice first the Saxon features of the buildings generally, to the exclusion of the square west towers of the special class, which will be treated presently in connexion with those of District VII. In this northernmost region occur some of the most interesting examples in the whole country, and Monkwearmouth, Jarrow and Escomb, in Durham, Hexham and Corbridge, in Northumberland, are deserving of special mention. Monkwearmouth porch is, perhaps, the most remarkable monument of pre-Conquest architecture and suggests problems not easy of solution.

DURHAM.

The extreme south of the county gives us at *Sockburn-on-Tees* a ruined chapel with clear signs of a pre-Conquest date. Aycliffe, near Darlington, is catalogued by Mr. Hodges as pre-Conquest, but the criterion is only the somewhat hazardous one of the character of the masonry. The same may apparently be said of Staindrop, near Barnard Castle (not seen by the writer).

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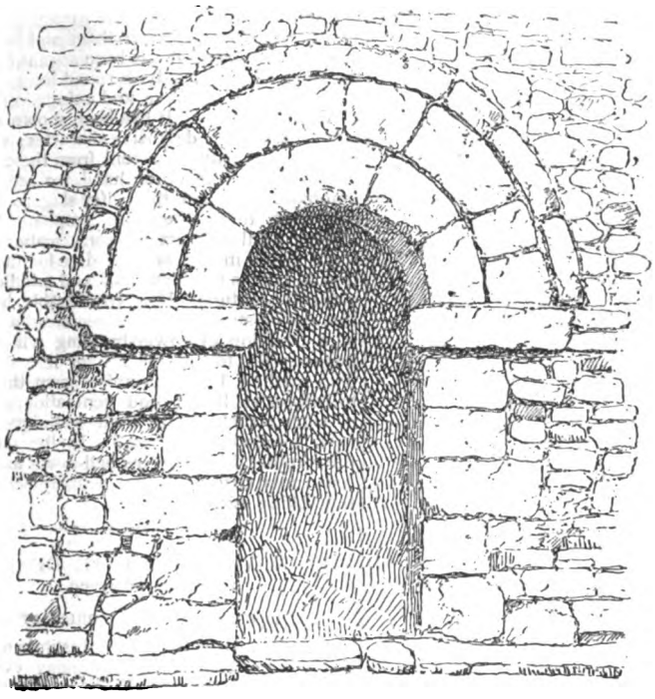

Fig. 27.—West Doorway of Tower, Clee, Lincolnshire.

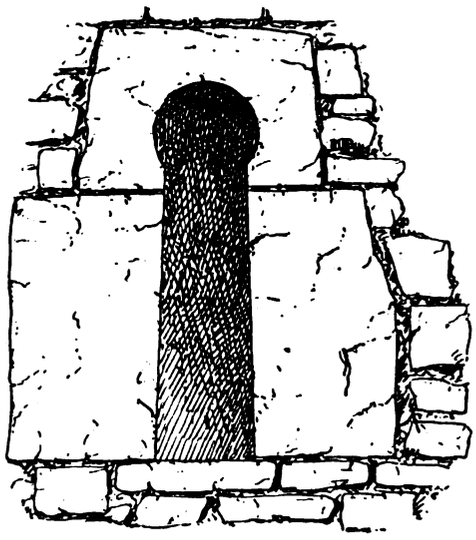

Fig. 28.—"Keyhole" Light, West Face of Tower, Clee. (Height 2 ft. 8 in.)

In the Stockton neighbourhood occur three good examples.

Norton is a fine cruciform church with central tower. This and the transepts are Saxon; the former has characteristic openings, the latter big-stone quoins.

Billingham, besides its tower, noticed below, seems to have preserved its Saxon nave, attested by its lofty and narrow proportions.

Hart.—The evidence here is not so distinct, but parts of the existing edifice appear of Saxon date. The discovery of turned baluster shafts similar to those at Monkwearmouth and Jarrow is in favour of this ascription.

Escomb, near Bishop Auckland, is conspicuous in the first rank of existing pre-Conquest monuments as a complete and almost untouched church of the Early Saxon period that has remained in use, so far as we know—save for a few recent years—from the time it was built until now. It has a nave and square-ended chancel, a chancel arch that may be Roman, and door and window openings of very early character. It is fully described, as are all the other early monuments of the district, in the above-noticed papers in "The Reliquary."*

Monkwearmouth.—The Saxon remains here were described in the *Builder* for October 12, 1895. They consist of a west porch, on the walls of which was subsequently reared a tower, with the west wall, and possibly the south wall of the church. The outstanding features of the structure are, first, the facts that the porch is covered with a barrel vault, of a kind that occurs in the crypts of Wilfrid at Hexham and at Ripon and nowhere else in existing Saxon work, and that the west window in the chamber above it is of the Classical form only found at the seventh-century church at Brixworth; and next, the occurrence of elaborately turned baluster shafts and figure and animal carving of a remarkable kind. There is very strong evidence, both monumental and historical, connecting this work with the contemporary of Wilfrid, Benedict Biscop, who founded the monastery of Wearmouth about 674 A.D. The tower above the porch is much later, but has a pre-Conquest character. The nave is about 66 ft. long to the present Early Norman chancel arch, and the Saxon nave was probably the same.

Jarrow.—It seems likely that we possess in the present chancel of the church of St. Paul at Jarrow-on-Tyne a portion, at any rate, of the nave of a church built here when the monastery of Jarrow was founded at about the same time as that of Wearmouth. The tower which comes before this chancel is certainly Early Norman, and can be dated at about 1075. A large collection of turned baluster shafts of a kind only found in this part of the country is preserved in the porch of the present church. They came from another old Saxon church on the site, destroyed in 1783, that had a nave of the remarkable length of 28 paces by a width of only 6 paces, and a height of wall of nearly 30 ft.*

Hexham.—The crypt under the central tower of the present abbey church is very similar to that at Ripon, and was constructed by the orders of Wilfrid about the year 674. The Hexham crypt is largely composed of Roman worked stones, that were abundant in the neighbourhood of the great wall and Roman stations. The plan differs from that at Ripon in that it seems to pre-suppose a church with its altar end to the east, while at Ripon the contrary orientation is indicated. The extensive works now in progress at Hexham may result in bringing to light the foundations of the nave of Wilfrid's famous church, and establishing on monumental evidence the nature of its plan.

Heddon-on-the-Wall possesses some good remains of l. and s. work at the south-east angle of the nave.

Corbridge, where one of the great Roman roads to the far north crossed the wall on its course into Caledonia, possesses a pre-Conquest church in which the square west tower has been erected on the walls of an earlier porch. The opening from this former porch, now the lowest stage of the tower, into the church is through a grand arch, 16 ft. high by 8 ft. 2 in. wide, peculiarities in which show that "the arch has been bodily transferred from a Roman gateway." The side walls of the nave, broken through by later arcades, are original, and have marks of the old internally splayed windows, specimens of which are preserved in the west wall of the church and also above the west entrance to the porch.

Lindisfarne.—Some masonry in the lower part of the chancel walls of the Norman priory church, and also (possibly) the foundations of an apse earlier than the present east termination, may be remains of the pre-Conquest church which was removed to make way for the present structure.

Whittingham.—Only the lower portions of the original square west tower are here preserved, but they exhibit l. and s. work in the quoins as well as in the western quoins of the adjacent nave. The tower had till 1839 mid-wall work with baluster shafts on the belfry stage.

DISTRICT VIII. B.—It is proposed to deal in a final section with the class of square western towers in the four north-eastern counties, called in these papers "Lincolnshire bell towers," that agree in certain special features of which the most characteristic is mid-wall work in the belfry openings, but are not furnished with the regular Saxon criteria, such as l. and s. quoins, pilaster strips, double-splayed windows, or baluster shafts, on which in the previous papers reliance has chiefly been placed. Towers like Barton-on-Humber, which do exhibit these features, have been already dealt with along with the rest of the monuments. It will be convenient to give a list of all the towers in question in geographical order from south, and afterwards to comment on them, not singly, but in groups.

LINCOLNSHIRE.

In the south part of the county there is *Great Hale*, and the obviously late examples of Boothby Pagnell and Syston, which show mid-wall work. *Coleby*, *Harmston*, *Branston*, and *Bracebridge* are on or near the Cliff road as we approach Lincoln; *St. Peter-at-Gowts*, *St. Mary-le-Wigford*, and *St. Benedict* in Lincoln itself. North of Lincoln and west of the Ermine-street a compact group consists of *Marton*, *Great Corringham*, *Heapham*, *Springthorpe*, *Harpswell*, and *Glentworth*.

On the wolds to east, between Market Rasen and Grimsby, there may be counted *Hainton*, *Rothwell*, *Nettleton*, *Cabourn*, *Swallow*, *Scartho*, *Clee*, *Holton-le-Clay*, and *Waith*. Grainsby is not one of the class, while *Worlaby*, *Winterton*, and *Alkborough* are to be found in the northernmost section of the county.

YORKSHIRE.

[Maltby near Rotherham, Leathley by Otley, Weaverthorpe, Kirkby Grindalythe and Stonegrave on the wolds, are early, but have no pre-Conquest signs. The characteristic mid-wall work, however, occurs at *Monk Fryston*, between Selby and Leeds, and also at Hornby, near Bedale, as well as in the following from the wolds:—*Wharram-le-Street*, *Appleton-le-Street*.

DURHAM.

This county furnishes the towers of *Billingham* and *Monkwearmouth*, while Jarrow, though not Saxon, must be referred to for comparison.

NORTHUMBERLAND.

This county, besides the already-mentioned Corbridge and Whittingham, contributes well-marked examples. In the Tyne Valley are *Ovingham*, *Bywell St. Andrew*, *Warden*, and further north *Bolam*.

This gives us about forty examples of square west towers, thirty of which exhibit mid-wall work in the belfry openings, while the belfry stage in the others* is later, but was almost certainly treated originally in the same manner. They have *ex hypothesi* no other feature which is in itself a convincing proof of pre-Conquest origin, though the strip work that surrounds the belfry openings at Wharram-le-Street, Billingham, Monkwearmouth, Bywell, and Ovingham, might be reasonably claimed as such a feature. They show a native and non-Norman character (1) in being unbuttressed (Hornby is the one exception); (2) in their tall and slender proportions (this is by no means

* 1893-94

* Hutchinson, "History of Durham, 1787," ii. 475.

* Viz., Cabourn, Coleby, Hainton, Halton-le Clay, Nettleton, Springthorpe, Swallow, Worlaby, Warden.

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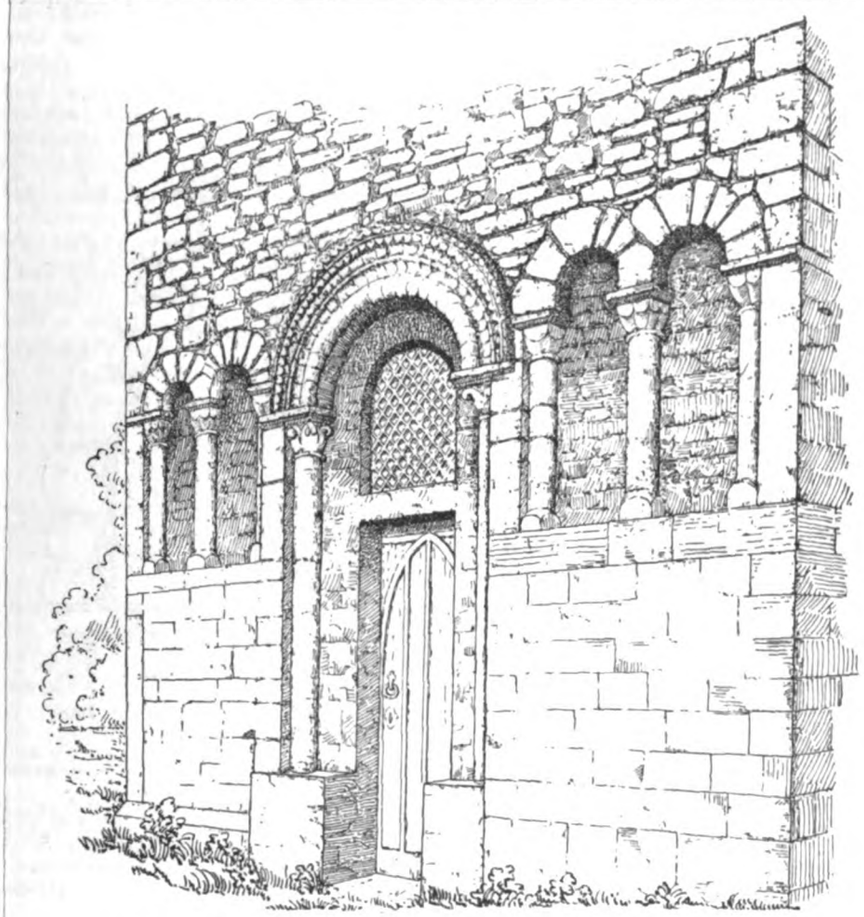

Fig. 29.—Arcading in Lower Stage of Tower, Branston, Lincolnshire.

universal, for some examples of the class, such as Harpswell, are of very sturdy build); (3) in some remarkably plain but well-constructed west doors, of which fig. 27 gives a good specimen;* (4) in occasional loops of a curious keyhole form, which does not seem to have been noticed on the Continent† (fig. 28); (5) in the cubical caps of the belfry openings, for which see *Builder*, August 6, 1898. On the other hand, there are distinctly Norman or even later features in the clasping corner buttresses at Hornby, the west door at Boothby Pagnell, and the mouldings in the belfry openings at Syston, while diagonal tooling in the Norman form occurs at Alkborough, Clee, and elsewhere, and the herring-bone masonry at Marton is very Norman in character. Branston has arcading of Norman character on the exterior of the ground story (fig. 29). Neutral features, such as plain tower arches with chamfered imposts and internally splayed loops, are common, and with these may be noted the absence from the quions of l. and s. work. No one of the two score examples now under consideration exhibits l. and s. quoins, though these are sometimes to be found on the adjacent west corners of the nave, as at St. Peter-at-Gowts, Bracebridge, and Rothwell. The towers vary in the presence or absence of plinths, sets-off, and horizontal string-courses. Great Hale is about the only one that is absolutely plain, and this example is also unique in the possession of a narrow turret stair in the thickness of the wall at the north-east corner. The upper stages of all the rest are only reached by ladders, and nearly every one has a door-like opening to the church above the tower arch. No one has, or rather had originally, a vaulted lower stage save Monkwearmouth, and here the vault belongs to the earlier porch, not to the tower superimposed upon it. No one seems to have retained its summit unaltered, but, as a rule, save where there is a later spire, they end flat with more or less modern battlements. On the question of the original termination the following may be noted. None of the forty show signs now of any other kind of ending than the flat one with which they have actually come down to us. A comparison with other examples not in this special class contributes some relevant facts. St. Benet's, Cambridge, the l. and s. quoins of which go right up to the summit, looks as if it always ended with its present flat top. Sompting has the German "Helm." Corbridge, according to Mr. Hodges, had its east and west walls surmounted by gables.* Some early Norman towers in the Duchy ended flat (Lion-sur-Mer, Luc-sur-Mer), others with a pyramidal cap (Ver, Thaon) and such a cap exists in the Norman towers at Penmon and Priestholme, in Anglesea, in the latter instance certainly original like that at Thaon. The examples vary in the presence or absence of a west door, but this exists in fully half the total number, and, though the lower windows are generally mere loops, there is no sign that any of the towers were built or used for purposes of defence.

Putting together these facts about this interesting class of pre-Conquest monuments, we may conclude as follows. The type is certainly Saxon, for the special characteristic of mid-wall work occurs elsewhere in connexion with other pre-Conquest features. There is nothing inconsistent with pre-Conquest origin in the occurrence of recessing or angle shafts or diagonal tooling in the west doors or tower arches, for the west door of about 1060 at Kirkdale shows all these features. On the other hand, three or four examples already noticed are certainly post-Conquest, and some of the others, such as Marton, Harpswell, and Appleton-le-Street, look late in technique or detail. It is clear that they represent a native building tradition that survived the Conquest, and this gives them one of their special claims to attention. Though St. Peter-at-Gowts and St. Mary-le-Wigford, at Lincoln, may not be Colswegen's towers, it is clear that Colswegen's contemporaries and successors would be carrying on this traditional work even under Norman lords. When and under what circumstances the type originated is another question.

The occurrence of these towers in such large numbers in the north-east counties that received the bulk of the Danish incomers in the ninth and tenth centuries makes it natural to surmise some connexion between them and this epoch of our history, and it has been sought to find in them parallels to the Irish round towers, which were places of defence and refuge in the days of Viking inroads. It has been shown already, however, that the defensive character so marked in Ireland is entirely absent from these towers, in which, on the other hand, we see marked emphasis laid upon the belfry stage, so that, as we have them, they are emphatically bell towers. All the architectural features about them point, moreover, to a date for their erection as late as the first half and middle of the eleventh century. It is conceivable, however, that the existing examples represent a survival of a tradition of tower-building which really began with towers of refuge like the Irish. The existing Irish examples seem themselves to belong to the second generation, so to say, of such structures, as their technique is, as a rule, somewhat advanced. In the same way the familiar Lincolnshire bell-tower may represent ruder structures that actually belonged to the Viking age.

* Doorways of this type, to which a certain Doric massiveness and simplicity lend marked character, occur at Heapham and Springthorpe and at Cabourn, Swallow, Rothwell, Scartho, and Clee—all in the country between Gainsborough and Grimsby. Elsewhere they do not appear.‖

† Save in these towers (all of which are in the north division of Lincolnshire) the key-hole opening seems only to be found at Langford, Oxon.

* *The Reliquary*, January, 1893, p. 14. Such gables have been given to the conjectured early form of Barton-on-Humber, in fig. 25, *ante*.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

EXCAVATIONS IN THE FORUM AT ROME.

A MEETING of the Royal Institute of British Architects was held on Monday evening at 9, Conduit-street, Mr. William Emerson, the President, in the chair.

The minutes having been taken as read,

Professor Lanciani gave a lecture upon the "Architectural Results of the Latest Excavations in the Forum at Rome." He explained that the remarkable success of these excavations in a district which had been so often searched and laid bare was due to the fact that former excavations had always stopped at the higher level of ruins. As soon as the pavement of a street, house, or public building had been exposed to view they were asked to stop without being able to ascertain whether under those structures of the late Empire there were deeper and older strata of even greater archæological interest. As it was known that the Roman Forum and the region of the Via Sacra had been swept by fire and rebuilt at least four times under the Empire, it was at last determined to probe that sacred piece of ground down to the level of the virgin soil wherever it was possible to do it without injury to the higher and later structures. The results surpassed their most sanguine expectations, especially from the archæological and historical point of view. The architectural discoveries, too, though modest, nevertheless merited special notice. By means of a series of photographic lantern slides the lecturer conducted his hearers over the Forum and the Via Sacra, starting from the Comitium, and directing attention to and discussing the various objects of interest the excavations had brought to light. Nearly two years had elapsed since the finding of the monument which they had identified as the Heroon, or empty grave of Romulus. The controversy about the nature, date, and object of the monument had been decided in their favour, and it was now admitted that this was really the identical monument raised in honour and in memory of Romulus at the time when Rome was still ruled by the kings. The deification of Romulus was not a late Greek fable, as some recent critics contend, but a fact proved conclusively by these recent discoveries. The Heroon is or was composed of six parts or elements—namely (*a*) the Cœnotaph or empty grave, (*b*) the two lions which guarded it on either side, (*c*) the pillar of honour, (*d*) the stone inscribed with the *lex loci*, (*e*) the altar, (*f*) the sacrificial stone. The whole group was found embedded in layers of sacrificial remains such as charred bones of victims, small vases, clay discs representing cakes, figurines of bronze, bone, or clay representing men and women in the stiffness of death, and as it lies at a considerable depth under the level of the Imperial Comitium, so its site was indicated by a square enclosure surrounded by a marble transenna and paved with black stone, the famous "lapis niger" of Festus and Varro. The Cenotaph was found filled up with earth and decomposed organic remains, without any trace of a cinerarium or ossarium. This is in perfect accordance with the Roman tradition, and the popular belief in the fate of Romulus. The abundance of organic matter in the earth

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which filled the grave was due to the practice common in those times of slaying the victims so that their blood might flow inside and give joy and satisfaction to the spirit of the hero and appease his wrath. The mysterious and irresistible power of the same spirit was symbolised by one or two lions. The interest of this chain of discoveries culminated in the inscribed stele or pyramid still standing after twenty-six centuries in the identical site in which it was set up at the time of King Numa or King Servius. The inscription engraved on this rough block of tufa has been given the place of honour among the 95,000 epigraphic documents which have been collected all through the Roman Empire for the *Corpus inscriptionum*. It precedes by a couple of centuries what was considered up to the date of its discovery the very oldest specimen of the Latin language and Latin palæography, the so-called cup of Dvenos, now in the Berlin Museum. Mutilated as it is, and containing some 60 per cent. of words hitherto unknown, an interpretation of the inscription is at present impossible, but judging from the signification of the words which have passed into the Latin tongue, the stele must have contained regulations issued by the king-high-priest in connexion with hero-worship at the grave of Romulus. Continuing along the Via Sacra, Professor Lanciani referred to the results of the geological exploration of the ground, showing how the primitive path, which was irregular and winding, had gradually been transformed, until, as buildings were erected on either side, it took a definite shape and was made to turn four or five times at right-angles. Coming to the newly-discovered monument, the Basilica Æmilia, the lecturer said they had learned by experience the possibility of this extraordinary fact—that a building of the first magnitude like the Basilica Æmilia, proclaimed by classic writers the finest of its class in the world, could have been excavated to the very root of the foundations, deprived of its hundred columns, that tens of thousands of feet of its gracefully-carved marbles could have been burnt into lime or turned into new shapes and purposes, without a single record being left of the titanic deed of destruction. Having briefly sketched the history of the place, the lecturer said that they had now learned that the building must have been gutted and wrecked in the great fire of 283 under the Emperor Carinus ; and that it was hastily and disgracefully restored by the Emperor Diocletian in the clumsy style which characterised the patchwork of the Decadence. They had also learned that whatever parts were left standing of the Basilica at the end of the fourth century were pulled down to make use of the materials for the building of the Church of St. Paul on the road to Ostia. The lecturer added, by way of consolation, that by tracing the lines of the foundation walls and by sorting the fragments of its architectural decorations, they had been able to reconstruct the original design in plan as well as in elevation. A drawing of the restoration, the work of Signor Giuseppe Gatteschi, was shown by the lantern. The Temple of Antoninus and Faustina, the next building reached, had been freed by their latest operations from its ignoble surroundings, and also restored to its original height and to its original perspective point of view. The pavement of the Via Sacra which runs in front of the Pronaos is 4 ft. higher than the original one, and there were five steps of the original stairs buried under the mediæval pavement. These steps have been uncovered, and the temple now appears in all the noble proportions of its original design. Discussing the Regia and its remains, the lecturer dealt particularly with two interesting relics of the building—viz., the circular structure in the inner hall, and the storepit or underground tholos. The former is suggested to be part of the sanctuary in which the spears of Mars were kept, while the storepit and the altar have been identified with the *Ops Consiva*, whose presence and worship in the Regia are attested by historians of early Rome. The spears of the Regia were venerated as the weapons of Mars. They were wooden rods with metal points, and two have actually been found in the present excavations. The chapel in which they were kept was a genuine seismographic observatory, where earthquakes were observed and registered. Leaving the Regia, the lecturer next drew attention to the House of the Vestals, relating incidents in its history and particulars about its architecture lately ascertained. Entering the cloisters of the Vestals, the first monument met with is the pedestal of Claudia, the first and the only princess of Vesta who gave up her exalted position to embrace the Christian faith. Across the Via Nova one enters the newly-excavated colossal temple of the deified Roman emperors. Architects will find the temple a new and unexpected subject for study, so different are the plan and elevation of the building from any known design of a Roman public building, and so wonderful is its preservation. The building does not stand isolated on its own ground but is connected with the Palace of Caligula and with the state stairs that descend to it down to the level of the Forum. It was already known from the discovery of other such stairs in the Palace that the Imperial architects—possibly the Emperors themselves—objected to steps, and that whenever the plan of the building allowed it, they substituted for steps inclined planes, with an easy gradient of six or seven in a hundred, interrupted by horizontal landings. The newly-discovered descent from the Palace of Caligula to the Temple of the Emperors is designed in the same way. Lastly, the lecturer described the Imperial warehouses for Indian goods, brought to light in the excavations. This establishment, officially styled the "Horrea Piperataria," was built by the Emperor Domitian, about 84 A.D., for the storage of the spices named and described by Pliny in the twelfth book of his "Natural History." The warehouses were wrecked and gutted in the fire which destroyed the whole quarter of the Via Sacra in 191 A.D., a few weeks before the death of Commodus. Considering the happy results of the excavations, the lecturer said their thanks were due to the Italian Administration of the Antiquities, and to their colleague, Commendatore Boni, for the scheme so cleverly planned and so skilfully carried through, and for their decision not to stop any more in the search at the level of the classic buildings of the Empire, but to reach, wherever possible, the lowest and deepest strata, contemporary or even anterior to the foundation of Rome. By following this scheme he felt confident they would ascertain the true origin of Rome, and the nationality and stage of civilisation of its original settlers.

Mr. F. C. Penrose moved a vote of thanks to the lecturer for his admirable and deeply-interesting account of the recent excavations. He remembered looking at the Forum many years ago, when it was in a very different architectural condition than now. It was then more picturesque, because there are now so many objects to interest one, and the archæologists had to apologise for spoiling Nature's work. Nevertheless, they were most thankful for the new discoveries. Professor Lanciani had referred to the aggregation of soil and rubbish in the Roman Forum, and they could all appreciate his point, because they knew how Roman London had been built upon. His remarks about the tomb of Romulus were also deeply interesting, and the discoveries had taken them back to a much earlier date. It was gratifying to know that the recent excavations had not done any harm to the interesting buildings of the classical time which had already been brought to light.

Sir Lawrence Alma-Tadema, in seconding the vote, said Professor Lanciani had stimulated him in his work more than any other man. In his lecture he seemed to have taken them by the hand and conducted them over the Forum and lingered at the tomb of Romulus and the House of the Vestals.

Sir William Richmond supported the vote, and remarked that whenever we found comradeship with an Italian we felt that we were a common brotherhood with them. Italy was a great nation, and if she did not run consecutively with the great ages of Greece she took up from Greece all that was beautiful and transmitted it over Europe and to our barbaric Isles. We Englishmen were desirous of harking back to these great classic ages of purity of thought, purity of design, and purity of construction, and the Professor had stimulated them. He had written a kind of epitome of the ancient history of Rome and had told them that Romulus was not a mythical person. It had been the fashion of late years to attempt to destroy all ancient myths and to say that so-and-so never existed and was only an idea. They were very grateful to the modern scholars who went back to these ancient beginners of history and told them that they were not myths but men.

Professor Aitchison, R.A., after congratulating the lecturer, said there was some mystery yet to be solved as to the way in which Greek architecture was transformed into Roman. It had been suggested that excavations and researches in the Isle of Sicily might show some of the steps by which this had been accomplished, and he trusted that the mystery would soon be solved by some of the indefatigable antiquarians and archæologists of the present day.

Dr. A. Murray said that in listening to the lecture he had felt that he was on a visit to Rome. During the past twenty-five years no Roman, at all events, had done so much for archæology as Professor Lanciani.

The Chairman mentioned that the lecturer had been carrying out researches in Rome since 1871. This year he received the Queen's gold medal—the last time an Italian received this honour, who was the only one, was fifty-one years ago. He had been struck by the Professor's remarks about the collection of *débris*. When he was in Rome he noticed every day streams of carts come into Rome from Campagna laden with earth for building purposes, and he had been assured by a native that this had been going on from time immemorial. No doubt this would account to some extent for the depth at which they found the lower strata.

The vote having been carried,

Professor Lanciani said that England preceded all other nations by a hundred years in her appreciation of Rome. He had found in this country far more important documents relating to the Roman Forum than in any other land ; in one library alone he had found 2,727 beautiful water-colour drawings, and he had also found many gems in private houses. He was glad to say that a movement was now on foot to provide an English college in Rome for the benefit of archæological students. In this respect England had heretofore been behind other nations, but he hoped before long that the college would be an accomplished fact.

Mr. F. C. Penrose said it was quite true that this British school was in course of formation, and very soon there would be a considerable movement in its favour.

Professor Aitchison asked the lecturer to convey to his fellow-countrymen the goodwill and best wishes of the Englishmen assembled at this meeting. We owed much to Italy ; she started to give us the whole of the classics, most of which would otherwise have been lost, and to architecture and archæology she had rendered great service.

This concluded the proceedings.

THE ARCHITECTURAL ASSOCIATION.

An ordinary fortnightly meeting of this Association was held on Friday evening last week in the Meeting Room of the Royal Institute of British Architects, No 9, Conduit-street, Regent's-street, Mr. W. H. Seth-Smith, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected Members of the Association :—Messrs. P. J. Bartlett, R. M. E. Carey, C. M. Childs, W. L. Clarke, H. A. Coldman, P. M. B. Collcutt, F. J. Cox, R. T. Congreve, W. S. Dakers, J. W. H. Farrow, S. T. Hennell, R. M. F. Huddart, W. C. Lemaitre, A. C. Mac George, R. H. Nicol, C. E. Power, E. T. L. Smith, and F. Worrow.

Mr. R. S. Balfour, Hon. Sec., announced that the next meeting of the Discussion Section would be held on the 16th inst., when a debate would take place on the subject of "Party Walls."

The late Mr. William Young.

The President said that although the late Mr. Young was not a member of the Association, yet he took the warmest interest in it, and consequently it was with much regret that he had to announce the death of Mr. Young. Mr. Young was in the zenith of his fame, and had achieved a very high distinction in being elected to carry out such a building as the War Office. All who had seen Mr. Young's design for that building must have felt what an able design it was, and how well it justified the appointment made by the Government. He thought it would be in accord with the wishes of the members that a vote of condolence be sent to the family in their bereavement.

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The motion was agreed to in silence.

The Legal Position of the Architect.

The President said that Mr. L. L. Macassey, who was to have read a paper before them that evening on the subject of "The Legal Position of the Architect," was too unwell to do so, but Mr. Macassey's son, who had assisted in the compilation of the paper, had kindly come there that evening for the purpose of reading it.

Mr. Lynden L. Macassey, B.A., LL.D., then read the following paper:—

"There are few professions for which more varied qualifications are required than that before some of whose leading members I have the privilege of reading this paper, for the capacities in which an architect requires to act are numerous and carry responsibility. At times he is called on not only to advise his client on matters of architectural moment, but often compelled to be a quasi legal adviser and constantly obliged to assume the role of arbitrator between his employer and those engaged in carrying out his designs. In each capacity the law invests his actions with different legal consequences with which every architect should be acquainted. Members of the profession are presumed, in the eyes of the law, to be thoroughly versed in all matters requisite for properly advising their clients. 'The public profession of an art,' said Mr. Justice Willes, in Harmer *v.* Cornelius, 28 L.J.C.P. 85, 'is a representation and undertaking to all the world that the professor possesses the requisite ability and skill.' Indeed, the great principle of English law applicable to all such professions is that the architect must display reasonable skill and care, and if his employer suffer damage by reason of his failure so to do, for it the architect will be held responsible. In determining the precise liability of architects for their actions under certain circumstances, the real difficulty is properly to apply this principle. There are in reality but few decisions bearing directly on the liability of architects, for the honour of the profession has been singularly well maintained. But such as there are I shall mention, and in addition point out the legal relations that exist at different times during the execution of a contract between the architect on the one hand, and the employer and the contractor on the other. The knowledge thereof is essential to every architect. It is, indeed, a part of the reasonable care and skill he is obliged to possess. Without it he cannot fail to put himself and his employer in many injurious positions.

Now the employment of an architect may be divided under two main heads: his employment as a skilled adviser to his client, and his employment during the execution of works as an agent of the client. Both branches of service come under the function of contract.

As a skilled adviser the architect may be employed to give evidence, to make valuations of property, to act as arbitrator, and to prepare designs for intended buildings, and the latter is most frequently the form his employment takes. When, however, the buildings come to be erected, a contractor is generally called in, and as between the building owner and the contractor the architect acts as agent.

In dealing with the duties of the architect, reference must first be made to the retainer, for often the validity of his agency depends on his being properly retained. In most transactions between employer and architect a valid contract can generally be implied from the course of business letters between the parties, and if no terms are arranged the architect will be entitled to reasonable remuneration. It is always best, however, to have the conditions of service and the terms of payment settled before the work begins, and so avoid misunderstandings. A short letter from the architect reciting the terms will do, for even though not acknowledged, the employer is legally bound if he acquiesces and allows the work to go on.

When, however, the employment will last for a year, the agreement should be in writing and signed by the employer (21 Car. II., c. 3, s. 4), the provision made by the Statute of Frauds. But the mere fact that the employment has extended beyond a year will not of itself bring the case within the statute. In fact, to make the Act apply, it must appear from the terms and subject matter of the agreement that the employment will not be completed within the year (Peter *v.* Compton, Skin 353), and it should also be noted that an agent of the employer, if duly authorised, may sign for him.

In cases where an architect is employed by a corporation, his retainer must be of a more formal character than when a private individual is the employer. As a general rule, contracts with corporations are only binding when under seal. Thus it has been held that a medical officer employed by a Board of Guardians must be appointed under seal (Dyte *v.* St. Pancras Board of Guardians, 27 L.T. 342).

But a contract not under seal may be binding upon a corporation in certain cases, that is, if it is with respect to matters necessary or incidental to the functions or business which the corporation has been created to carry on. What these matters are it is somewhat difficult at times to decide. In Nicholson *v.* Bradfield Guardians (L.R. 1, Q.B. 620), it was held that a dealer who supplied coal to the workhouse under an agreement not under seal was entitled to recover the price. Probably thus an architect retained to do repairs would not require to be retained under seal by a corporation, but if to construct new buildings and works he would.

As regards contracts with local and sanitary authorities, reference must be made to Section 174 of the Public Health Act, 1875, which enacts as follows (38 & 39 Vic., c. 55, s. 174, s.s. 1):—'Every contract made with an urban authority whereof the value or amount exceeds 50*l.* shall be in writing and sealed with the common seal of such authority.' The decision in Hunt *v.* Wimbledon Local Board turned on this point (3 C.P.D. 208, 4 C.P.D. 48). The plaintiff had been employed by the Board's Surveyor under their express authority to prepare plans for new offices for the Board. When the tenders came in, however, it was found the lowest considerably exceeded the estimate. The scheme fell through, and on the plaintiff suing for his fees for the preparation of his plans the jury found that the offices were necessary for the purposes of the Board, and that the plans were necessary for the erection of their offices. But it was held by the Court that Sub-Section 1 of Section 174 of the Public Health Act, 1875, was mandatory, and *as the amount was over* 50*l.* and the contract not under seal, the plaintiff could not recover.

But in Younge & Co. *v.* Mayor, &c., of Royal Leamington Spa (8 App. Cas. 517), the defendants' engineer, with their approval and consent, called in the plaintiffs under the specification to finish up a contract abandoned by a former contractor. The work was completed and the defendant board got the benefit of it, but the plaintiffs failed to recover, as there was no contract under seal.

But Section 174 does not apply unless it is apparent at the outset that the amount of the work or the value of the services rendered will exceed 50*l.* Thus, in Eaton *v.* Basker (7 Q.B.D. 529) a medical man agreed verbally with a Sanitary Authority to attend fever patients in tents at 5s. 3d. per tent per day. His bill ran up to 100*l.* It was held that he was entitled to recover, as the contract was not one exceeding 50*l.* and requiring a sealed agreement within the meaning of the Act, as at the time it was entered into the parties had not ascertained it would exceed that amount.

What, then, do these cases show us? Firstly, this, that an architect, to be a properly authorised agent, should not accept a retainer to prepare plans for a Corporation or Local Authority unless under their common seal, if in the latter case his percentage or fees exceed 50*l.* He may find it impossible to sue for his fees, and in the carrying out of the works he may, as the agent of the Corporation or Local Authority, have perfectly *bonâ fide* made arrangements with builders and contractors which, however, his employers are in a position to repudiate, placing him in the undeserved position of having, in the eyes of the law, acted as an agent without authority, and rendering himself liable to the builders or contractors.

Even at common law, apart from the Public Health Act, the Corporations or Local Authorities might disclaim all contracts, however small, he had made on their behalf, and an agent, though honestly acting in a believed authority, is liable under the rule in Collen *v.* Wright (8 E. & B. 647) and Firbanks Exors. *v.* Humphreys (18 Q.B.D. (C.A.) 62), which renders him personally liable An architect may, however, if retained to advise at day fees, recover his fees against a Local Authority under Eaton *v.* Basker, although they do exceed 50*l.*

The architect to a Local Authority, if he be a permanent official, may, however, be lawfully appointed under Section 189 of the Public Health Act by resolution entered on the minutes, as in Smith *v.* Hirst, 23 L.T. 665, and in such a way appointed may act as the Local Authority's agent without fear of consequences.

So an architect may be validly appointed or merely temporarily retained by School Boards acting under the Elementary Education Act, 1870, Section 35, and Rule 7, Schedule III., by a minute of the Board, countersigned by the chairman and by the clerk (Scott *v.* Great and Little Clifton School Board, 14 Q.B.D., 500).

It will be remembered that at the outset I pointed out that the architect who holds himself out for and accepts employment must possess and bring to bear upon the discharge of his duties a reasonable amount of skill and care. But the obligation does not apply alone to architects. Solicitors, doctors, dentists, and many other persons engaged in professional and technical matters are subject to the same liability. The question then arises, what is a reasonable amount of skill which must be possessed by an architect? and the answer to this is not very satisfactory. No general rule can be laid down. The circumstances of each case must be taken into consideration. It is not enough to act to the best of one's skill and ability, one must act in a skilful manner (Jones *v.* Bird, 5 B. and A., 845). What would be a skilful manner under the particular circumstances seems to involve much greater knowledge and ability to-day than it did fifty years ago. The law considers the advance of science and human requirements. But before going into details, let me mention one exception. If an employer accepts the services of an architect to carry out certain work, and knows that the architect has had but limited experience and training, he does so at his own risk. And if by reason of the inexperience of the architect damage occurs, the employer cannot, in the absence of negligence, hold the architect liable therefor When, however, the fact of an architect's incompetence for the work becomes known to his employers, they are justified in dispensing with his services before the expiration of his engagement (Harmer *v.* Cornelius, 28 L.J.C.P., 85).

As the first illustration of absence of reasonable care and skill, one may deal with the introduction into a design of some novel invention, the success of which has never been tried, or the undertaking, in the first instance, of work of a very doubtful result. In the case of the doctor or solicitor there is no implied warranty as to results. The doctor may do his best and the patient may die, the solicitor may take every needful step and yet lose his case. But these contingencies do not come to the aid of the architect; he is bound to avoid experiment at the expense of his clients, and unless he sees his way to a successful result the work should not go on. In Duncan *v.* Blundell, 3 Stark 6, 5 M. & P., 548, Mr. Justice Bayley said:—'A professional man should not undertake work when he does not know whether he can succeed or not.' The law, however, is very indefinite as to what length an architect may go in doubtful work. Direct authorities are wanting, but reasoning from analogous decisions discloses the principle that to be free from liability he should acquaint his employer fully with the hazardous nature of the work and obtain his consent thereto, and satisfy himself, after investigation, that with the adoption of proper methods the work may be carried out successfully. In an old case of Slater *v.* Baker and Stapleton, 2 Wilson, 359, where surgeons had used a new instrument for operating with disastrous results, the Court said 'this was the first experiment made with this new instrument, and if it was it was a rash action,' and allowed the action. But in case of an action against an architect in respect of unsuccessful work, it would appear from Chapman *v.* Walton (10 Bing, 63) that the fact that he took the steps that all architects in his position would have taken will be a good defence. A clear distinction should be drawn between mistakes in policy on the part of the employer, and incompetent procedure on the part of the architect. A wooden building like a Norwegian hotel is much cheaper than a stone erection; if the architect builds it of wood according to instructions and of proper dimensions he is not answerable if it does not stand the weather.

As sometimes happens, the employer is dissatisfied after the completion of the work with the result of the design, and tries to throw responsibility on the architect. What is the position of the architect? With respect to all matters of policy on which the client is com-

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petent to form an opinion, as, for example, the arrangement of particular rooms in a house, and of which he has approved, he is estopped from turning round afterwards upon the architect and charging him with want of skill. But the employer is not deemed to be competent to determine minute matters of detail, such, for instance, whether or not particular members are of proper scantling. Should girders break or walls crack, from causes that the architect ought to have foreseen, the latter will be liable for want of reasonable skill.

The position of the architect in respect of plans prepared by him is of special importance, and how he is affected by any errors or insufficiencies either in them or the specification. The case of Thorn *v.* The Lord Mayor of London, 1 App., Cas. 120, may be regarded as the leading authority. There the facts were these :—The plaintiff had contracted with the Corporation of London to build a bridge across the Thames according to the plans of the City Engineer. Certain caissons for the pier foundation were included in the work and these the contractor found he could not construct according to the plans and specification. Another method with the consent of the Engineer had to be adopted and the contractor sued for the extra expenditure he had incurred. It was held, however, that he could not succeed, as there was no warranty on the part of the defendants that the works as proposed were capable of being carried into execution. The usual clauses were in the specification. It will thus be seen that under ordinary plans and specifications, architects as against contractors cannot be made liable for their insufficiency. So that if a contractor undertakes to do a thing that is impossible at the outset, he may refuse to carry out the contract on the ground of impossibility of performance according to the decided cases, yet were he has once entered on and completed the work, he cannot claim in respect of any extra expense occasioned by the work being impossible or impracticable.

The liability of the architect towards his employer for defective drawings is, of course, different, and we must distinguish defective drawings by reason of the work being infeasible, and defective drawings prepared in a careless manner. An architect, in the absence of special agreement, is bound to make sufficient preliminary investigation to satisfy himself that his proposals are practicable. Thus, in the case of Moneypenny *v.* Hartland, 2 C. & P., 378, the plaintiff had been employed to prepare an estimate and other particulars for a committee proposing to erect a bridge. He relied on the borings that had been taken by a surveyor previously employed by the committee, which turned out incorrect. The estimates were exceeded in consequence, and the plaintiff, when he sued for his fees, failed to recover. It is rather difficult to say whether the committee would have succeeded in an action against the architect. Could they have shown appreciable damage, I am inclined to think they could for his neglect of ordinary skill and care.

In respect of defects in the drawings arising out of careless preparation, it would probably only be when the employer had been put to extra expense thereby that he would take proceedings against an architect. This, as we have seen, is not likely to happen. But if it should, the architect is undoubtedly liable for want of skill and care.

As against the public few cases have occurred in which architects have been held liable for failure of their designs. A case is Mosdell *v.* Mitchell and others (*Times*, January 20, 1891), in which the widow of a workman brought an action under Lord Campbell's Act against a building owner, his contractor, and architect, for the loss of her husband, who was killed by the walls of a house falling upon him, which walls were too light to bear the strain. The house had been designed by the defendant architect for the defendant builder. During the hearing the jury, on the suggestion of the judge, stopped the case against the building owner, and gave a verdict for 500*l.* against the builder and architect jointly.

As illustrative of the care that the law exacts from an architect in his capacity of skilful adviser, one may mention the case of Crabb and others *v.* Brinsley (5 T.L.R. 14), in which the defendant had been retained to advise on the character and condition of certain houses in Holborn proposed as security for a mortgage. The defendant reported that the houses were good security. The plaintiffs made an advance of 1,500*l.*, but the premises were afterwards sold for 410*l.* There were two actions, and in the second action the plaintiffs recovered the full amount of their advance, viz., 1,500*l.*, as against the defendants.

There are many other cases of like character, which might be referred to, but they disclose nothing new in the legal position of the architect as a skilful adviser of his employer. The facts vary in each case ; but the law appears well settled that the architect must bring to the discharge of his duty a reasonable amount of skill and care.

We may now assume that the architect has completed his drawings and specifications for some intended work, and that the building owner has approved of the documents and is desirous of obtaining tenders. The architect, as a rule, is called upon to investigate the character of the different tenders submitted, and his duty is to advise impartially. In a case of Miller *v.* Wilson, reported in the *Building News* of August 6, 1886, the plaintiff, a building owner, sued an architect for advising him to accept a particular tender under which alterations to his house were carried out, and which were the highest of those sent in. After a great deal of conflicting evidence on both sides, eventually the jury found for the defendant architect. Plainly, an architect's duty is to advise which of the firms who have tendered are most likely to do the work the cheapest, but in the most satisfactory manner, and bring it to a satisfactory conclusion.

With the acceptance of a tender by the employer, and the entering into a contract, the architect enters upon a wider sphere of duty in acting as his employer's agent. His duty, then, is faithfully to carry out the work according to the plans and specifications, and to exercise a competent supervision to ensure satisfactory workmanship and materials being obtained.

An architect during the construction of the works has not authority to deviate from plans or specification in the slightest without his employers' consent. When no express authority is given, an architect can only bind his employers in respect of acts done or orders given in the general course of his employment, and these are confined to such as are absolutely necessary for carrying out the work. The authority of the architect is really of very limited extent. In the words of Chief Baron Alexander in Rex *v.* Peto, the 1 Y. and J. 37, he is a 'person who ought to be in general, but an onlooker of the owner to see that the work is accurately performed.' Cooper *v.* Langdon (9 M.W. 60), is an instructive case. There, according to the drawings and specifications, a certain wall was to be of brick for which stone was substituted by the builder. The building owner took action for breach of contract and succeeded. The defendants claimed that he made the alteration at the instigation of the architect, but there was no authority shown on the part of the architect to bind his employer in respect of any deviations from the drawings.

The authority to make alterations or additions is usually conferred by the building contract, when it is conferred at all, and the architect must keep strictly within its terms. Thus in Rex *v.* Peto (quoted above) the architect had the power to order 'additions or omissions.' The work consisted in building a custom house with piled foundations. The architect had the house built without piled foundations, and it was held that this was not an omission, but, in reality, a variation which was not in the power of the architect to order.

A matter of great importance is the question of quantities, and on this a few observations may be offered. It is extremely doubtful whether an architect is allowed to retain a quantity surveyor without express authority from his employer. Much depends on the terms of the architect's retainer. Thus, in Waghorne *v.* Wimbledon Local Board (*Times*, June 4, 1877), the defendant board instructed their surveyor to prepare plans and specifications and procure tenders for the erection of a mortuary chapel. The surveyor instructed the plaintiff to take out the quantities. He did so and sent in his bill in the ordinary way. The board refused to pay, but the Court held that, as the board had instructed their surveyor to procure tenders, and as tenders could not have been submitted without bills of quantities, there was implied authority to the architect to retain a quantity surveyor.

Where, however, the architect is not directed to procure tenders, it is exceedingly questionable whether, apart from a distinct custom in the profession, an architect, on his own initiation, should retain a quantity surveyor ; in fact, it is so doubtful, that it is much better not to do so (Moon *v.* Guardians of Witney Union, 3 Bing. N.C. 114, cf. Evans *v.* Carte, *Times*, May 28, 1882). For should the architect retain a quantity surveyor without authority, he will be personally liable for that gentleman's reasonable charges, and it matters not that he retained him in perfect good faith and convinced of his authority to do so (Collen *v.* Wright, 8 E. and B., 647). In a case, Gordon *v.* Blackburne (the *Builder*, February 1, 1879), the defendant, an architect, had requested the plaintiff to take out quantities for a building he had been instructed to prepare plans for. The quantity surveyor did so, and applied to the architect for payment, by whom he was referred to his employers. He then proceeded against the architect and recovered his fees.

The architect should not prepare the quantities himself. It is objectionable for many reasons, as the quantities are often paid for by the builder. The general law prohibits an agent from making any profit out of his agency apart from his own proper remuneration by his employers. And it is only a custom to the effect stated that would enable an architect to receive any money from the builder in respect of quantities.

In the case of inaccuracies in bills of quantities, what are the liabilities of quantity surveyor and architect ? The quantity surveyor is appointed by the owner. To the owner, then, and to him alone is the quantity surveyor responsible at all. There is no privity between the quantity surveyor and the contractor, and therefore no liability to the contractor, apart from fraudulent misrepresentation, although, as was held in North *v.* Bassett (1 Q.B. 333), there may be a reasonable and good custom that the builder should pay the quantity surveyor's charges.

Whether the architect or a quantity surveyor takes out the quantities, it is to their employer that they will be liable, and to him only, for negligence and want of care. But as the judge remarked in Priestly *v.* Stone (4 *Times* L.R. 730), quantity surveyors are not liable apart from negligence. What they do is to submit their quantities as the result of their calculations, and to the best of their belief correct. There is the obligation on the builder taking those quantities to satisfy himself of their accuracy.

The two principles of law governing the liability of architects, viz., the application of reasonable skill and care, and their keeping within the limits of their authority as agents, must now be applied more immediately to their conduct during the execution of works.

At such a time an architect's duty is to exercise a proper supervision, so that the employer gets as good a building as he bargained for. In Ellisen *v.* Lawrie (*Times*, February 19, 1878), owing to the improper attention given by an architect to the laying and jointing of sewer pipes in connection with a dwelling-house, foul gases penetrated into the residence, causing illness in the family. The plaintiff, the owner, sued the architect for the cost of repairs and for medical expenses, and succeeded in his action. Of course, the question of what constitutes proper supervision must be left to the discretion of the architect who knows the character of the work, and more especially the character of the contractor engaged upon its execution.

The liability of the architect in respect of alterations and omissions has already been dealt with. It should be mentioned that he has no authority of himself to call in a quantity surveyor, as is often done, to measure up deviations and extras. That was the course adopted in Plimsaul *v.* Lord Kilmorey (1 T.L.R., 48) by the architect in respect of building operations at St. James's Theatre. It was held that he had no right to do so, and that even if there was a custom for the architect to employ a quantity surveyor it could not reasonably apply to the measuring up of extras.

Dealing with the question of extras—a most trying one often to architects—most specifications provide that extra work shall only be executed on being ordered in writing by the employer or the architect. No definition exists of what constitutes extras, though many have been suggested, and the builder may refuse to carry out certain items of work, claiming them as extras, unless on written authority, items which the architect may consider within the contract. But an order in writing may be

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given under protest and will not be construed as against the architect or the employer as admitting the contractor's contention. The position of the architect as against the contractor is this: If the specification provides for a written order, a written order there must be before the contractor can claim payment (Thames Iron Works Company *v.* Royal Mail Steam Packet Company (13 C.B. [N.S.] 358), and if a contractor executes work with this provision without a written order, he has, if there has been no waiver of the condition, no redress against any one. But supposing the specification is silent, then the architect cannot without express authority from his employer order extra work. If he does so, and holds himself out as possessing, or acts without that necessary authority, he renders himself personally liable to the contractor in respect of the extra work so ordered (Collen *v.* Wright).

Passing on to the architect's duty in respect of measuring up, that involves the same application of reasonable care and skill. The accuracy of the work must be considered in respect to the magnitude of the job, and is altogether a question of degree. Thus in Corbett *v.* Richmond & Chandler, reported in the *Building News*, May 18, 1888, the plaintiff was an architect, and sued the defendants (his employers) for balance of his commission in respect of the erection of certain premises in Manchester. The defendants resisted on the ground of the architect's negligence in measuring up work with the result that the contractors were paid 537*l.* more than they were entitled to. The official referee to whom the Judge referred the case said, 537*l.* on 10,000*l.*, the value of the premises amounted to only ¾ per cent., and with only such a difference between the defendants' and the plaintiff's figures on such a job, it was absolute nonsense to charge an architect with negligence. He had never known a case in which negligence was charged against a professional man on such insufficient grounds. Towards the contractor the architect is not liable at all in respect of measuring up except on the ground of fraud.

Much the same state of things exists in regard to certificates. To the employer the architect is responsible for negligence in granting certificates, whether it be a progress or a final certificate; and the fact that by the terms of a building contract a final certificate is to bind both builder and employer, does not bind architect and employer. Thus, in Rogers *v.* James, (8 T.L.R. 67) the plaintiff was an architect who sought to recover a balance of fees in connexion with the supervision of some houses. The defendant (his employer) counterclaimed for negligence, in that the architect had not insisted on the builder putting in certain concrete in foundations. The architect pleaded that he had deducted the value thereof from the balance of the contract money payable to the contractor under his final certificate, and that it, under the usual clause in the specification, was binding on both employer and builder. The jury found that the plaintiff had been negligent. The Judge held, and his view was maintained by the Court of Appeal, that the clause binding employer and builder did not apply as between architect and employer.

When the issue of the architect's certificate is a condition precedent to the payment of the contractor, an architect is often perplexed to know how he stands if, from reasons of dissatisfaction with the work, he is unable honestly to grant the certificate. Is he liable to an action at the hands of the contractor? It must be remembered in connexion with this that the architect is in no way the servant of the contractor, and owes him no duty different from that which he owes to all mankind. The case of Le Lievre *v.* Gould (1 Q.B. 491), a case of action against an architect for negligence in discharging his duty. The plaintiff was a third party who had not retained or paid the architect, and, moreover, the negligence was practically admitted. But the action failed. Lord Esher's judgment contains the following sentences:—'What duty is there when there is no relation between the parties by contract? In the absence of contract an action for negligence cannot be maintained when there is no fraud.' And in Stevenson *v.* Watson (4 C.P.D., 148) the plaintiffs, certain builders, took action against the defendant architect in respect of his certificate being insufficient, alleging that he did not exercise care and skill in ascertaining the amount due to them, but not alleging fraud. It was held that the defendant in granting certificates was not liable for want of care or skill. He was only bound to give an honest decision.

So that, therefore, an architect generally is only liable to a contractor in point of fraud, whether in respect of refusal to grant certificates or delay in granting them, or approval or condemnation of materials or workmanship, and other such matters. Lord Herschel very clearly and explicitly explains in Peek *v.* Derry (14 Ap. Cas. 374) what is fraud. 'Fraud,' he says 'is proved when it is shown that a false representation has been made (1) knowingly, or (2) without belief in its truth, or (3) recklessly, careless whether it be true or false.'

If, therefore, an architect believes in the justice of his cause, let him refuse a certificate fearless of consequence, but on grounds, however, that he can stand over should the contractor proceed for a mandatory injunction to restrain the employer from keeping him out of his money.

There is an interesting case, that of Ludbrooke *v.* Barrett (46 L.J., C.P., 798), to illustrate what was held to amount to fraud on the part of the architect in refusing a certificate. The plaintiffs, being builders, had agreed to build certain buildings for one Ridgway on the condition that they should be paid on the defendant's certificate when the buildings were erected to his satisfaction. It was found that the architect had an interest in the matter, and that he had colluded fraudulently with the building-owner in refusing the certificate, and the action was allowed.

The architect has often, as was mentioned, to occupy the somewhat inconvenient position of arbitrator between the contractor and the employer. Acting as such, he is in the position of a quasi-judge, and, as such, is not liable to either the employer or the contractor for negligence or want of skill in making his award. He is, of course, personally liable for fraud, and that to all parties injured by his wrongful acts. In the Tharsis Sulphur Company *v.* Loftus (L.R. 8, C.P., 1), the defendant, an average adjuster, was retained by the plaintiffs to settle and adjust the proportion which the ship and cargo respectively were to bear losses incurred during the voyage. When he had made his award the plaintiffs, in spite of their undertaking to abide by his decision, brought an action against him alleging negligence in making his award. It was held, however, that the action would not lie, and see also Pappa *v.* Rose (L.R., 7 C.P., 32 and 525).

Architects in their professional career are frequently and inevitably made the recipients of confidential information respecting the affairs of their clients, and not infrequently at some other stage of their career find themselves in the position of opponents to their former employers. It is not easy to decide what is confidential information, but, be it what it may, the decision in Robb *v.* Green (A.C., 315) and the words of Lord Justice Smith are imperative:—'It is a necessary implication which must be grafted on a contract of service that the servant undertakes to serve his master with good faith and fidelity, and it is a breach of this condition to use during or after the period of service confidential information acquired during it adversely to the employer or for the servant's own benefit.' Plans belonging to a late employer, for instance, would be confidential, and if submitted to a new employer the Courts would issue an injunction against any architect so acting, and would compensate his late employer by damages for any injury incurred thereby. But where there is nothing confidential in the information, where it is merely a compilation of facts in every one's power to make, if possessed of the requisite ability, there is nothing to prevent an architect using that for the benefit of himself or of his new clients.

It was mentioned at the outset that the law deems an architect to be acquainted with its general principles to ensure an observance of his advice by his client being free from injurious consequences. The precise extent of this knowledge is not clear. From Jenkins *v.* Betham (15 C.B., 188), we may gain some information. The defendants were engaged by the plaintiff, on his appointment to a living, to value dilapidations. They valued the dilapidations at too low a figure, because of their ignorance of the legal difference between outgoing and incoming incumbents, which they admitted. The Judge at the trial directed the jury that the defendants could not be held unskilful for not knowing the law as a lawyer did, but that they should be liable if they did not display such a knowledge of it as was ordinarily current. On a motion for a new trial the Court held that the defendants should have known the broad distinction existing between outgoing and incoming incumbents. So it seems that an architect may be required to know the broad principles of law applicable to matters within his everyday business, such as ancient lights and the right to vertical and lateral support, and that for damage arising to his employer through his ignorance of such questions he will be held responsible.

In conclusion it may be observed that many of the difficulties experienced and responsibilities undertaken by architects are such as with properly drawn specifications and carefully prepared plans should not arise. The specification is too often looked upon as a mere enumeration of dimensions and catalogue of materials rather than the basis upon which all the obligations of the contractor may be codified. Every specification should contain properly drawn general conditions, with the legal effect of which the architect should be cognisant. It is curious that among building-owners there seems a much higher appreciation of what powers may be wielded under the specification than among the majority of architects, and I think the experience of most of my audience will bear me out when I say that often the first evolution of friction between an architect and his employer is when the latter finds in respect of some ordinary detail of procedure he is unable to restrain some contumacious contractor.

Architects have sometimes bewailed the dearth of legal decisions directly affecting their professional conduct. It certainly is an extraordinary feature that the conduct of architects and engineers has been less frequently called in question than that of almost any other profession. And while to me, as a lawyer, that should be perhaps a matter of regret, I cannot help regarding it as a very bright feature in the pages of legal history, and one fully worthy of those great professions, professions which of all others embrace infinite possibilities and confer lasting benefits on the inhabitants of the world."

The Chairman, in inviting discussion, said that they were glad to have heard the paper, which presented an almost unlimited field for discussion. In listening to it he had been once again impressed with a sense of the great responsibility architects had to bear, and also with the importance of making the basis of their training a wide one. Architects should have a broad, general knowledge of the principles of legal matters in regard to the practice of architects and building contractors.

Mr. Arthur Harston said that they must all feel particularly obliged to Mr. Macassey for his paper, and to his son for reading it so clearly. Mr. Macassey, senior, had done considerable service to the architectural profession in the very able book which he had, in conjunction with Mr. Strahan, written for the benefit of architects—a book which he would recommend to the notice of architectural students who had not yet commenced practice. Lawyers, as distinguished from architects, were free from any liability for negligence, and that was one of the matters in which the lawyer was very much more fortunate than the poor architect, who, in law, was required to be at top an artist and at bottom a detective policeman. A client sometimes knowingly employed a bad builder, relied on the architect to get good work out of him, and held the architect responsible should the builder fail in the attempt. It was always best for an architect not to be backward in talking matters of business to a client before any work was started. One of the best methods of arranging a contract with an employer was to take the schedule of the Institute of Architects, and, having made the necessary alterations in it, send it to the client with a letter saying: "These are the usual terms of architects, and they are my terms." On the subject of negligence he might refer to the case of Rogers *v.* James, in which the owner claimed for negligence. The defence was that as the owner had acted on the certificate of the architect in paying the builder (who made a much larger claim and brought an action against the owner), and as the certificate had been upheld and acted on the owner was estopped from disputing it in any way. The owner said that the architect had been negligent in ascertaining the amount of extras in the executed works, and the Court held that he was negligent. The architect then appealed, and then the Judges of the

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Court of Appeal, although they found that the architect had acted in the honest exercise of his judgment, confirmed the decision that he was liable in damages to the owner for negligence. But the previous case in 1871 was not cited—the case of Pappa *v.* Rose—a case which at first sight did not appear to have much to do with architects. It was the case of a Greek gentleman who consigned currants to a broker in Mincing-lane with instructions to sell them, as of fair average quality in the opinion of the selling broker, as soon as they arrived for the best price he could get for them. They were sold, and the buyer was dissatisfied with the quality and appealed to the broker, who, after examining the currants, agreed that they were not of fair average quality. The customer claimed and obtained compensation. Pappa then brought an action against his broker. The principle decided in the action was that the broker was acting in a quasi-judicial capacity as a judge between two parties, and the Court found that he had acted honestly, and was not liable for negligence nor want of skill or care. He (the speaker) ventured to say that if that case had been cited in Rogers *v.* James the judgment of the nine judges who adjudicated in Pappa *v.* Rose would have had considerable influence with the four judges in Rogers *v.* James. But, unfortunately, nobody thought that a currant case could affect an architect, and it was not cited and the architect had to suffer. Two other cases had occurred on the same point in which the case of Pappa *v.* Rose *was* quoted. They were both tried in 1900—viz., Chambers *v.* Goldthorpe* and Restell *v.* Nye.† In both these cases the architect was successful. He hoped that they would not go away with the idea that architects were to shirk their responsibilities; they must make every endeavour not to be careless or unskilful. Another important point which had been touched upon in the paper was as to the authority of the architect to order goods. The architect was an agent, and if he acted without proper authority he caused loss to tradesmen, who could recover against him. An important case bearing on that would be found in the *Builder* just published (Saturday, November 10)—the case of Vaux *v.* Wimperis and Arber. The Limited Liability Company for whom the architects acted having gone into liquidation and the architects having ordered the goods without disclosing their principal's name, were naturally held to be liable. It was a very important case which should not be forgotten. Architects should never give an order on their own name, but in the name of the employer, which course will relieve them from risk, if acting within their authority.

Mr. Hampden W. Pratt, in proposing a vote of thanks, said that the case reported in the *Builder* of Vaux *v.* Wimperis and Arber seemed in the result to have been hard on the architects. One had always understood that in acting for a client an architect was absolved from personal responsibility. From that case they might learn the lesson that they could not be too careful in giving orders. As to getting a contract under the seal of an authority, he might mention an experience he had early in his practice. A joint Hospital Board approved his plans for a hospital; tenders were procured, and the contract was signed by the chairman of the Board, but it was not sealed. The work went on until about 1,000*l.* had been expended by the builder, when a new Board was elected hostile to the hospital scheme. That Board gave up the whole matter and refused to pay any one anything, as the contract was not under seal. That was sixteen years ago, and the work stood just as it was left. The Hospital Board did not possess a seal at all, and at the time he did not think it irregular to proceed with the work without seeing that the contract was under seal. Moreover, the Clerk to the Board was a solicitor, and one expected that everything therefore would be done in proper order. Counsel's opinion was taken in the matter, and the architect, builder, and surveyor were informed that they had no case, and from that day to this not a penny had been paid to them.

Mr. C. H. Brodie said he thought that the reason for the decision in the case of Vaux *v.* Wimperis & Arber was perfectly clear. The architects, who were the defendants, in accepting the tender for the hot-water works, said, "We beg to accept your offer." Mr. Justice Grantham said that the result might be unfortunate, but that architects in giving orders should be careful to make it clear that the goods were not for themselves. He agreed with Mr. Harston that, as this had not been done, the case went rightly against them.

Mr. E. Greenop seconded the vote of thanks. He said that in arranging terms with a client at the commencement of a job a good many difficulties were got over if the architect explained matters to the employer, for clients were usually totally ignorant of the ordinary procedure in having a building erected. As to the liability of an architect, he should like to know whether there was any difference as regards possible liability in ordering variations or extras when the architect acted in an honorary capacity. He did not think an architect should ever act in that capacity, as it was not good for the profession or the clients. The architect should accept the proper fees, and, should he desire, make a donation to the building fund. The law as to the liability of an architect for ordering extras as an agent seemed to be in a state of confusion. As he understood it, an architect might order extras or variations arising in the execution of the work necessary for the proper completion of the contract. That seemed to lead nowhere, because it might be something quite outside the contract and yet be necessary. As to the point that an employer who got to know of the incompetence of his architect was entitled to dispense with his services, that would be rather a dangerous course for the client to take in the middle of a job. Mr. Macassey said, "Where the client was dissatisfied on matters which he could judge very well of, the architect was not responsible"; but although the client might have the drawings of what was proposed shown to him, he might very well say that he did not know what was intended. He understood a contractor was liable for work which had been omitted from the specification or drawings, if the quantities were not made part of the contract, or if there were no quantities, if the specification stated that the client was to have a complete building. The contractor had to do all omissions from the specification, whether they were large or small. He should like to know how far a client could demand the architect's drawings. An architect might get out half-a-dozen preliminary schemes which represented a good deal of work, and from which it would be quite possible for a client to put up buildings; could the architect, in the event of the client not proceeding in the matter, refuse to let the client have the sketches? As to the architect's liability for supervision, there were many small jobs on which a clerk of works could not be engaged, and a visit from the architect once or twice a week was of very little use when there was an unprincipled builder. Would a visit of once or twice a week absolve an architect from liability—once a week in ordinary times and twice a week during the preparation of the foundations?

Mr. H. T. Hare said he had been interested in the point raised in the paper as to the architect's responsibility for the appointment of the quantity surveyor. Of course, the proper and best way to proceed was for the architect to get the authority of his client to the employment of the quantity surveyor, but there were many cases in which that was rather a difficult thing to do. Frequently a client did not realise that quantities were necessary, and he could not understand why he had to pay 1½ per cent. extra, and thought that that 1½ per cent. ought to be included in the architect's fee. Consequently, when tenders were obtained the architect frequently employed a quantity surveyor without any direct authority for doing so. He (the speaker) had always understood that in doing so the architect took a large amount of responsibility, and that in the event of the tenders being too high, and the work being abandoned, the architect would be responsible to the quantity surveyor. But, according to Mr. Macassey, that was not so, *i.e.*, that the fact that a client expressed the desire to have tenders implied the employment of a quantity surveyor. In one sense that was a relief to hear, but it did not seem to be exactly reasonable, for it would be quite possible to have tenders on the specification alone. As to the ownership of drawings, it was generally understood that the client could claim drawings, although he did not think there had been any decision on the subject. That had always seemed to him unreasonable, for the client, in employing an architect, did not employ him to make drawings, but to build a house or whatever it might be, and the drawings were merely the architect's method of conveying his idea to the builder; they were not part of the contract between the employer and the architect.

Mr. A. T. Bolton said he was afraid the difficulty as to the ownership of the drawings was due to the lawyer's idea of the importance of documents. The lawyer could not get away from the idea that the drawings must be on the same footing as all other documents. As a rule, lawyers did not understand drawings, and looked upon them in much the same way as they did upon the specification or actual form of contract, and thought, particularly as they had been signed and referred to as the drawings numbered, say, 1 to 10, that therefore they must belong to the client, and must represent something that the client had paid for. A most unjust extension of that conception had been made, for apparently they had gone so far as to claim every kind of document relating to a case as the property of the client, although, as any architect would readily concede, there might be among them original conceptions of the architect, designs which might be described, in fact, as copyrightable inventions. The classical case on the subject was that of the drawings for the Houses of Parliament, when the Government insisted on having, and they secured, he had always understood, every drawing relating to those buildings, and probably in consequence of that the legal profession had got the idea that drawings must be the property of the client. What architects felt was that the client paid for the skill and capacity of the architect and not for the drawings, especially as it was quite possible to build a building without drawings at all. He hardly expected the legal profession would ever look at the matter from their point of view. The lecturer had delightfully embodied a legal idea of the architect as an onlooker to the employer, or, as Mr. Harston put it, a kind of policeman-detective. A conception of this kind meant that a client could obtain an inferior builder and ease his mind by saying, "It is all right; there is the architect, and he will see that things are done properly." In reality the architect was nothing at all of the policeman-detective. The architect was really almost the builder himself; he was certainly the chief workman in the best sense, and his object, while obtaining good work, was to co-operate with the builder. The idea of abandoning the old judicial position of the architect as between the client and the builder was much to be regretted, and the tendency to emphasise the position of the architect as solely that of an agent to the client was particularly unfortunate, because it might very well happen in certain cases that a good part of an architect's time might be occupied in defending a builder against the exactions of a client, as in cases where the builder was looked upon as a person out of whom a building was to be extracted at less than its real value. The architect wished the work to be done properly, and that was the object of the best builders too. The old idea of the architect standing between the two parties and getting the best results was a good one, and if departed from the profession would fall short of the old high standing it occupied. He hoped the paper would be the precursor of others on the subject of building legislation. The subject was rather overlooked, and young architects were sometimes plunged into practice without knowing much about these things. It was an advantage for an architect to be brought at an early age into contact with these matters, and such papers as that of Mr. Macassey's that evening were a great help to them. The particular case which the lecturer had given to them, where the architect or engineer had been dependent upon the borings taken by his predecessor, was an exceedingly unfair one. Many clients would not care about having fresh borings made, and altogether it seemed exceedingly hard that an architect or engineer should be made responsible for failures arising from the errors of their predecessors. The remarks made about experiments would be a useful additional warning to young architects to be careful of patentees. As to deviations from the drawings, it was a delightfully legal idea that an architect should not make deviations. What did the lecturer think of the Institute form of contract in that connexion? It was a very convenient form of contract to use; it was all in print, and any builder and client could read it and have a copy, and he would like to know what the lecturer thought of its conditions. In this particular point it would be impossible to do

* See the *Builder* for February 10 last.
† See the *Builder* for January 27 last.

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satisfactory work at all without deviations. Fortunately, the majority of clients would not thank an architect for asking questions on every point of deviation. He always thought that the Institute form of contract enabled an architect to deal with deviations, apart from the question of extras; but if a client could make a personal claim against an architect for making a chimney, for instance, say, a foot higher than it was shown in the drawings, it might be a serious matter.

Mr. F. G. F. Hooper said that in France the architectural profession was much more regulated and recognised than it was in this country, and the legal position of the architect was much more clearly defined, while there existed a Society, with a centre in Paris, which took up test questions on behalf of architects. The Society was supported at the joint expense of the body of architects, and a case, instead of being fought by an individual, was fought by the Society should it be an important one, and one affecting the whole profession. The idea, perhaps, was not a bad one, although in this country architects were anxious to avoid any semblance of trades-unionism. He thought it would be undignified if an architect undertook no liability or responsibility in his work. Architects should be prepared to take any responsibility which legally fell upon them, but in financial matters an architect should not fail to consult his client and get instructions for all he did.

Mr. Harston said he would like to add a few words about the case of Vaux *v.* Wimperis and Arber. If the company had not gone into liquidation there would not have been any difficulty in the matter. If an architect had received instructions from a solicitor to do certain work, and if the client went bankrupt, and the architect attempted to recover from the solicitor he would fail because, *primâ facie*, the solicitor was acting, not for himself but for his client. In the case referred to there might yet be an appeal on the ground that, *primâ facie*, the architects in ordering the goods were agents, and that the onus of proof to the contrary lay with the plaintiffs who were claiming against them for the cost of the goods.

Mr. Guy M. Nicholson said that some of the decisions quoted by Mr. Macassey seemed to point to the fact that the law was in a very bad state with regard to buildings. Some of the decisions made it almost impossible to carry out a contract—the decision of Priestly & Gurney *v.* Stone, for instance. If a builder had no claim against anybody when a serious omission was made in the quantities, it would practically prevent him tendering at all. To expect the builder to check the quantities was absurd. In a large building, like the Law Courts or the new War Office, the quantities required six months or more to take out, and how could the builder check them in three weeks? It was unfair to ask him to do more than price the quantities, on the mere chance of obtaining the work. It was also unfair to expect him to do work which was omitted from the quantities without paying him for it, as in Priestly and Gurney *v.* Stone. If he was referred to the quantity surveyor for payment, it would be useless in many cases, as the surveyor's commission only covered the cost of preparing quantities and was not sufficient to pay for a portion of the building as well. Hence, if the omission was of any size, the surveyor would probably become bankrupt and the builder would get little or nothing. The remark had been made that it was not necessary to have quantities when obtaining tenders, That was so, but it would take a very long time, and in buildings of any size builders would not tender without them. In two recent cases when there were no quantities considerable loss of time resulted, as the builders, after keeping the drawings for a week, returned them with the remark that the work was too complicated to tender on without quantities, and for that reason, and because they made it a point to refuse to tender for work to cost over 1,000*l.* when there were no quantities, they must refuse on this occasion also. The law seemed to point to the necessity of quantities being made part of the contract, and the argument that the surveyor under those circumstances would get careless did not hold good, for if he made a mistake he would injure his reputation and lose his work. The Admiralty had forced their surveyors to pay for their mistakes as far as they were able, but it was an unsatisfactory system, as it encouraged quantities being taken full, to cover any mistakes.

Mr. Osborne Smith having made some remarks as to the ownership of drawings,

Mr. Brodie said the question of ownership of drawings amounted to very little. Every sensible architect in these days of process reproduction had duplicate copies made of his drawings, and made one of these sets the contract drawings, keeping his own handiwork himself. ["They claim more than that."] Yes, but they must prove their right to more. The fact that so few architects and engineers got into the Law Courts over their work was a triumph of common sense over law. As to supervision, in a recent case an architect was mulcted in heavy damages in consequence of dry-rot spreading through the house due to the existence of a lot of shavings in the foundations and in the concrete. On the face of it, it seemed to be a most unjust decision, for an architect could not always be on the work, and it might easily happen, where there was no clerk of works, shavings might get mixed up with the concrete.

The Chairman, in putting the vote of thanks to the meeting, asked if Mr. Macassey could give them a rather more complete definition of the term *agent*. He would also like to know what Mr. Macassey's views were as to the Institute's Conditions of Contract. He (the speaker) noticed that architects were fast surrendering all their powers, as agents to the building owner to a court of arbitration, or to an individual arbitrator, and it was a question how far clients would regard that as a surrender by architects of their duties and responsibilities. The whole matter was to come before the Institute for discussion, and he hoped that all those who were interested in the matter would attend and give the matter full consideration. Architects should be most careful never to put work out to public tender unless they reserved ample power as to the condition of the successful contractor. The point as to deviations was a most important one. Architects should have an understanding with the client before the contract was entered into that they should have power to deviate when necessary. If architects were put under a hard and fast rule that no considerations of art, &c., were to justify such deviations that would mean taking the very soul from their art work. It must occur to every thoughtful man to make improvements as the work went on; if he did not he was not worthy of the name of an architect. It would be absurd if they had to consult their client on all points of deviation, and no architect would agree to it. As to trades-unions, they must all be heartily in favour of them whether they had to do with professions or not, so long as those unions worked in directions which were legitimate. He felt that bodies like the Institute of Architects should be able to defend members of their body against litigation which might be oppressive.

The vote of thanks having been heartily agreed to,

Mr. Lynden Macassey, in reply, said that as to the cases of Rogers *v.* James and Pappa *v.* Rose, they were, he thought, capable of being distinguished. As to the liabilities of quantity surveyors to builders, a quantity surveyor was not liable to a builder in the case of errors in quantities except in the case of fraud, and fraud was where he would submit an inaccurate bill of quantities knowingly, or a bill of quantities which he did not know to be accurate or not, or a bill of quantities recklessly and carelessly got up. If the quantities were taken out to the best of the surveyor's ability and knowledge, the surveyor was not liable for error, and that was a very fair condition for the law to insist on. As to a definition of agency, an important consideration is the law relating to architects. An agent was a person appointed by some one to act for him, so far as he the principal might legally act, and such acts of the agent were considered the acts of the principal. The agent must be appointed in a proper way, and must have proper authority. He might be appointed to do all things in general or only to do certain things. In other words, he may be a general or special agent. An architect was a special agent to design and superintend the construction of works. He was to superintend the works that his principal had agreed to, and he was bound to carry out those works. During the execution of the work points would arise, as to which he must exercise his discretion, though, if he had not authority to exercise that discretion, he could not do so. Surely it was an easy thing to have it inserted in an agreement or contract between the building owner and contractor that the contractor and building owner should agree that the contractor should carry out all such deviations which the architect in his discretion might deem necessary. That would give an architect full authority to exercise his discretion and bind his employer, and if that were done an architect would be under no liability provided he acted honestly and to the best of his ability. Without that authority architects had no power to order variations and omissions, and if they did order them without the express wishes of their client they were liable. As to the case of Vaux *v.* Wimperis and Arber, the points were quite clear as reported in the current issue of the *Builder*, and the decision was consistent with all the principles of law. The hot-water pipes were ordered by the architects and accepted by them, and there was no disclosing the fact that they acted for any one but themselves. But, in ordering, had they disclosed the fact of their agency, they would not have been liable. The engineers supplying the pipes must have looked to the building owner for payment. [A voice: "But the plaintiffs must have known that the architects were agents to the building-owner."] On the facts there was no suggestion as to that. The architects sent the order and accepted the offer of the engineers on their own authority. It was in the power of the architects to protect themselves, for they could have ordered as agents, and in that way have protected themselves against responsibility. [A voice: "Would the client's initials on the estimate be sufficient?"] Not apart from a distinct custom in the profession A voice: "It was shown that the clients had paid money on previous certificates, which showed that the plaintiffs knew that the architects were acting as agents"]. This appeared to be the only transaction between the architects and this particular firm. As to the position of the architect in relation to the employer and the builder, he thought it was a most impolitic thing, as some gentlemen proposed, for any one to act as agent for both parties. As to extras, an architect had no power to order them unless he had discretionary power under the contract, but apart from that he could not, without express authority from the client. Architects as a profession should take steps to form the profession into a close one as solicitors and doctors had done, and he believed that was what both architects and engineers would eventually do, and in that way clearly define what their liabilities were.

The Chairman announced that the next meeting would be held on the 23rd inst., when Mr. A. T. Walmisley would read a paper on "The Use of Rolled Joists in Construction." The members of the Institution of Junior Engineers had been invited to attend on that occasion.

The meeting then terminated.

THE SURVEYORS' INSTITUTION:

PRESIDENT'S ADDRESS.

The first ordinary meeting of the present session of this Institution was held on Monday evening, in the premises of the Institution, Great George-street, Westminster, the President, Mr. John Shaw, in the chair.

The minutes of last meeting having been confirmed, the hon. secretary, Mr. J. W. Penfold, read a long list of donations to the library, and on the motion of the President, a vote of thanks was accorded to the donors.

The President then read an interesting address, which, however, was almost entirely taken up with questions of agriculture, which it is not within our province to report. The following passages, however, will be of interest to some of our readers:—

"Difficulties are frequently cropping up in rural districts now under by-laws really applicable to urban districts only. The effect of these by-laws is to make it necessary in all alterations of premises, or any new buildings erected in future, to supply plans and specifications to the Sanitary Inspector, whether such work relates to a populous district or to a country village, and also to detached farm-premises. I think that some exception should be made with reference to an isolated farm house and buildings and also to detached premises in a country village. The Acts regulating the ventilation, drainage, and area of cow-houses are most important, and have a

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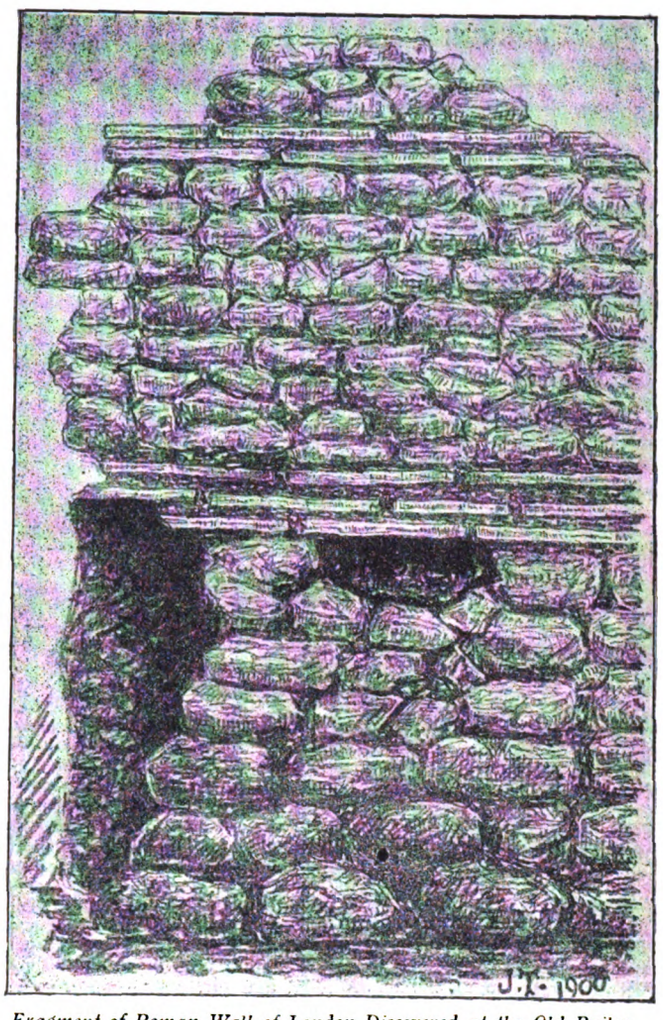
far-reaching tendency all good in their way, and might be carried out in all new buildings, but it would be a serious and expensive undertaking to remodel altogether the present cowsheds and premises. A good deal of dissatisfaction has been felt in the country with reference to the requirements of the model regulations issued by the Local Government Board for the guidance of local authorities in framing regulations under Section 13 of the Dairies, Cowsheds, and Milkshops Order, 1885. It was felt that the 800 cubic feet of air space required per cow was excessive, and the Council, at the suggestion of the Counties Palatine Provincial Committee, approached the Board on the subject with a view to some modification of this requirement, with the result of eliciting an explanation from the Board to the effect that they did not propose to lay down any requirement as to cubic space in the case of cowsheds, the cows from which were habitually grazed, but no modification of the requirement could be made in cases where the cows were not habitually grazed out of doors. It is probable that this will to some extent meet the dissatisfaction which prevails on the subject, and will tend to lessen the very considerable additional difficulties with which the milk trade was threatened. . . . For the grazing of cattle and the production of milk, nothing is of more importance than an ample supply of good water. In consequence of the great extension of the system of subsoil drainage, the rains now pass away so quickly into the rivers and streams, that springs have for some years been very low, and during dry times there has lately been a great scarcity of water both for cattle and for household purposes. It appears from the experiments of practical engineers that a large quantity of water might with proper management be impounded without interfering with the necessary river supply. More than thirty years ago I was engaged with the late Professor Anstead and the late Dr. Letheby in testing the flow of water in a great part of the river Derwent in Derbyshire, and we found an immense amount of underground water in the valley of the Derwent which could not be accounted for except by underground springs, which I have since proved and utilised. I should also like to refer to Mr. Mansergh's wonderful work in Wales for the supply of water to Birmingham, where, after providing 27 millions of gallons daily for the necessary compensation water for the rivers flowing from the valley, he estimates an excess of 72 millions of gallons daily available for Birmingham and other places, and this water if not so impounded would flow rapidly away and be of no practical use. This illustrates what might be done on a small scale in many parts of England, and I should be very glad if the subject could be taken up by some of our engineering members."

On the motion of Mr. A. Buck, seconded by Mr. Daniel Watney, a vote of thanks was accorded to the President for his address. Mr. Buck, in referring to the labour question, said there were various causes why labour had left the country and gone to the towns, but in his opinion the chief cause was the wretched state of the homesteads in which agricultural labourers formerly lived. The dwellings were often built on waste lands, there were no sanitary arrangements, and the younger generation of farm labourers became disgusted with their surroundings. In recent times this matter had been seen to, but there was a danger of going to the other extreme in the attentions of the sanitary authorities.

The next meeting of the Institution will be held on the 26th inst., when Mr. A. T. Walmisley will read a paper on "The Roofing of Farm Buildings."

COMPETITIONS.

NEWPORT TECHNICAL INSTITUTE. — We understand that Mr. W. V. Gough, of Bristol, and Mr. A. A. Burnett, F.S.I., of Southampton, have been awarded the premiums of 50*l.* each for plans for the new Free Library, Technical Institute, and County Offices at Newport, Isle of Wight, the plans of the former being adopted, subject to alterations, at an estimated cost of 9,500*l.* There were fifty-four competitors, and six plans were selected by the assessor (Colonel Edis, F.S.A.), the remaining four being:—Messrs. Houston & Houston, London; Mr. C. A. Sharpe, Westminster; Mr. H. Chatfeild Clarke, London; and Mr. F. A. Tugwell, Scarborough.



Fragment of Roman Wall of London Discovered at the Old Bailey. From a Drawing by Mr. F. Terry.

THE ROMAN WALL FRAGMENT AT THE OLD BAILEY.

THE accompanying sketch of the fragment of the Roman London wall recently uncovered at the Old Bailey was made by Mr. Terry, the Clerk of Works to the Corporation, who has kindly placed it at our disposal for illustration. It was, he says, impossible to take a photograph of the face of the wall in consequence of its proximity to another wall; but he has made the drawing with great care to give the exact appearance of the masonry.

The principal dimensions are figured. The lower portion of the wall, below the middle courses of tiles, projects about 14 in. in front of the upper portion above this point.

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting on the 13th inst., Mr. Mansergh, President, in the chair, a paper on "The Metropolitan Terminus of the Great Central Railway," by Messrs. G. A. Hobson and Edmund Wragge, MM. Inst. C.E., was read. The paper described the important works carried out in the St. John's Wood district in the construction of the latest London terminal station, comprising the tunnelled approach, the various under-bridges and over-bridges, the large goods warehouse and yard, the coal depot, the passenger station, new roads, &c. The sorting-sidings and engine-sheds, situated at Neasden, were also described. The Metropolitan division commenced at a point near Finchley-road Station, and terminated at the spot where Blandford-square had formerly existed. Under Lord's Cricket Ground, where there were shunting lines and sidings, three covered ways, containing altogether seven lines, had been constructed. The whole of the underground work was in the brown and blue clays of the London basin, and had been carried out without mishap of any kind. South of "Lord's" the lines began to spread out and to multiply, until at the crossing of the Regent's Canal accommodation for fourteen roads was provided. These were carried by a steel bridge of two spans, one span crossing the canal, and the other being a provision for the authorised "Canal, City, and Docks Railway." This bridge was of steel, and of the considerable width of 425 ft. The yard for the goods and passenger stations lay immediately to the south of the canal. To the west of the bridge the canal had been widened to form a basin, and a wharf-wall and shed had been constructed. The goods warehouse was a building consisting of five floors, and having a total area of 11½ acres and a contents of 8,500,000 cubic ft. The outside walls were built of brick, and the interior structure was mostly of steel, of which about 7,000 tons had been employed. The columns were ninety in number, seventy-two of which bore a load of 700 tons each. This load was distributed by means of steel base-plates and concrete foundations (weighing a further 100 tons per column), until the pressure on the clay was reduced to 3 tons per square foot. The warehouse was surrounded by a yard covered with a light roof. The coal depot, at present 4½ acres in area, was situated to the west of Grove-road, and was reached by a branch line carried under that thoroughfare. The yard was laid out entirely to suit the present method of handling coal by the dealers in London. It was intended to double the size of the yard as early as possible. The passenger station, known as Marylebone, was also described in detail.

AMERICAN MACHINERY PAVILION, PARIS.—The American Pavilion for Machinery at the Paris Exhibition is to be brought to Manchester and re-erected there. Messrs. Potts, Son, & Hennings, architects, have inspected the building, and on behalf of their clients, Messrs. Mather & Platt, of Salford, have arranged with the American Commission in Paris to purchase the structure as it stands with all accessories. Messrs. Mather & Platt have recently acquired fifty acres of land and propose to erect new works, and the building referred to will form an interesting feature in the scheme.

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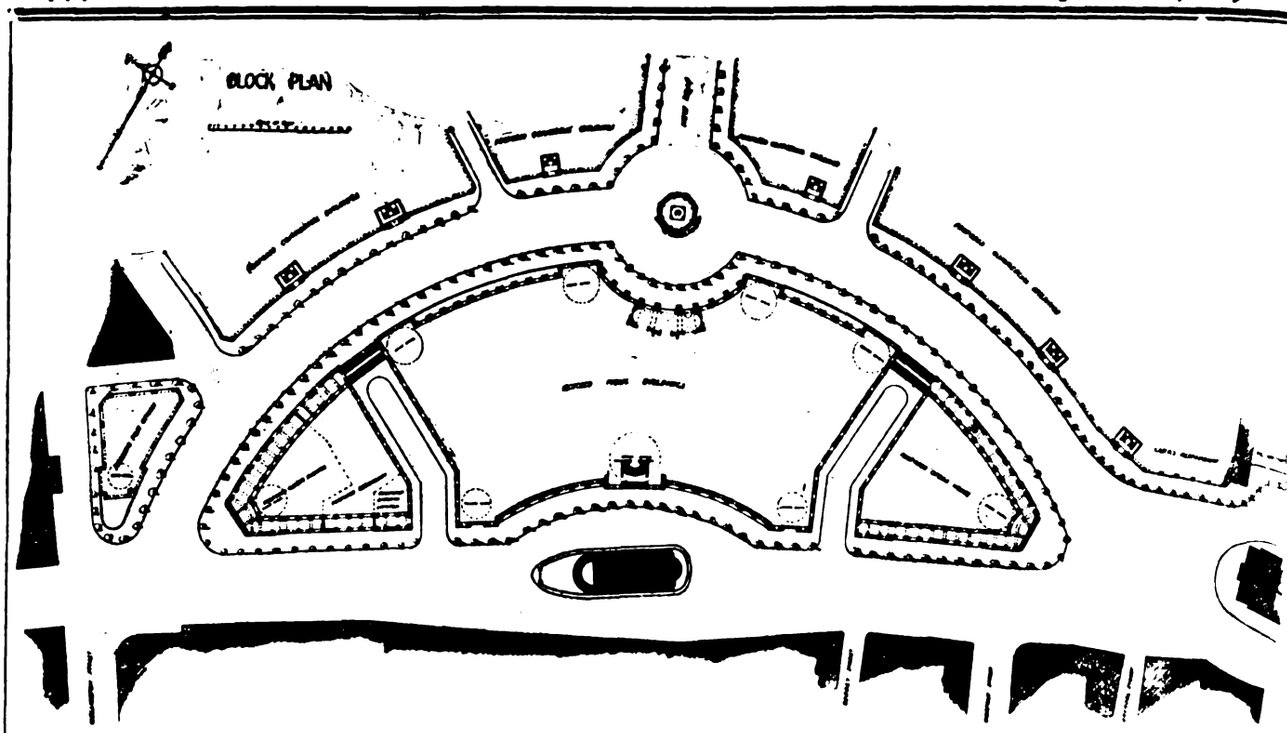

Design for New Street for the London County Council. No. 20. Plan.

Illustrations.

DESIGNS FOR NEW STREET FOR THE LONDON COUNTY COUNCIL.

WE publish in this issue the elevations of four more of the designs recently made for the crescent street and Strand frontage in connexion with the proposed Holborn to Strand street; viz.: those numbered respectively 17, 20, 21, and 29. As we have before observed, though the names of the architects are known, as long as they are (as they still are) officially private we do not think it proper to insert their names. When the embargo of silence is removed by the County Council authorities, we will then give, in a prominent position, a list of the architects with a reference to the distinguishing numbers of their designs, and to the dates when they were illustrated in our pages.

We have already, in our issue of November 3, commented at length on all the designs here illustrated. We subjoin the plan of No. 20, because it embodies a special feature in the laying out of the streets—the circus and central object at the junction with the main street proposed. We have given the plans whenever they contained any feature which was an essential element in the design, and which seemed necessary to explain the elevations. The profile of the frontage of No. 21, and the block plan of No. 17, were included on the elevation drawings, and have therefore been reproduced in the lithographs.

ARCHITECTURAL SOCIETIES.

GLASGOW INSTITUTE OF ARCHITECTS.—At an extraordinary general meeting of this Institute held on Tuesday—Mr. David Thomson in the chair—a special resolution was confirmed bringing the declaration required from members of the local Institute into conformity with the declaration of the Royal Institute of British Architects. At the same meeting reference was made to the death of Mr. Young, architect of the Glasgow Municipal Buildings and other important works, and the secretary was instructed to minute an expression of sincere regret thereon. At the close of the general meeting a meeting of the Alexander Thomson Memorial Trustees was held, under the presidency of Mr. T. L. Watson, for the purpose of examining the drawings and sketches submitted by Mr. D. Rome Guthrie, the Alexander Thomson travelling student. Descriptive notes of Mr. Guthrie's journey were read by Mr. M'Gibbon.—*North British Mail.*

THE ARCHITECTURAL ASSOCIATION OF IRELAND.—On the 6th inst. there was a meeting of this Association in the Grosvenor Hotel, the President, Mr. Frederick Batchelor, in the chair, when Mr. H. W. Chubb, of London, read a paper on "The Development of Locks, Keys, and Safes," which was illustrated by pictures of locks used from the earliest times, and also by lantern views. Commencing with a reference to the most primitive means of security—namely, a simple bar and pin—he spoke of Egyptian locks in wood and Roman locks in bronze and iron, exhibiting an increased degree of complication. He showed models of curious Chinese and Japanese padlocks at present in use, and directed attention to a picture of a Roman ring which had a key and seal attached. Early English keys were more in the form of modern ones. Pointing to a diagram of a beautifully designed key of the Renaissance period, he said that before an apprentice was at that time admitted to the guild of locksmiths, he was obliged to make a very fine key to be presented to the chief craftsman; and one or two years was often spent by the apprentice in making a simple key. A characteristic of some German locks of the Middle Ages was that they had projecting guides to enable a person to find the keyhole when he came home on a dark night. Prominent amongst the exhibits shown was a collection of Roman keys which, until recently, formed part of the "Forman" collection. Nearly every known variety of Roman key was illustrated in this, from the small finger-ring key up to the largest kind. One had a seal formed upon the end of its bow, with the letters "S. C." reversed. Two are almost unique, having angle-shaped bits; only one of this kind has been observed by the lecturer elsewhere, viz., in the Brussels Museum. Apart from the very varied forms of "bits," all proclaiming different kinds of mechanism in the locks they served, the bows were usually plain rings, but ornamentation was observable in a few. Where this was the case, the bows were of bronze and the rest of the key—or such portion as has escaped rust—of iron. In referring to Cammell's "99" steel alloy, Mr. Chubb said that recent experience in making up plates and slabs of this material into bankers' strong rooms had considerably increased the respect in which it was held by all those who had to work it. At no stage whatever of its manufacture was it soft, so that it either had to be worked and shaped when it was red-hot, or else by exceedingly powerful appliances when it was cold. As it had been found impossible to drill holes through it even with the heaviest steam-driven machinery at anything like a commercial speed, recourse was had to punching; and the force necessary for making each hole was ascertained to be 150 tons. The noise of the punching was like the report of a gun. Its immense toughness, which was practically twice that of the very best Siemens steel, interfered somewhat with the process of making each piece level. A few days ago a plate of it only ¾ in. thick proved so stubborn when being passed through the levelling rolls, that it broke a solid iron roller no less than 14 in. diameter right across its middle. It was not claimed that this alloy was absolutely impervious; but those facts showed that it possessed the two qualities of hardness and toughness, which were both necessary for the best bank rooms, in a degree so marked, that it was probably superior to any other kind of homogeneous steel for the particular purpose. A recent application of Cammell's Harveyed steel to the protection of bankers had been shown at the Paris Exhibition. A slab of this material 4½ in. thick was first taken up to Messrs. Armstrong & Mitchell's proof ranges, and there fired at at a range of 50 yards with a 6-in. 100 lb. shell. The shell was shattered, and the slab, which was uninjured, was then provided with hinges and turned into a door. It had no hole whatever through it, or even into its outer surface, to give lodgment for nitro-glycerine or dynamite; and, when closed, it had the appearance of being the entrance to, say, an Egyptian tomb, since there was not even a handle by which to pull it open. How the various locking and unlocking movements are effected was fully explained.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The first ordinary monthly meeting of the present session of the Sheffield Society of Architects and Surveyors was held on the 8th inst. at the School of Art. Mr. J. Smith occupied the chair. Mr. Beresford Pite read an interesting paper on "The Crafts and Art of Brickwork." Mr. Pite, who has recently been appointed Professor of Architecture in the Royal College of Fine Art, in the course of his lecture, said: The importance to a designer of full acquaintance with the nature and properties of the materials for which he designs needs not to be stated at length. In order to give expression in work to the special qualities of a material, his knowledge of it must not only be technical as to its nature and manufacture, but historical, so that its traditional uses and suitability may be considered and reflected in design. There is a necessary harmony and relation between the means employed and the end to be attained in architecture, as in every work of beauty. Beautiful design, sound construction, and satisfactory materials are each necessary to good architecture. The different expression of a wall erected in stonework and another built of bricks is an illustration of the importance of the material artistically. In that of stonework, the stones from their size and natural beauty, give the wall its character and expression. The material is natural, and may be in itself delightful; the working of it, the binding and jointing, and the cement are all certainly important, but secondary entirely to the stone in the interest of the structure. In a brick wall, the material is of no great in-

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terest; in spite of the dictum of Vitruvius, it is mean and humble, the uniformity of the size of the bricks and their smallness have this effect, but the interest and beauty of finished brickwork is very great. The mortar which embeds and encloses each brick unit, the bonding, regularity, and evenness of the whole, composed of so many units, are each factors of interest. The mortar or cementing material plays a much more important part than in the wall of masonry. Together with the bricks, it forms a concrete amalgam rather than a structure of squared blocks. This character can be readily seen in the remains of Roman brickwork in England, notably in the fine wall at Leicester. Mediæval and Elizabethan brickwork has much the same effect, the mortar joints being broad, but the work of the Georgian period witnesses a change of feeling. A finer quality of brick, suitable for carving and moulding into architectural forms, was largely used, and with it a fine and delicate mortar joint, the amount of mortar revealed on the surface of the wall being of the smallest possible extent. This work has more the characteristics of minute masonry. The bonding and planning of the courses of bricks became of great importance with the decline of mortar, the strength of such walling being dependent on the distribution of the weight and thrusts on the body of each brick, and not on its joints, the adhesive quality of the mortar being not a constructive consideration. Modern brickwork is a practical compromise between the mediæval and Georgian methods; the mortar joint is neither thick nor thin, and consistent bonding is often neglected, the use of powerful mortar being expected to make amends for it. In brickwork there is scope for fine handicraft and much human interest, and even a garden wall may be rendered beautiful and have character. The quality of texture and surface, which is valuable and important in all great work, can be imparted by a sympathetic study of even brick and mortar; the sympathy with the material that he uses will prevent an architect from lapsing into anachronisms in designing features unsuitable for execution in brickwork, and also provide the student with a new stimulant to the enthusiastic study of the elements of fine buildings.

EDINBURGH ARCHITECTURAL SOCIETY.—A meeting of this Society was held on the 7th inst. in Dowell's Rooms. Mr. W. J. Blain, Glasgow Architectural Association, gave a lecture on "Some Scottish Houses," in which he described and compared the houses of the Dee and the Don—Drum House, the Castles of Crathie, Craigievar, Midmar, and Castle Fraser.

BRISTOL SOCIETY OF ARCHITECTS. — The ordinary monthly meeting was held on Monday at the Fine Arts Academy, Mr. Joseph Wood, vice-president, in the chair. Mr. Harold Smith, lecturer on architecture at the Merchant Venturers' College, delivered an address on "The Architects of the Court and Capital of England in the Seventeenth Century." The speaker first dealt with the Renaissance of the Elizabethan and Jacobean periods, showing how it eventually culminated under the patronage of the Court in the work of Inigo Jones. He then spoke of the effect of the civil war, and pointed out that most of the artists of the Restoration were foreigners. After a description of the capital as it was in the seventeenth century, he concluded by describing the work of Sir Christopher Wren in restoring the City, building St. Paul's, and adding to Hampton Court and Greenwich Hospital. The paper was illustrated by numerous photographs, shown by means of the lantern, and also an interesting collection of prints relating to work of the period.

ARCHÆOLOGICAL SOCIETIES.

ROYAL ARCHÆOLOGICAL INSTITUTE.—At the general meeting on the 7th inst. of this Institute, Sir Henry Howorth, President, in the chair. Mr. H. S. Cowper exhibited a collection of over 200 objects purchased during a journey in North Africa, Egypt, and Asia Minor last winter. They included stone and bronze figures, terra-cottas, gems, rings, and coins, weights, scarabs, and beads, and stone and bronze implements. Among the early and prehistoric things were a curious perforated stone mallet, possibly a weight adapted for this purpose; an earthenware figure of the Trajan "owl-face" idol type from Adalia; and a sard seal from Aleppo with a highly convex surface covered with characters believed to be Hittite. The most interesting object in the collection was a stone figure of Amasis, 19 in. high, and in perfect condition. This is of extreme rarity, and was acquired close to Sais, in the Delta. An early cylinder of apparently the First Dynasty, acquired in the Fayum, seems to contain a reference to the "Lake" at that early date; and there were a few good bronze figures. The gems were numerous, the finest being a chalcedony scaraboid with the type of Aphrodite robing, of fourth-century work; an early scarab with a sow; an agate with Scævola before L. Porsena; and a largish nicolo with a beardless Jupiter. Two fine examples of the Cyrenaic gold staters with the name of Golantheus were among the coins, and among other Greek objects of interest may be noticed an Aryballos in the shape of a maiden's head, of archaic sixth-century work; a Greek lamp from Cyrene with a head of Silenus; and several very pretty terra-cotta female heads of fourth or third century work from Naucratis. A leaden sling stone from Rhodes has the inscription BABYPTA. In a paper entitled "Miscellanea Heraldica," by Mr. J. Lewis André, F.S.A., the reader pointed out the great influence possessed by the science of heraldry during the latter part of the Middle Ages, and its extensive employment in architectural decorations. Several curious armorial bearings and the fabulous explanations of them were noticed, and the use of the savage man, or "woodhouse," in heraldry, art, and ceremonial was discussed at some length. It was pointed out by examples from his plays that Shakespeare took for granted a fair knowledge of heraldry in his hearers or readers. The paper concluded by noticing the value set by the Sussex family of Pelham on their badge of the buckle, and by that of the Percies on their motto "*Esperance en Dieu*." Messrs. Green, Brabrook, and Allen Browne took part in the discussions.

BRITISH ARCHÆOLOGICAL ASSOCIATION. — The session 1900-1901 commenced on Wednesday evening the 7th inst., when a meeting was held under the presidency of Dr. W. de Gray Birch, at the rooms in Sackville-street, Piccadilly. A most interesting lecture was given by Mr. Newstead, the curator of the Grosvenor Museum at Chester, upon the Roman remains recently discovered in that city. The lecture was illustrated by photographs of the various objects found and the sites of the several discoveries. Within the past two years extensive alterations have been carried on within the boundaries of the city of Chester, which have yielded very many relics of the Roman occupation. One of the most important architectural relics of ancient Deva was discovered in the summer of 1898, and consisted of a semicircular structure composed of brickwork and masonry, resting upon a floor of thick concrete and large tiles; the inner surface was covered with three grades of plaster, the first being finely-powdered brick, the second chiefly of coarse sand, and the third a finishing coat of finely-ground quartz. The site of the building is in Godstalls-lane (off Eastgate-street, North), and the depth at which the remains were found is 8 ft. 11 in. Mr. Newstead considers the structure was probably a lararium. Close alongside was found a wooden spade, similar to those used by the Romans in their mining operations. East of this structure, but at a higher level, was a rough concrete floor made of fragments of Roman roofing-tiles faced with cement, and upon this floor were quantities of fine charcoal and many slips of waste sheet bronze, two bronze fibulæ of the harp-shaped type, and a curious implement, somewhat resembling a "bit" used by a modern joiner. One of the most interesting things here discovered was a slip of bronze with a buckle-shaped attachment, bearing the motto in green and red enamelled letters, VTERE FELIX. During the last three months extensive excavations have been made in the rear of premises in Eastgate-street, a few paces west of Godstalls-lane, which brought to light considerable traces of Roman work in a series of drains having a base of flat broad roofing-tiles with the sides and top of roughly dressed masonry. On October 9 last about 15 ft. of lead water pipes in differing lengths were dug out, portions of which bear inscriptions to Agricola. One of these inscriptions is on a raised band 3 ft. 10½ in. long by 2 in. broad, the letters practically filling the whole space, and is as follows:—"IMP. VESP. VIIII. T. IMP. VII. COSCN. IVLIO AGRICOLA LEG. AUG. PR. PR." The inscription was submitted to Mr. Haverfield, who considers the date to be A.D. 79, as Agricola governed Britain from A.D. 78 to A.D. 85, though the occurrence of Agricola's name on the pipes does not imply any special action or presence of his at Chester, but is due to the common method of dating. It is satisfactory to know that these most interesting relics of the Roman city have been preserved by Mr. Newstead's efforts, and have been presented by the owners of the property and the contractor for the works to the Chester Archæological Society. The various distances and depths, and the exact nature of the several localities at which all the relics were discovered, together with their relative positions, are all accurately recorded by Mr. Newstead, to whom a cordial vote of thanks was given by the meeting.

THE BUILDING TRADES' GIFT TO THE NATION:

HOMES FOR DISABLED SOLDIERS.

WE are asked to announce the following additional subscriptions which have come to hand:—

	£	s.	d.
The Building Trades of Walsall (per Mr. W. Wistance)	100	0	0
The Birmingham Master Builders' Association (per Mr. W. Sapcote) (third instalment)	100	0	0
Messrs. Holloway Brothers	54	10	0
The Nottingham Master Builders' Association (per Mr. W. J. Barton) (second instalment)	47	5	0
Workmen of Messrs. Holloway Brothers	25	2	1
The *Builders' Journal* Shilling Fund (second instalment)	14	17	9
The Employees of Mr. Walter Wallis (per Mr. A. Sweetman)	7	11	0
Mr. T. W. Heath and Workmen (Kensington)	3	3	6
Workmen of Messrs. T. Rider & Son	3	0	0
Mr. A. S. Turner and Workmen	2	12	0
Messrs. G. Candler & Sons and Workmen (Brixton)	1	18	9
Mr. C. Kibley and Workmen (Plumstead)	1	17	0
Workmen of Messrs. Barnes & Co. (Shoreditch) (third contribution)	1	17	0
Mr. Burkitt (per Mr. Robt. Neill)	1	1	0
The Yorkshire Federation of Building Trades' Employers (per Mr. W. R. Thompson)	0	17	6
Messrs. H. Stevens & Co. (Southampton)	0	8	6
Messrs. M. & E. Whewell (Blackburn)	6	0	0

The foregoing list was sent for publication last week, but received too late. Since then we have received the following further list of donations:—

	£	s.	d.
Manchester Master Builders' Association	65	0	0
Mr. Warburton (Manchester)	20	0	0
Longridge Master Builders' Association	9	0	0
Workmen of Messrs. Perry & Co.	34	13	0

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend the Hampstead Guardians 2,005*l.* for the erection and equipment of laundry and boiler house, and for the installation of electric light at their workhouse; and the Metropolitan Asylums Board 75,000*l.* for the erection and fitting of an Asylum at Tooting Bec.

Works Department.—The same Committee reported as follows:—

"The Works Accountant has reported to us with reference to the necessity of altering the percentages to be added to the cost of estimated works to cover general and establishment charges. The percentages added to works completed since March 31, 1900, were provisionally fixed at 2¼ per cent. for general and 3¾ per cent. for establishment charges, making 6 per cent. in all. The estimated expenditure on works for the year 1900-1 is 300,000*l.* There has been some rearrangement of the charges as between 'General' and 'Establishment,' and in order to cover these charges the accountant now estimates that the percentages should be 2 per cent. and 4½ per cent. respectively, making a total percentage of 6½ per cent. We have accordingly fixed these percentages to be added to the cost of estimated works completed in the six months to March 31, 1901."

Mr. Beachcroft said he understood that the estimated expenditure for the current year was 300,000*l.*, while last year he believed it was 370,000*l.* He would like to know whether there was any prospect in the shape of references for the Council to justify the hope that the Works Department would be supplied with sufficient work, or was the Council innocently or ignorantly starving the department.

Mr. Bruce, Chairman of the Committee, replied that up to the end of the year there was ample work for the Department, and

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whether more was given would depend on the Council's Committees and the Council itself.

Colonel Ford said they knew that the Works Department depended for success on the amount of work given to it, and the tendency seemed to be to reduce that work.

Street Improvement.—The Improvmeents Committee recommended, and it was agreed :—

"That, notwithstanding any previous resolution of the Council, the application to Parliament for powers to widen Scrubb's-lane, Brook Green-road, and Fulham Palace-road, sanctioned by the Council on July 31, 1900, be made in general accordance with the plan approved by the Improvements Committee on October 31, 1900."

The Water Question.—After a long discussion and the defeat of two amendments, the following recommendations of the Water Committee were carried.—

"(*a*) That a bill be promoted in the Session of 1901 for the purchase by the Council of the undertakings of the eight metropolitan water companies.

(*b*) That it be referred to the Parliamentary Committee to prepare and present to the Council the necessary Bill for carrying out the above recommendation, and also the necessary Water (Finance) Bill."

The Housing Question.—The Housing of the Working Classes Committee brought up the following report :—

"The Council on October 23, 1900, passed the following resolution :—'That it be an instruction to committees to confer with the Housing Committee before bringing up to the Council any proposal the carrying out of which would involve the displacement of twenty or more persons of the labouring classes, and in all cases where the displacement of any such persons is involved, to state in their report what action is proposed with a view to provision being made for the re-housing of such persons.' In connexion with the above resolution, our attention has been directed by the Building Act Committee to an application made to that Committee by Mr. H. H. Collins on behalf of Messrs. Davis Brothers for consent to the formation of a street to lead out of the north side of Bethnal Green-road, and also for consent to the widening of Blyth-street and a portion of old Bethnal Green-road. It appears that by the proposed scheme, 210 small houses occupied by persons of the working class will be cleared away. On the basis of each house containing on an average four rooms, and calculating two persons per room, it may be estimated that 1,728 persons of the working class will be displaced by the execution of the scheme. The application states that 141 houses will be erected to front on Blyth-street and on the proposed new street, and taking each house to be three stories in height and to contain six rooms, accommodation will thus be provided for 1,692 persons, leaving a balance of thirty-six persons displaced who will not be provided for in the new dwellings. . . . . Having regard to the fact that the application is made on behalf of private individuals who are under no statutory obligations to make provision for persons of the working class whom they displace, we are unable to advise the Council to take any action in the matter. The scheme appears to be a satisfactory one in other respects, and we propose to watch its development. . . . ."

The Committee also brought up the following report :—

"We report, for the information of the Council, that since March 31 last the following working-class dwellings have been completed, and are now occupied :—

Name of Buildings.	Date of First Letting.	Number of Persons Accommodated.	Estimated Cost (land and buildings).
	1900.		£
Holmwood-buildings, No. 97, Southwark-street	April 2	72	5,444
Benson-buildings	" 9	180	11,814
Hedsor-buildings	" 16	410	23,683
Abingdon-buildings (Boundary-street area)	May 7	360	23,046
Laleham-buildings	" 14	380	21,111
Murphy-buildings	" 14	400	
Gardiner-buildings	Oct. 22	278	29,495
Hunter-buildings (Falcon-court, Borough, scheme)	...	...	
Cobham-buildings	...	...	15,464
Millais-buildings (Millbank estate)	June 25	120	15,064
Leighton-buildings (Millbank estate)	July 23	120	
Cranford-cottages, Brook-street, Limehouse scheme	" 16	108	5,325
	Total	2,428	150,446

Another block of buildings on the Millbank estate, viz., Romney-buildings, accommodating 200 persons, will be completed and ready for occupation within about ten days from this date.

Before the dwellings are occupied we have arranged for the block to be opened to inspection by members of the Council and their friends on Monday, 10th inst. It should be mentioned that Romney-buildings have been completed in five months, and Cobham-buildings two months before the specified time, and we think that the expeditious manner in which these works have been carried out by Messrs. Holloway Bros. and the Works Department respectively reflects great credit on the contractors and that Department. . . . ."

Temporary Structures. — The Building Act Committee brought up the following report :—

"In our report, dated October 15, 1900 (presented to the Council on October 23), we stated that we had arranged for the issue to the occupiers of premises on the line of route of the march of the City Imperial Volunteers, of notices, calling attention to the necessity of the Council's licence being obtained in respect of temporary structures proposed to be erected, and also to the necessity for shoring up balconies intended to be used for the accommodation of sightseers. We have now to report that 128 applications were made for the Council's licence. Of these ninety-six were granted, two were refused, six were received too late for consideration, and twenty-four, not being in order, were returned to the applicants. In addition to these, sixty-eight structures were erected without the Council's licence, the attention of the Council being called thereto by the District Surveyors. In each of these cases the owners were informed of the illegality of their action, and cautioned as to their liability in case of accident. Fortunately no such accident occurred, but we consider that the matter should not be allowed to rest here, and with a view to preventing the erection of structures of this kind on future occasions, we have instructed the Solicitor to take proceedings, if possible, for the recovery of penalties from the owners of all structures which were erected without the Council's licence. Requisitions to survey what appeared to be dangerous structures were sent to the District Surveyors in sixty-eight cases, in twenty-two of which it was found necessary to serve notices to take down or secure the structures. In the majority of the other cases the structures were secured by shoring. In three instances wooden structures were removed by the Council's officers on the day of the procession owing to the construction being unsatisfactory. The measures taken by the Council at the time of the Diamond Jubilee procession in regard to the shoring of balconies seem to have had a beneficial effect, and in only one instance did the owners refuse to carry out suggestions made by the Council's officers where balconies were inefficiently shored or structures hurriedly erected without the Council's licence."

Having transacted other business the Council adjourned.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

At the meeting of the London County Council on Tuesday the following applications under the 1894 Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated :—

Projections.

Hampstead.—A porch at the entrance to a building known as Broadhurst Mansions, on the south side of Broadhurst Gardens, Hampstead (Mr. G. W. Booth for Messrs. G. Trollope & Sons) —Consent.

Lewisham.—A projecting lamp over the entrance to the Salisbury public-house, High-street, Lewisham (Mr. A. L. Guy for Mr. C. Hutchinson) —Refused.

St. Pancras, West.—A bay on the flank of No. 10, Cambridge-terrace, Regent's Park, St. Pancras, to abut upon Cambridge-place (Mr. W. D. Caröe for the Misses Barron).—Refused.

Strand.—An iron and glass shelter at the entrance to the new grillroom at the eastern end of Prince's Restaurant, Piccadilly (Messrs. J. T. Wimperis and Arber for the Prince's Hall Restaurant Company) —Refused.

Width of Way.

Hackney, South.—Five houses on the west side of Brookfield-road, Hackney, with the forecourt fence at less than the prescribed distance from the centre of the street (Mr. W. L. Beurle).—Consent.

Formation of Streets.

Bethnal Green, South-West. — That an order be issued to Mr. Collins, sanctioning the formation or laying out of a new street for carriage traffic to lead from Bethnal Green-road to Old Bethnal Green-road, Bethnal Green, and the widening, in connexion therewith, of Blythe-street and a portion of Old Bethnal Green-road (for Messrs. Davis Brothers). That the name Teesdale-street be approved for the new street.—Agreed.

Cubical Extent.

Greenwich.—The erection at Enderby's Wharf, River-side, East Greenwich, of a building to exceed in extent 250,000, but not 450,000, cubic feet, and to be used only for the purposes of the manufacture and storage of telegraph cables (Mr. F. R. Lucas for the Telegraph Construction and Maintenance Company, Limited).—Consent.

Finsbury, East.—The erection on the south side of Little Arthur-street, Golden-lane, City, at the corner of Hot Water-court, of a building to exceed in extent 250,000, but not 450,000 cubic feet, and to be used only for the purposes of the trade of a shirt-maker. (Mr. J. O. Cook for Messrs. J. James & Co.).—Refused.

Deptford.—The erection at the London Joinery Works, Rollin-street, Canterbury-road, Deptford, of a building to exceed in extent 250,000, but not 450,000 cubic feet, and to be used only for the purposes of a timber-sawing, planing, moulding, and framing mill. (Mr. W. H. Brown for Messrs. Farquharson Brothers & Co.).—Refused.

Islington, West.—A van factory on the north side of Albert-mews, York-road, King's Cross, to exceed in extent 250,000, but not 450,000 cubic feet, and to be used only for the purposes of the trade of building and repairing vans. (Messrs. Potts, Son, & Hennings for Messrs. Herbert Clarke, Limited—Refused.

BOOKS RECEIVED.

THE CASE LAW OF THE WORKMEN'S COMPENSATION ACT. By R. M. Minton-Stenhouse. Second Edition. (Effingham Wilson.)

ARCHÆOLOGIA ÆLIANA: Vol. XXII., Part 2. (Andrew Reid & Co.)

Correspondence.

***To the Editor of* THE BUILDER.**

THE STATISTICS OF SAXON CHURCHES.

SIR,—Will you allow me this opportunity of saying how grateful I shall be if any of your readers familiar with our old churches will kindly send me an intimation of any signs of pre-Conquest work other than those mentioned in my list. What is most valuable, of course, is some distinctive mark, and not merely a general appearance of high antiquity, or such neutral features as plain tower or chancel arches. The catalogue now offered is a provisional one, and I shall receive with pleasure any corrections or suggestions which your readers may be good enough to send to me.

G. BALDWIN BROWN.

The University, Edinburgh.

A LONDON STREET IMPROVEMENT.

SIR,—Referring to the Note in a recent issue of the *Builder* relative to the intention of the London County Council to apply for Parliamentary powers to widen Central-street, St. Luke's (connecting Old-street and City-road), this would, if granted, materially assist a scheme which I am putting forward for the formation of a direct thoroughfare from south to north.

A committee of the Corporation of the City of London is now considering the best means of rendering Southwark Bridge more useful for vehicular traffic, as, chiefly on account of the steepness of its approach on the north side, it is of little value at present. I have long advocated the importance of forming a viaduct from the Bridge passing in a north-westerly direction, crossing

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Upper Thames-street and debouching into Queen Victoria-street opposite Bread-street which would be practically on a dead level. By the widening of Bread-street and Wood-street, or the formation of an entirely new street a little to the west, the route would be continued through Red Cross-street, Golden-lane (which are both widened), and Central-street to the City-road; and a very inexpensive widening of streets opposite would lead to Islington Green, near the Agricultural Hall. In this way a direct thoroughfare *viâ* the Elephant and Castle and Dover-street would be obtained from the south and south-east to the north and north-east.

Among the advantages of this route would be the following. The lessening of vehicular traffic on London Bridge, and the easement of the streets around the Mansion House, and especially Cheapside. By the viaduct the traffic westward would pass through Cannon-street and St. Paul's-churchyard to Newgate-street, which is now being widened. The widened streets between Queen Victoria-street and Fore-street would give a communication north and south from Cheapside, as all the streets are at present narrow and generally choked with vans. There would be the saving of a mile from Southwark Bridge to Islington Green; and the easier gradients would form an excellent tram route and relief to the terminus in Moorgate-street, and also an easement to the traffic at the Angel, Islington.

Outside the City, with the widened Red Cross-street, Golden-lane, and Central-street, the cost of extending the street to Islington would be very small, as the value of the frontages would go a long way towards recouping the cost of the property taken.

On the south side all the thoroughfares are wide and the approaches to the bridge are not so steep as those on the north, and these could be reduced. The construction of the streets in the City would, of course, be an expensive matter; but as there can be no doubt of this being a Metropolitan improvement, the London County Council might reasonably be expected to contribute its share of the outlay, and the value of the frontages to the new street would materially lessen the cost.

Some such scheme as this is absolutely necessary, and must come sooner or later; and no time can be better than now, whilst the improvement of Southwark Bridge is under consideration.

J. Douglass Mathews, F.R.I.B.A.

BELFAST ASSEMBLY HALL COMPETITION.

Sir,—About a year ago the Presbyterian Church of Ireland advertised for designs for their new Assembly Hall and Central Offices. The designs were sent in on March 12 last, and the assessor awarded the first premium (100*l.*) to my design; the second premium (50*l.*) to Messrs. W. Hemstock & Son, of Leeds; and the third premium (25*l.*) to Mr. Wm. C. Laidlaw, of Edinburgh.

I am now informed that the Committee decline to accept any of the designs submitted in the competition, and have appointed Messrs. Young & Mackenzie, of Belfast, to carry out this work.

I understand that Messrs. Young & Mackenzie advised and assisted the Committee in the preparation of the competition, and as these gentlemen evidently possess the entire confidence and support of the Presbyterian body, I think it is much to be regretted that they were not entrusted with the work at the outset, thus obviating the waste of much time and energy on the part of the unfortunate competitors.

I am unable to illustrate my design, as the Committee retain my drawings and refuse to lend them to me for the purpose of publication.

Rupert Savage.

THE CURFEW.

Sir,—In your last issue of the *Builder* you have a report of a paper on "Church Bells," read before the Architectural Association Discussion Section, in which it is mentioned that considerable interest was taken in the reference made by the author to the ancient custom of ringing the curfew, and three places were mentioned where this still prevails during the winter months, viz, Hythe, Hitchin, and Gray's Inn.

In this ancient borough the curfew is rung not only in the winter months, but all the year round, with the exception of Sundays, Christmas-day, Good Friday, and any local holidays. The curfew is rung from 8 to 8.15 in the evening. Another bell is rung in this town at five o'clock in the morning from 5 to 5.15; it is called the workmen's bell, and is supposed to warn those whose duty it is to be at work at six in the morning that it is full time that they were out of their beds. These bells are rung in the Town Hall, and, curious to say, the bells in the Town Hall are the only bells which call the people to church on Sundays or any other Holy days.

On the induction of a new vicar to the parish, it is part of the vicar's duty, after he has been inducted in the parish church, to proceed to the Town Hall and personally to ring a peal on the eight bells. I hope you will pardon me from giving you this article, but I think it might be of interest to those who have not yet paid a visit to this ancient and loyal borough, which I am pleased to notice in any royal proclamation which is issued, in which it is stated that this proclamation is to be read "in the churches of Great Britain and Ireland and Berwick-upon-Tweed."

J. Lorimer Miller,
Architect.

Berwick-upon-Tweed.

A TRICK OF THE TRADE?

Sir,—On August 4 I advertised in your paper for a situation as junior assistant, and, amongst others, received a letter from a firm of architects in a provincial town asking for particulars, which I supplied them with at once.

On August 13 they wrote back saying they were not prepared to give the salary I asked. As it was barely enough to keep me, away from home, I replied saying that I should certainly not accept anything less than a sum I named, and thought that they must have misunderstood my application, thinking I wanted a situation as tracing clerk.

I did not expect to hear from them again, but, to my surprise, I received another letter on August 25, asking if I was still disengaged, and, if so, would I send them specimen drawings. I supplied them with these the following day. On September 4 they acknowledged these and said they would write me in a day or two.

The next letter, which I was to receive "in a day or two," arrived on September 22, in which they asked if I would have any objection to go to their branch office, and to residing there, and adding that they would be out of town for *a day or two*. However, I replied by return, so that it would be there when they got back, saying that I should have no objection to going there at all.

After waiting until October 1 for a reply, I wired to them saying that I must know something definite by return, and the next day I received a letter written, I presume, by the office boy, informing me that the principal was away at present in South Wales, but would return by the end of that week, when he would *at once* communicate with me. I do not know if the "principal" is still in South Wales, but he has not *yet* communicated with me, so I suppose he must be.

This, sir, is my first experience of seeking a situation, and I should be very grateful to you if you would make the facts known in your valuable paper for the benefit of all those seriously thinking of entering the profession. For my part, I think, after being articled five years, such treatment as this is rather disheartening.

Junior Assistant.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

18. The Advantages and Disadvantages of High-pressure Supply — London County Council Regulations—Earthing the Middle Wire—Electrolytic Troubles.

THE Board of Trade Regulations originally fixed the maximum pressure of supply at a consumer's terminals as 300 volts continuous or 150 volts alternating. These regulations were revised in 1890, and the maximum pressure of supply, whether alternating or continuous, was fixed at 250 volts. About this time, also, several companies commenced to supply their consumers at pressures of 200 volts and some even at higher pressures. The advantage to the supply company of serving at these high pressures soon became obvious to electricians, and it is highly probable that supply at 100 volts pressure by a public company will soon become a thing of the past.

If we raise the pressure of supply from 100 to 200 volts, then, since energy is the product of current and pressure, it is obvious that we shall only require half the current and, therefore, mains of half the size to supply the same quantity of energy. As the cost of the mains is generally a large fraction of the total cost of the station, this is a very important saving. Another way of looking at it is to say that, if we double the pressure, then the same mains can supply twice as many consumers. In the above calculation we have supposed the same current density in the main, that is, that it will carry the same current at the two pressures. If we are only considering the heating of the main, this is a perfectly fair supposition to make, but in central station practice it is not the heating of the mains that fixes their size, but the drop of electric pressure due to their resistance. An ordinary electric supply main can carry three or four times the current flowing at its maximum load without undue heating, but in this case there would be an excessive drop in the pressure at a distance from the station. By the Board of Trade Regulations the drop of pressure in a distributing main must not be greater than 3 per cent. of the declared standard pressure. Hence it is this regulation that fixes the size of the mains.

If the resistance of the mains is R ohms, the current flowing in them C amperes, and the pressure of supply E volts, then the drop of pressure at their far end is C R volts. The percentage drop of pressure is $100 \frac{C R}{E}$. Now if we double the pressure of supply E, we must also double the current C if this percentage drop of pressure is to be the same in the two cases. Hence in the case of supply from central stations in a town, by doubling the pressure we can also double the permissible current, and thus quadruple the capacity of the mains. By raising the pressure of supply from 100 to 200 volts we quadruple the capacity of the copper mains of the supply company. If we raise the pressure of supply to 250 volts, the maximum permissible, then the capacity of the mains is increased $2{\cdot}5 \times 2{\cdot}5$, *i.e.*, $6\frac{1}{4}$ times. This explains why supply companies are so anxious to serve at high pressures.

We shall now consider this increase of pressure from the consumer's point of view. The advantages are that the company will probably charge him less if he take his current at the higher pressure, and that the cost of wiring his house will be slightly reduced. There may be a 10 per cent. saving in the total cost of the wiring owing to the lighter wires required.

The disadvantages are numerous. First of all, there is the much more unpleasant shock that can be got from the fittings. A 100-volt shock is hardly felt by most people unless their hands are very moist and make good contact. A 200-volt shock is felt by everybody and is often very unpleasant. In many cases, however, this is by no means the worst shock that can be got from the fittings. We have seen that in a three-wire continuous current system the pressure of the middle main from earth is sometimes considerable, and hence this has to be added on to the pressure of supply in order to get the pressure between the main connected to the positive outer and earth. For example, in a three-wire system the positive main may be at a potential of +400 volts, the middle at a potential of +150 volts, and the negative main at a potential of −100 volts. In those houses which are supplied from the middle and negative outer the maximum possible shock would be 250 volts, but in the other half of the houses supplied from the station there are wires the difference of pressure between which and the water or gas pipes is 400 volts. A shock at this pressure could easily be fatal. This is a serious drawback to the use of high pressures, and we shall consider below whether it can be eliminated by earthing the middle wire.

Another drawback is the necessity of having more expensive switches and fuses. Switches which will easily break a current at 100 volts will arc across at 250 volts, and there is a risk of serious damage being done. Again, double-pole switches, with a thin fibre separator between the positive and negative parts, such as are used on 100-volt circuits, are unsuitable for 200 volts, and are usually forbidden by the fire insurance companies. Similarly double-pole cut-outs are forbidden and two separate single-pole cut-outs must be used. Small cut-outs on 100-volt circuits often have a break of only 1 inch. The least-sized break at the higher pressures is $1\frac{1}{2}$ inches. Special switch lamp-holders have to be employed, and the insurance companies insist that only the highest quality flexible wires are to be used.

Two hundred-volt lamps are dearer than 100-volt lamps; they are also larger and clumsier. The efficiency of the ordinary high-voltage lamp in the market is at least 10 per cent. worse than that of a 100-volt lamp. Its life is shorter, and as a rule it ought only to be used in a vertical position. The inferiority

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of the 200-volt lamp might be got over by arranging two 100-volt lamps in series, but the drawback to this solution would be the complication of the fittings and the impossibility of having only one lamp burning at once. As low candle-power lamps can be had at 100 volts, the meter bill need not be increased by this arrangement.

In busy manufacturing towns like Glasgow, which have adopted a 250-volt service on the three-wire system, it is found that considerable inconvenience is caused in workshops and factories by the necessity of running two enclosed arc-lamps or five open arc-lamps in series between the mains. Hence it is difficult to practise those petty economies of turning off a lamp when it is not wanted which make electric lighting, comparatively speaking, cheap. It is possible to make an enclosed arc-lamp that will run on a 250-volt circuit, but it is found that such a lamp has a very poor light efficiency. The following are the results of experiments made by Mr. W. B. Sayers on various types of arc-lamps on the Glasgow circuit. He found that open-type arcs were twice as efficient for light-giving purposes as enclosed-type arcs and about three times as efficient as ordinary glow-lamps. He also found that a group of glow lamps taking the same energy as a 250-volt enclosed-type arc-lamp gave out three times as much light. This proves that a 250-volt enclosed-type lamp is of no commercial use for light-giving purposes.

The actual numbers Mr. Sayers found by his experiments are instructive and are given in the following table :—

	Open-type Arc.	Enclosed-type Arcs.		New Glow-lamps with Clear Globes.			
	5 in series.	2 in series.	1	16, 16 c.p.		31, 8 c.p.	
Current in amperes	10	4	2·75	4·4		4·5	
Watts	500 per lamp.	500 per lamp.	680	1,100	Reduced to 500	1,120	Reduced to 500
Relative luminosity	1,000	475	100	680	310	750	333

The necessity of having five open arc lamps in series on 250-volt circuits is not only a drawback because we have to turn on the five if only one be required, but also because one faulty lamp will affect the running of the other four. In large warehouses attempts have been made to get over the difficulty by having what Mr. Sayers calls a "ganger" switch-board. A separate pair of cables is run to every lamp, so it is easy at the switch-board to arrange that any five lamps in the warehouse can be put in series. A drawback is the necessity of having telephones or speaking-tubes at various convenient points to communicate with the switch-board attendant. Another solution, and in our opinion the only satisfactory one, is to have a rotary converter to transform the 250 volts into 100 volts or any other voltage that may be found most convenient for the type of arc lamp used.

The London County Council sought recently to impose severe restrictions before granting their consent to the City of London Electric Lighting Company raising the pressure from 100 volts to 200 volts in its Southwark area. They wanted the company to bear the cost of all the necessary changes in the house wiring, that it should change the lamps free of cost, that if the fire insurance companies raise the consumer's premium, then he should be entitled to deduct this amount from the payments he makes for electricity supply, and, most important of all, that they should lower their charge to the consumer by at least 15 per cent. When also three wires connected to the three supply mains are brought into a consumer's premises, then the middle wire should be split so as to make two pairs of undertakers' terminals at least 6 ft. apart. The reason of this restriction is to prevent the possibility of a 400-volt shock. For this reason also the London County Council seem to approve of earthing the middle main at one point.

In a good many towns in this country it has become the custom to supply alternating current at 200 volts. The gain by doing this is not so great as with direct currents, owing to the case with which a pressure of an alternating current supply can be altered by means of a transformer. The London County Council usually make the stipulation before granting permission to an alternating current supply company to raise its pressure, that if a consumer desire to be served at 100 volts instead of 200, then the company have to fix at his house a transformer which will reduce his pressure from 200 to 100.

Owing to the great extension of electric traction in this country using a standard pressure of supply of 500 volts and the tendency to have one power house for traction and lighting, there will be many advantages in supplying the lighting circuit on a three-wire system with 500 volts between the outers. In this case the generators can supply the traction circuit by day and assist the lighting circuit at night-time. The loads will overlap to a certain extent, but this difficulty can be overcome by accumulators. The effect of adding a traction load to a lighting station will obviously be to level up what electricians call the load-factor, and greatly increase the output without much increasing the standing charges.

Another advantage from the supply point of view is that powerful motors can be operated at 500 volts, and it is found in practice that there is a large demand for them. When they are used certain additional precautions have to be taken. The mains leading to them should be concentric and armoured, or should be contained in steel pipes, the armouring or piping being connected to the earth. At 500 volts it is difficult to break the circuit owing to the arcing that ensues, hence special switches have to be used. In this case also magnetic cut-outs are preferable to those with fusible wire, as they are more certain in their action. Metallic covers are usually employed with motors, and it seems to us desirable that these covers should be earthed so as to prevent the possibility of any one getting a shock from them.

The question of earthing the middle wire of a supply system has not yet been authoritatively settled. It is, however, a question of great importance, and so we will consider the reasons for and against this procedure. When alternating current is transmitted at very high pressures it is convenient to use a concentric main, and to use the inner tube for the high pressure conductor, and connect the outer tube to earth at one or more points. As this makes the main absolutely safe, and alternating currents leaking through the earth do no damage and produce no disturbance to metallic telephone circuits, no objection to earthing is made in this case. With direct currents, however, the problem is much more difficult, owing to the "eating" or corroding action of direct currents on water or gas mains.

In the early days of electric traction in America great trouble was experienced owing to stray currents from the rails which, of course, conveyed the return current to the dynamos, corroding water, and other pipes. In the city of Brooklyn a large water main was perforated and pitted with holes thirty days after the opening of the electric tramway. Telephone cables, gas-pipes, &c., anywhere in the neighbourhood of the rails were also all badly damaged. Various expedients had to be adopted to prevent all this damage being done, and it is owing to this dangerous electrolysis that the Board of Trade in this country insist that the drop of volts along the rails of a tramway from one end to the other be not greater than seven. Even this pressure is regarded by some electricians as too high, as electrolysis will take place at much lower pressures. In some experiments recently made by Mr. Parshall on an electric tramway, it was found by cutting the track at the middle of the line and inserting an ammeter, that some 60 per cent. of the current was returning by the earth. We shall return to this question when discussing electric traction.

If no part of a three-wire direct current supply system be put to earth, it is found that the negative outer always gets nearest to the earth pressure. This happens, whatever system of mains we employ, whether bare copper strip on porcelain conductors or continually insulated cables, the negative outer is always nearest the earth pressure. The reason of this is probably electric osmosis, which causes moisture to travel from the positive conductor and towards the negative conductor. This improves the insulation of the positive conductor and lowers that of the negative. So strong is this action, that when the rubber insulating the negative mains is slightly porous, large blisters have been found in it full of liquid. We see, then, that the middle main, as a rule, is above the earth potential.

If we connect this middle main to earth we deliberately lower the insulation of the whole system and greatly increase the losses by leakage currents. The negative main with its feeble insulation resistance is now at −250 volts potential, and the small leakage current across the positive main is reduced as its pressure is lowered to +250. On the other hand, no one can get a shock greater than 250 volts from earth. Also all the three mains can be brought into a consumer's house without contravention of the Board of Trade regulations, and this is the consideration that appeals with most force to the supply engineer. The disadvantage from his point of view is that an "earth" on either outer produces a short circuit on one side of the system of distribution. As the first consideration of an engineer is to maintain the continuity of his system of supply this is a serious matter.

Most electricians think that it would be inadvisable to earth the middle wire at several points. When the system is out of balance there may be a considerable current in the middle wire, and hence there might be large leakage currents to earth, which might cause considerable damage by electrolysis. It looks as if concentric systems of house wiring with the outer earthed would never be possible in connexion with central stations. It is a retrograde step to use the earth to carry current. If we try and earth the middle main of a large three-wire system we get a current of fifty or even a hundred amperes flowing to earth and finding the shortest paths to the negative conductor. It is therefore a question which admits of an easy answer when large systems are under consideration, namely, that we ought not to earth the middle conductor. We are left, then, in the unsatisfactory position that the pressure on one of the wires in a house circuit supplied at 250 volts with ordinary supply mains may be at a pressure of between four and five hundred volts from earth—a pressure that has ofted proved fatal. At Glasgow triple concentric mains are used, and the middle main is earthed through a resistance. This solution, although not very satisfactory, is the best we have as yet examined.

With alternating current systems the same drawbacks do not apply, and it is much easier to get satisfactory solutions. For example, with three-wire polyphase systems we can use star windings, and earth the centre of the star through a small choking coil. As the frequency of the leakage currents passing through the choking coil are three times as rapid as the frequency of the currents in the mains, there is very little leakage. When mesh windings are used it is well to have star windings in addition, with their centres earthed so as to keep the mains all at the same potential from earth.

GENERAL BUILDING NEWS.

RESTORATION OF NAVE, ST. STEPHEN'S CHURCH, CAERWENT, MONMOUTHSHIRE.—The nave of this church was reopened on the 5th inst., after restoration. The work was executed by Mr. W. Clarke, of Llandaff, under the direction of Mr. G. E. Halliday.

ST. LUKE'S CHURCH, GLOUCESTER.—This church, at the corner of Linden-road and Bristol-road, Gloucester, was consecrated recently. The work is completed up to the third bay of the nave, leaving two bays and the tower boundary walls, &c., to complete the original plan. The materials are red brick with Bath stone facings, the roof being covered with Tilberthwaite green slates. Mr. T. J. Williams, of Gloucester, was the builder, and Mr. Walter Planck, of London and Gloucester, was the architect.

ST. JUDE'S CHURCH, HANLEY.—The new Church of St. Jude, Hanley, will consist of a nave with aisles on either side and with porches and choir vestry at the west end, a chancel with organ-chamber and priest's vestry on the north side, and a morning chapel on the south side. The nave is 81 ft. long, 30 ft. wide, and 35 ft. high to eaves, and

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52 ft. to the ridge, and is separated from the aisles on either side by five arches of stone, springing from stone piers. At the west end of the south aisle is the baptistry with a bayed end projecting beyond the aisle wall. The aisles have large windows, and the roofs finish just over the nave arches, allowing of clearstory windows over the latter. The chancel, 36 ft. long, is a continuation of the nave, there being no break in width or height, but the division is marked by a double-roof principal, with stone shafts running down the walls, and the chancel roof is of a better character than that of the nave. The floor of the chancel will be well raised, and a large arch opens into the organ-chamber on the north side and two smaller arches open into the morning chapel on the south side; a large east window is placed high up to allow of a high reredos at some time. The morning chapel opens into the south aisles with an archway, and there is a porch giving access to this aisle and the chapel. The walls of the interior will be plastered. It is intended that the interior shall be enriched by mosaics some time. The church will accommodate 800, and its total length from east to west is 150 ft. outside, with a width to the outside of the aisle walls of 63 ft. and to the outside of the organ chamber and morning chapel of 85 ft. The exterior is of red bricks, with stone dressings to windows and doors. The roofs are being covered with tiles, and the length of ridge is broken by a small spire containing an exhaust ventilator at the junction of nave and chancel, the total height to the top of the cross on this spire from the ground being 88 ft. The church will be heated by low-pressure steam with radiators so placed as to warm the air in the porches before it enters the church. The lighting will be by electricity. The total cost of the church and land will be about 10,000*l.* The contract is being carried out by Mr. T. Godwin, and the architects are Messrs. R. Scrivener & Sons.

PRESBYTERIAN CHURCH, NEWCASTLE-ON-TYNE. — The foundation-stone was laid recently of a Presbyterian church which is being erected in College-road, Newcastle-on-Tyne. The architects are Messrs. Badenoch & Bruce.

CHURCH, WEST HARTLEPOOL.—The foundation-stone of St. Matthew's Mission Church, West Hartlepool, was laid on the 31st ult. The new church is being built on the site at the corner of Elwick-road and Arncliffe-gardens. The plans have been prepared by Mr. J. J. Wilson, and the contractors are Messrs. Brazell & Whitton, West Hartlepool. The building is to be of pressed red brick, with stone dressings, and the style is Perpendicular. There will be a main hall, capable of seating 320 people, with a chancel and organ chamber, and two classrooms. The total cost, including site, is estimated at 3,000*l.*

CHURCH, POULTON, CHESHIRE. — The opening services of St. Luke's Church, Poulton, Seacombe, took place on the 1st inst. The new church lies within the parish boundary of the mother church of Wallasey. The site is at the corner of Mill-lane. So far, funds have only permitted the erection of the nave, baptistry, and narthex; the chancel, side chapel, vestries, and organ chamber being left over until sufficient money is raised. The style is Early English, and the building is of Ruabon brick, with stone dressings. The floor is laid in wood blocks. The roof is formed of pitch pine, and ceiled throughout with pitch pine boarding. The architect was Mr. Harry May, of Liverpool; and the contractors were Messrs. William Tomkinson & Sons, of Liverpool. The various fittings have been supplied by Messrs. Jones & Willis. The oak pulpit was designed by the architect, and the lectern is a modelled brass eagle. The font, a relic of old times, found in the rector's garden, has been placed upon a stone base of the Norman period, and placed in the baptistry. The dimensions of the present building are:—Length, 61 ft.; total width, including aisles, 48 ft. The nave, 26 ft. wide, requires the chancel, 30 ft. in length and the same in width. Seating accommodation is provided for 300 worshippers, which will be considerably increased when the chancel is added. The total cost of the work so far undertaken has been 2,500*l.*

LEAMINGTON PARISH CHURCH EXTENSION.—Leamington Parish Church, which has been closed for some time during the progress of extensions and alterations, was reopened on the 2nd inst. The church has undergone many enlargements since the early years of the century, when it was a small village church, with an embattled tower, with accommodation for less than two hundred worshippers. The new scheme launched by the present vicar includes, besides the lengthening of the nave, the provision of a new baptistry, and the building of a clock tower, designs for which are in preparation. The enlarged church will accommodate 1,500 worshippers. The enlargement has been carried out by Messrs. Smith & Sons, builders, Milverton, in accordance with the designs of the late Sir Arthur Blomfield, and under the superintendence of the firm of Sir Arthur W. Blomfield & Son. The estimated cost of the enlargement and restoration is 18,000*l.*

REOPENING OF CHRIST CHURCH, COBRIDGE, STAFFORDSHIRE.—This church was recently reopened after restoration. The work was carried out by Mr. William Cooke, of Burslem. Mr. G. L. Jones, Burslem, was the architect.

PRIMITIVE METHODIST CHAPEL, LOUGHBOROUGH, LEICESTERSHIRE.—The Primitive Methodist Chapel in Swan-street, Loughborough, was re-opened on the 31st ult., after alteration and renovation. The architects were Messrs. Barrowcliff & Allcock, and the constructional work was executed by Mr. A. Faulks. The painting and decorative work was carried out by Mr. A. Shepherd, and the heating apparatus was supplied by Messrs. Messenger & Co. A choir gallery has been formed behind the pulpit, and an organ by Messrs. T. Hardy & Son, of Stockport, has been placed in this gallery.

WESLEYAN CHURCH, BRAMPTON, DURHAM.—A Wesleyan Church has been erected in Main-street, Brampton. The church has seating accommodation for 400 persons. At the main entrance is a tower, terminating with a spire to a height of 67 ft. The fittings throughout are of pitch pine, and the roof is partially open with arched work underneath and pitch pine ceiling. The architect is Mr. John Wills, of Derby and London; and the contractors: Mason work, Mr. T. Telfer, Langholm; joiners' work, Mr. J. H. Reed, Carlisle; plastering, Mr. W. Barker, Brampton; painting and glazing, Messrs. Penfold & Son, Brampton; plumbing, Messrs. Wallace & Allen, Glasgow; slating, Mr. Hewitson, Carlisle; heating, Mr. Corbett, Carlisle.

RESTORATION OF ST. GEORGE'S CHURCH, LEEDS. —The work in connexion with the restoration of St. George's Church, Leeds, is approaching completion. It has been carried on under the supervision of the architect, Mr. Walker.

ST. SILAS CHURCH, BELFAST.—The foundation-stones of this church, which is in the Old Park district, were laid on the 3rd inst. Mr. Thos. Roe is the architect, and Messrs. Campbell & Lowry are the builders.

REOPENING OF PARISH CHURCH, BRUNDALL, NORFOLK.—The parish Church of St. Lawrence, at Brundall, was reopened recently after alteration. The work consists of an addition of a north aisle and vestry, and the re-seating of the chancel with oak choir stalls. A carved oak pulpit and an eagle lectern of oak have been presented to the church. The architect for the alterations was Mr. A. J. Lacey, of Norwich. Mr. R. W. Riches, of Postwick, was the contractor; the glazing was by Mr. J. Horth, Norwich, aud the casements by Messrs. Barnes & Pye, St. Miles's Foundry. The pulpit was made by Messrs. Howard, of Norwich.

CHURCH, WOOLMER-GREEN, WELWYN, HERTS.—The Church of St. Michael and All Angels, Woolmer-green, in the parish of Welwyn, was consecrated on the 3rd inst. The building is of red brick, with stone dressings, and has a tiled roof. Mr. R. Weir Schultz, of London, was the architect, and Mr. F. Lawrence, of Datchworth, the builder.

GIRLS' SCHOOL, BRUTON, SOMERSETSHIRE.—On the 26th ult. a new school was opened for "The Bruton Girls' School Company, Limited." The new buildings, which include the school proper and the mistress's house in one block, are situated near Cole Station. The building has been constructed of local stone, with Bath stone dressings, and the roofs are covered with plain red tiles. The ground floor provides accommodation for sixty or more scholars in a schoolroom 44 ft. long by 20 ft. wide; it is capable of division into two rooms by means of a sliding partition, and there are in addition two classrooms for cooking and laundry work; a dining hall to seat fifty girls, cloakroom, lavatory, store, teachers' study, mistress's dining and drawing-rooms, large kitchen, with pantry and servery in connexion with dining-hall, scullery, washhouse, and usual offices. The upper floor, which is reached by two staircases, contains a room for science and art work, with storeroom attached, three dormitories for twenty to thirty beds, sick ward for four beds, six other bedrooms, bathrooms, lavatories, &c., boxroom, linen rooms, &c. Mr. Arthur J. Pictor was the architect of the new buildings, which have cost over 3,000*l.* to build. Mr. T. Hobbs, of Bruton, is the contractor.

THE DUKE'S SCHOOL, ALNWICK.—Designs for the new Duke's School at Alnwick have been prepared by Mr. J. Wightman Douglas, of Alnwick.

BOARD SCHOOLS, SUTTON-IN-ASHFIELD, NOTTINGHAMSHIRE.—A new block of Board schools was opened at Sutton-in-Ashfield on the 31st ult. The buildings are to be known as the Central Schools, and are situated off Priestsie-road, and facing the Great Northern Railway. The schools, which cover an acre of ground, are built of brick, with stone dressings, and have accommodation for 284 boys, the same number of girls, and 300 infants. They are in three separate blocks. Boyle's system of ventilation has been adopted; the furniture has been supplied by the Bennett Furnishing Company, of London, and the hot-water heating apparatus by Mr. W. Haslam, of Hardstoft. There are also improved patent folding partitions, these having been supplied by Messrs. Peace & Norquoy. Mr. H. Shaw, of Sutton, was entrusted with the contract, while Mr. J. P. Adlington was the architect.

BOARD SCHOOL, NORTHAMPTON.—The foundation-stone was laid recently of the Board school which is being erected in Barry-road and School-road, Northampton. Messrs. Law & Harris are the architects, and Councillor A. P. Hawtin is the builder. The clerk of works is Mr. George Bull.

WORKHOUSE, HUNSLET, YORKSHIRE.—On the 8th inst. the foundation-stone of the new workhouse to be erected for the Hunslet Union, off Wood-lane, Rothwell Haigh, was laid. The new house is to be built on the pavilion system, and will, it is expected, be ready for occupation in December, 1902. The space at disposal at present is a little over 4 acres, and the accommodation is for 414 inmates. The new buildings, however, are designed to house between 600 and 700 persons, and as the site comprises about 20 acres there is plenty of room for future extensions. The buildings are being erected in six groups—(1) an entrance building in which vagrants will be provided for on the cellular system; (2) a main building containing an administrative block, pavilions for male and female aged and able-bodied inmates, dining-hall, business offices, master's house, and all other necessary apartments; (3) laundry and boiler house buildings; (4) an infirmary connected with the main building by a covered corridor and facing south, with nurses' home in the centre; (5) a lunacy building; and (6) an isolation hospital. Aged married couples are to have cottages on an elevated portion of the site apart from the main building and facing the roadway, each with a garden in front. Robin Hood bricks and stone dressings will be used, and the roofs will be of Westmoreland green slate. Mr. J. H. Morton, of South Shields, has furnished the designs, and Messrs. Harold Arnold & Son, of Doncaster, are the contractors.

COUNTY GIRLS' SCHOOL, HENGOED, GLAMORGAN.—The new County Girls' School at Hengoed was opened recently. Accommodation is provided for eighty scholars. There are four classrooms opening to an assembly hall 37 ft. by 22 ft., while music-room, cookery classroom, dining hall, head-mistress-room, and cloakrooms and customary office are provided. The walls are of local stone faced with terra-cotta dressings and blue Forest stone sills. The assembly hall is floored with wood blocks. All the rooms are heated by means of open grates. A portion of the grounds is levelled for a tennis court, and the whole are enclosed. Messrs. W. Williams & Sons, of New Tredegar, erected the buildings at a cost of 3,800*l.* The architects were Messrs. James & Morgan, Cardiff.

HOME, CLAPHAM, LONDON.—The dedication of the new and permanent home of "The Free Home for the Dying," at North Side, Clapham Common, took place recently. The new building was, says the *Clapham Observer*, formerly the residence of the late Sir Charles Barry, and is one of the few fine old houses facing the Common still remaining. The home has undergone considerable alteration at the hands of Mr. A. E. Street, architect. The new building contains twenty-five beds, of which twelve are in the women's ward. The men's ward contains eight beds, whilst in addition there are several beds in separate rooms.

ST. MARY'S HOME FOR GIRLS, EASTNOR, HEREFORDSHIRE.—This home, which has accommodation for thirty-six children, and is in connexion with the Church of England Society for Providing Homes for Waifs and Strays, was opened recently. The building has two stories, and is of brick. It was built about eighteen months ago by Mr. George Hill, of Ledbury, Mr. E. Fisher, of London, being the architect.

WORKHOUSE, CHANDLER'S FORD, HAMPSHIRE. —The new Hursley workhouse at Chandler's Ford was opened a few weeks ago. Messrs. Musselwhite & Son, of Basingstoke, were the builders, and Messrs. Cancellor & Hill, of Winchester, were the architects. The contract price was just over 9,000*l.*

NEW BOARD SCHOOLS IN ABERDEEN.—Aberdeen School Board has resolved on an extensive building programme, including doubling of Old Aberdeen School, enlargement of Ruthrieston School, and reconstruction of Woodside School. It is also intended to build a new central school in School Hill, and to enlarge the School Board's offices in Union-terrace. It is estimated that 70,000*l.* will be required to carry out the programme, and the department of Mr. Ogg Allan, the Board's Architect and master of works, is accordingly to be increased by the appointment of a draughtsman.

TEMPERANCE HOTEL AND RESTAURANT, CLACTON-ON-SEA.—A temperance hotel and restaurant is being erected at Clacton-on-Sea from a design by Mr. T. H. Baker, of that town. The builder is Mr. H. C. Nunn. The building will be of brick and stone, and will contain, on the ground floor, a dining-room 70 ft. long; on the first floor, the kitchen and serveries, and in the front part of this floor, another dining-room. The rest of the building will consist of a basement, and the second, third, and fourth floor, containing together sixteen rooms, &c.

WORKMEN'S DWELLINGS, MORPETH, NORTHUMBERLAND.—An inquiry into an application by the Morpeth Town Council to the Local Government Board for permission to borrow 15,000*l.* for making advances under the Small Holdings Acquisition Act, 1899, was held at the Town Hall, Morpeth, on the 6th inst, by Mr. W. O. E. Meade-King. It was stated that the Corporation had put on the market a piece of land known as the Middle Greens, stipulating in the conditions of sale that only houses for working men should be built thereon. Mr. H. J. Boolds is the architect to the Corporation in this matter.

STATION HOTEL, KINTORE, ABERDEENSHIRE.—The Station Hotel, Kintore, has just been opened. The building is of three stories, and was designed by Mr. John Cameron, of Aberdeen. The principal contractors were:—Masonry, Mr. John Smith,

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Kintore; carpentry, Mr. John Maitland, Kintore; painting, Mr. Forrest, Aberdeen; plastering, Mr. Sievewright, Inverurie; and slating, Mr. Farquhar, Woodside.

FREEMASONS' HALL, LURGAN, CO. ARMAGH.—The new Freemasons' Hall, Lurgan, was dedicated on the 2nd inst. The building is of red brick, with terra-cotta dressings. Mr. W. Godfrey Ferguson, of Belfast, was the architect, and the builder was Mr. Thomas M'Millan, of the same place.

TRAINING COLLEGE, DERBY.—Additional buildings have been erected in connexion with the Lichfield and Southwell Diocesan Training College for School-mistresses at Derby. The chief are a dining-hall and a chapel. The last-named building is of Leicestershire-brick, with dressings of Matlock stone. The roof is of pitch pine. The building is warmed by hot water, and lighted by electricity. The architect is Mr. Percy H. Currey, of Derby, and the contractors are Messrs. Ford & Co., of Derby.

NEW DOORWAY FOR BAKEWELL CHURCH.—Bishop Abraham, father of the Bishop of Bakewell, recently dedicated and reopened the ancient northern doorway of Bakewell Church, which has been lately restored. The work has been carried out by Mr. Robert Smith, builder, &c, of Bakewell, from designs of Mr. C. H. Fowler, architect, of Durham. The original proportions of the ancient doorway have been regained by lowering the level of the outside approach, but the old stonework has not been interfered with. The new door is of English oak of fifteenth century design, and the wind porch inside the church is of wainscot oak of the same design. It is lighted through glass panels from the church inside, and is carried up above the arch of the doorway to a considerable height. The broadening of the flight of steps and the increased height of the porch add largely to the dignity of this portion of the church.—*Derbyshire Courier.*

SANITARY AND ENGINEERING NEWS.

SEWAGE DISPOSAL, NOTTINGHAM.—A Local Government Board inquiry into an application by the Nottingham Corporation for sanction to borrow 335,000*l.* for purposes of sewage disposal, was held at the Guildhall, Nottingham, on the 7th inst. The inquiry was conducted by Mr. F. H. Tulloch. The scheme was described by Mr. A. Brown, the City Engineer, who stated that the sum named would be divided as follows:—Value of land, 155,024*l.*; still sewage carrier, 3,250 yards long, 21,775*l.*; new main carrier formed of concrete, 2,000 yards long, 11,725*l.*; sub-soil drains, earthen pipes 25 in. diameter, 4,650 yards long, 6,045*l.*; sub-soil drains, 12 in. earthenware pipes, 42,784 yards long, 21,926*l.*; 4 in. sub-soil drains, 168,410 yards long, 33,682*l.*; sub-soil drain contingencies, 10,309*l.* 4s.; formation of cart roads, 5,400 yards long, 11,880*l.*; rough levelling and alterations to dykes, &c., 18,150*l.*; railway siding, 1,474*l.*; drainage of the village of Stoke Bardolph, 1,189*l.*; water supply of Stoke Bardolph, 330*l.*; stock, implements, &c., 17,000*l.*; tenant right, 2,000*l.*; working capital, 11,000*l.* Other evidence having been given, the inquiry closed.

SEWAGE DISPOSAL, MARSDEN, YORKSHIRE.—At the Mechanics' Hall, Marsden, recently, Colonel J. T. Marsh, R.E., held a Local Government Board inquiry into an application by the Marsden Urban District Council for consent to a deviation from the scheme of sewerage and sewage disposal works, for which a loan of 11,000*l.* was sanctioned in July, 1896. It was stated that the council proposed to adopt the septic tank system, and two tanks 67 ft. long, 20 ft. wide, and 9 ft. deep, would be constructed. The scheme was explained in detail by Mr. J. Haigh, the engineer.

SEWAGE DISPOSAL, NEWTOWN LINFORD, LEICESTERSHIRE.—Mr. F. H. Tulloch, C.E., inspector to the Local Government Board, held an inquiry at the Schools, Newtown Linford, recently, into an application by the Barrow-on-Soar Rural District Council to borrow 2,080*l.* for the purpose of sewerage and sewage disposal for the parish of Newtown Linford. The scheme was explained by Mr. F. Griffith, the Engineer.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOW, GREAT STAUGHTON CHURCH, HUNTINGDONSHIRE.—A stained-glass window, the work of Messrs. Lavers & Westlake, has just been dedicated in this church, to the memory of Mrs. Frances Cox Robotham.

NEW WINDOW, REDLANDS, BRISTOL.—A stained-glass memorial window has recently been erected in Redlands Green Chapel, Bristol, to a late member of the congregation, Dr. Prichard, a Bristol physician. The window is Classic in treatment, and was designed by Mr. T. W. Camm (Smethwick, Birmingham) with a special view to harmonious relation to the building, a fine example of Classic art. The subject is "The Great Healer; St. Luke, the Physician; and St. Barnabas, the Son of Consolation," and is chosen with a view to indicate the profession of the person to whose memory it is dedicated.

MEMORIAL WINDOWS, ST. MARGARET'S CHURCH, DURHAM.—Three stained-glass windows have been placed in the south aisle of St. Margaret's church, Durham, in memory of Lieutenant C. D. Shafto, who was killed at Vaal Krantz, Natal, in February last. A fourth window has been placed in the church in memory of a brother of the Lieutenant. The whole of the windows were made and inserted by Messrs. Burlison & Grylls, of London.

DECORATION, &C., LONDON PAVILION.—Closed for redecoration and structural alterations, which have occupied some five months, the London Pavilion has just been reopened. Messrs. Wylson & Long were the architects under whom the work has been carried out. The proscenium is widened, the stage itself has been lowered, and the seating so carried out that there is a clear view to be obtained from every part of the house. The general scheme of colour in the decoration is white or cream and gold, while the upholstery and silk panellings on the walls, executed by Messrs. Shoolbred & Co., and Mr. Lyon, of Holborn, are of a warm terra-cotta hue.

ELECTRIC LIGHTING NEWS.

ELECTRIC LIGHTING, &C., BATLEY, YORKSHIRE.—A Local Government Board inquiry, conducted by Mr. Sandford Fawcett, was held at the Batley Town Hall on the 31st ult. into an application by the Town Council for sanction to borrow 25,602*l.* for electric lighting and the supply of motor power. The inquiry was attended by Mr. Clivehugh, electrical engineer, and it was explained that the Corporation had in contemplation the construction of tramways. The site proposed for the works is at New Ing Fields.

ELECTRICITY WORKS, KEIGHLEY, YORKSHIRE.—The memorial-stone of the municipal electricity works at Keighley has just been laid. The engineer of the scheme is Mr. J. M. Smyth.

FOREIGN.

FRANCE.—During the scholastic recess a considerable portion of the decorations of the new Sorbonne has been completed. The Descartes Theatre has received a large painting by M. Gabriel Ferrier symbolising "The Poet's Dream," and the Students' Library a painting by M. J. P. Laurens of "Francis I. visiting the Sorbonne Printing-works." A picture of "Truth," by M. Henner, decorates the "Salle des Autorites." Among the decorative works still to be executed are the portraits of Corneille, Pascal, Bossuet, Moliere, and Richelieu for the "Salle du Doctorat;" a large decorative picture by M. Dagnan-Bouveret of "Apollo and the Muses," for the Richelieu Theatre; pictures by M. Toudouze for the Turgot Theatre; two pictures by M. Weertz for what is called the "Sundial Gallery," and ten panels by M. Poilpot for the vestibules of the two Faculties, and which represent "The Great Epochs of Humanity." —— A new gateway has been opened in the Paris fortification lines, at the end of the Rue Molitor, between the Porte d'Auteuil and the Porte de Versailles.——The new Hôtel de Ville of Versailles, which will be shortly opened, has been built from the plans of M. Legrand, who has utilised, for the decoration of the principal rooms, the splendid eighteenth century carved woodwork belonging to the old Mairie, a considerable portion of which has been preserved.——The death is announced, at the age of sixty, of M. Tiburce de Mare, painter and engraver, pupil of his father and of Gaillard. He exhibited many portraits between 1870 and 1881, and in 1884 obtained a medal for his engravings after Raphael.

JAPAN.—The twenty-sixth annual Report of the Minister of State for Education in Japan gives some interesting particulars concerning scientific and technical education in that country. Amongst other things we notice that the Tokio Fine Arts School is making steady progress. The object of this school is to train specialists in various arts, and instructors in general drawing. The school is splendidly equipped, and the course of study includes painting, designing, sculpture, architecture, and industrial fine arts. Each course of study extends over four years, a preparatory course of one year being obligatory on every pupil after his admission. The number of pupils is about 300. Amongst the technical schools we may mention that at Osaka, which is designed to prepare pupils as first-class workmen and foremen. It is divided into two departments, one of which deals with mechanical technology and the other with chemical technology. There are altogther twenty-five apprentices' schools in different parts of the country, which, by means of courses extending from six months, are intended to prepare the pupils as workmen in special industries.

SOCIETY OF ARTS.—The Society of Arts will hold the opening meeting of its session, the 147th since the foundation of the Society in 1754, on Wednesday evening, November 21, when an address will be delivered by Sir John Evans, K.C.B., F.R.S., Vice-President and Chairman of the Council. Among the lectures to be given previous to Christmas will be one on December 5, by Professor H. S. Hele-Shaw, LL.D., F.R.S., on "Road Traction"; and on December 12 by Professor Frank Clowes, D.Sc., on "The Treatment of London Sewage."

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. W. C. Griffiths, architect, 29, High-street, Newport, has opened a London office at Oswaldestre House, Norfolk-street, Strand.

SOUTH KENSINGTON MUSEUM.—The paintings bequeathed by the late Henry Spencer Ashbee, F.S.A., are now exhibited in the picture galleries of the Museum. The collection, which comprises 204 works, mainly consists of water-colour paintings, including early works by such men as J. R. Cozens, William Payne, Thomas Hearne, J. M. W. Turner (R.A.), H. Edridge (A.R.A.), T. Rowlandson, John Varley, R. P. Bonington, George Chambers, David Cox, Samuel Prout, William Hunt, P. de Wint, W. Clarkson Stanfield (R.A.), and George Cattermole. Among the more modern works are drawings by Sir John Gilbert (R.A.), H. G. Hine, Carl Haag, E. M. Wimperis, T. Sidney Cooper (R.A.), Charles Green, J. Fulleylove, and Sir James Linton. There are also fifty water-colour drawings by L. F. Cassas for "Voyage Pittoresque et Historique de l'Istrie et Dalmatie," published at Paris in 1802. The oil paintings include works by Sir A. W. Callcott, R.A., G. S. Newton, R.A., A. V. Copley Fielding, John Linnell, Sir John Gilbert, R.A., and T. Sidney Cooper, R.A.

DRAYTON MANOR, TAMWORTH.—It is stated that a New York banker has rented, with the option of purchase, Sir Robert Peel's estate at Drayton-Bassett, near Tamworth. The mansion was planned and designed for Sir Robert Peel, the distinguished statesman, by Sir Robert Smirke; the portrait gallery, added at the south-east corner of the house, was completed in 1846. Smirke was the architect also of Sir Robert Peel's house in Whitehall Gardens, Whitehall.

BROADLANDS, NEAR ASCOT.—This house, erected after the plans and designs of Mr. Norman Shaw, R.A., has been placed in the market. The billiard-room is fitted with the oaken carving and panelling originally designed and finished by Michael Wolgemuth for his own residence at Nuremberg. The property, which extends over 100 acres, comprises a park, a cricket ground, some model farm buildings, cottages, &c.

THE GLASGOW ARCHITECTURAL CRAFTSMEN'S SOCIETY.—The usual meeting was held on Friday, the 9th inst., when papers were read on the "Specification of a Roof"; by Mr. D. Ritchie on joiner's work, by Mr. Isaac Low, jun., on plumber's work, and Mr. J. Marshall on glazier's work. A good discussion followed, and its thoroughly practical nature was greatly appreciated by the members.

T-SQUARE CLUB, LONDON.—This Club has been established for architects, artists, engineers, and surveyors, and students in those professions. The object of the Club is to promote friendly intercourse between the members by giving a series of smoking concerts, which will be held in the Foyer of Covent Garden Theatre. The opening concert will be held on Wednesday, November 21st, when the chair will be taken by Mr. W. Emerson, President of the Royal Institute of British Architects. Over 135 members have already joined the Club. Full particulars of the Club may be obtained from the Hon. Secretary, Mr. T. Wilson Aldwinckle, "Saratoga," Dacres-road, Forest Hill, S.E.

THE HOUSING PROBLEM.—A meeting of the Southampton Literary and Philosophical Society was held at the Grammar School on the 5th inst., when a paper on the "Housing of the Working Classes" was read by Mr. Chas. J. Hair, A.R.I.B.A. It was not until the Public Authorities began to count the cost, he said, that they found what a gigantic problem they were dealing with. After paying for arbitrations, trade interests, and compensation, the land was found to be of such a value that it was quite impossible to build houses on it at a price that the poor could afford to pay in rent. The result was that the Authorities endeavoured to make the most they could of it by building high flats with, in some cases, shops on the ground floor. The rents of these flats were considerably higher than it was possible for the old inhabitants to pay, and those inhabitants went away to make slums by overcrowding elsewhere. After buying the land, the Corporation had further difficulties to face. Many of the restrictions imposed by the Local Government Board helped materially to add to the cost of the building. The restriction to thirty years for borrowing the money for a scheme meant that nearly 5 per cent. had to be paid for it. There was the delay consequent on getting the plans approved first by a committee and then by the whole Council, especially when, as was generally the case, a serious deficit had to be shown on the returns. The reason for so much delay was that Corporations had been trying to show a profit on the undertaking, and this, in the majority of cases, was simply an impossibility on account of the high price of the land. This fact had at last been acknowledged by London and in some other towns, where it had been decided to re-value the land for the purpose of artisans' dwellings, and put the difference between the valuation and the actual cost down to street improvement account. In many cases public bodies could not even make a financial success of building for people who could afford to pay a good rent. Private companies had done this, and were able to

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pay their shareholders as much as 5 per cent., so that it seemed that private enterprise should be encouraged to build for that class, and public bodies must try to solve the difficult problem of providing for the very poorest. Many speakers at various conferences which he had attended, advocated the housing of the poor in the country, and giving them cheap tram or train passes to and from their work. By all means should the better-paid artisan be encouraged to live in the suburbs, but the very poorest could not afford to live far from their work, and many of them, as was the case in the docks, were employed on night duty. Reverting to the question of public housing schemes, Mr. Hair said he thought committees make the mistake of either trying to learn how to do the plans themselves, by sending deputations to other towns, or else trying to judge them. It was a special duty, and unless a man could give some considerable time to it, he could not expect to produce good results. Locally it was said that the municipal lodging-house was a huge failure, and that the artisans' dwellings were a white elephant. If the land were re-valued at a reasonable building valuation—say, 20s. per square yard—the buildings would pay; and, further, in another fifty-nine years they would become the absolute freehold property of the ratepayers. The lodging-house had been more successful than its founders hoped; it had often been found necessary to send men away for want of accommodation. Of the twenty-six tenements in the artisans' dwellings, twenty-four were let, and the building had not been open a year yet. There were still two big areas of land to be built upon to complete the Corporation scheme, and he was sorry to say that at present there appeared to be a deadlock. If private enterprise could be induced to step in and build workmen's dwellings on the land, so much the better, provided there was no jerry-building. It was impossible to build cottages, as in that way the 600 people which the Local Government Board required them to rehouse could not be accommodated. Mr. Hair then outlined a scheme which he had offered to the Council to meet the difficulty, and which he believed, if adopted, would be a great success. It provided for the re-housing of the whole 600 people, and left a large portion of the site to be sold for commercial purposes or utilised for more artisans' dwellings. His scheme would not interfere with the Undercroft. It provided for three-story buildings, planned on the lines of a cottage, with, in most cases, a living-room, also used as a kitchen, a front parlour, and two bedrooms. He expected two families to take each tenement, not an ideal way of living, perhaps, but a very considerable improvement on the way in which many people now had to live. The buildings in his scheme were estimated to cost 18,200*l.*, including all professional fees and expenses. Valuing the land for housing purposes at 3*l.* per foot frontage, this would show a return of over 8 per cent., supposing the rent were equivalent to 1s. per week for each person living in the buildings. In conclusion, Mr. Hair said that if public bodies were going to do any good at all in the future they must try to buy their land better or cheaper; then they must exercise the strictest economy both in planning and detail. In Southampton, if a lodging-house were built near the Docks on some of the waste ground belonging to the Corporation, it would always be full, and would pay even if let at 4d. per bed.

MAIDENHEAD.—About thirteen acres of the ornamental grounds of Fishery House, Maidenhead, are to be laid out as a building estate with about 800 ft. of river frontage.

THE SANITARY INSPECTORS' ASSOCIATION.—A meeting of this Association was held at Carpenters' Hall, London-wall, on the 10th inst., when the Chairman, Mr. W. H. Grigg, delivered an inaugural address. In the course of his remarks he said: "I am sorry to have no exhilarating news to tell you in regard to the Sanitary Inspectors' Examination Board. A new phase of the subject has recently arisen. The London County Council, seeing that they are the technical teaching authority established by law in London, consider that they have not been properly treated in the matter. They consider that the whole question of the establishment of the Examination Board ought properly to have been left to their Technical Education Board—a view which will doubtless be shared by many—but they do not think the Government will be likely to undo so quickly what has been but recently done. They therefore, on the ground of the time being inopportune, do not intend for the present to pursue that line of policy, but are petitioning the Local Government Board to exercise their power under the Articles of Association to give them five representatives on the Board. The claim is further based on the fact that the Council provide one-half of the salaries of most of the inspectors in London. It does not appear to have occurred to the Council that this is the only professional examining body known which does not include a single one of the persons following the profession to which the examination relates. It may be worth our while to point this out to the Council and seek their assistance in securing proper representation on the Board. If the London County Council formed this Examination Board for inspectors they would surely take care that we had at least reasonable representation thereon."

CAPITAL AND LABOUR.

EDINBURGH BUILDING TRADE.—Notwithstanding the adjustment of the masons' strike some weeks ago, the building trade in Edinburgh has continued in a very dull state. Even before the strike was decided upon work was slack, and this was indicated by the prolonged resistance which the employers were able to offer to the men's demands. Whichever way that dispute may be regarded, it is acknowledged by not a few of the men themselves that the strike was somewhat ill-timed. It was true that there was a large number of heavy contracts on hand, mostly of a public kind, but for some time back speculative building had been depressed, and now it is practically at a standstill. For some years back tenements have been rushed up at an unprecedented rate, and there has also been a great increase in the erection of villas in the suburbs. These have been built for selling purposes, more than for letting, but it seems that the speculators are having a difficulty in getting the property off their hands. There is also a considerable number of unlet houses all over the city. The only demand for house property is of the class of cheaply-rented houses, and the builder does not usually look upon these as being greatly remunerative. In addition to this over-building, it is undoubtedly the case that, owing to the unsettled state of the labour market, there has been little disposition on the part of the speculator to embark upon any fresh work. With a threatened strike they could not hope to have completed any property in time for the selling season. There has also been a scarcity of money, while the high price of material has also combined to depress the trade. Many workmen have not been able to make a start since the close of the masons' dispute, and a very dismal winter is in front of them. During the strike the Masons' Society sent a good number of men to the country, where work was to be had. The consequence is that building in the country is pretty well exhausted, and the men have returned to the city. For masons the best of the season has now passed. Large contractors had the annoyance of seeing the summer practically wasted, and now they are being bombarded with large batches of applicants for work. At the new Fever Hospital at Colinton scores are being turned away daily. The supply of labour is likewise more than fully met at other large undertakings in the city. By those who are acquainted with the situation in Edinburgh, it is asserted that it will take many years before the trade recovers. Having gone so many weeks idle this summer, the operatives in Edinburgh are less able to bear a continuance of the present state of matters. Exact statistics are not available as to the number of men connected with the building trade who are at present going idle, as there are a good many who do not belong to the various organisations. Various estimates have gone as high as 1,000.—*Scotsman.*

LEGAL.

CLAIM FOR PERSONAL INJURIES.

AT the Clerkenwell County Court on Friday last week, before his Honour Judge Edge, James Isles, joiner and carpenter, Liverpool-street, King's Cross, claimed from Mr. E. D. Percy, builder, of Bayer-street, Golden-lane, E.C., 400*l.* damages for personal injuries.

Mr. Chester Jones was counsel for the plaintiff, and Mr. Elliott Hill represented the defendant.

Plaintiff's counsel explained that the injuries which his client had sustained were of a very serious nature, and in consequence he was under medical attendance for a long period. Indeed, he would be unable to carry on his occupation as joiner and carpenter for the rest of his life. The accident to the plaintiff, who had been in the employment of the defendant for about a month, occurred on March 10 last. He was sent to work at premises 143, Farringdon-road, where the defendant's men were constructing a lift to go through the premises; and a hole had to be cut from the top to the bottom of the place, after which it was necessary to put in on each floor what were called trimmers. Plaintiff started striking under the instructions given him, with the result that he overbalanced, and fell to the floor below, a distance of about 12 ft. He submitted that it was the defect of the defendant that he had not provided proper safeguards; and that, as the foreman ought not to have ordered the work to be done in that way, the defendant must be held responsible for his negligence. The plaintiff had, unfortunately, partially lost the use of his legs and had sustained injury to the spinal cord.

Plaintiff, who said he was twenty-six years old, then gave evidence in support of counsel's statement, and in cross-examination said he had done the work before and knew how to do it. His ordinary wages were 2*l.* 1s. 8d. a week, but he made a lot of overtime. He asked the foreman for a heavy hammer with which to do the work. He did not turn giddy and fall earlier in the day.

Dr. Bull described the plaintiff's injuries.

For the defence Dr. Patmore was called, and said he thought the plaintiff had walked better since July last. The injury having got somewhat better, might get better still.

The foreman to the defendant gave evidence to the effect that the plaintiff had the advantage of all proper plant on the job if he had taken advantage of it. The trimmer had not given way at all.

Counsel for the defendant contended that there was no evidence that the accident happened through any defect for which the defendant could be held responsible, and, in fact, that there was no defect in the plant at all.

After a protracted hearing the Judge said the conflicting evidence in cases of that kind caused him considerable anxiety and pain, and he was always sorry to find that even in small matters on which there ought not to be the smallest difference, there was a great diversity of testimony. He thought that the defendant was responsible, and gave a verdict for the plaintiff for 30*l.* 12s. with costs.

POINT UNDER THE PUBLIC HEALTH ACT, 1875.

THE case of Cawston *v.* the Bromley Urban District Council came before a Divisional Court of Queen's Bench on the 9th inst. by way of a special case stated.

The facts appeared to be these:—The District Council on February 13, 1897, gave notice to Mr. Cawston under the provisions of the Public Health Act, 1875, to sewer, pave, &c., a certain portion of Highland-road, Bromley. Mr. Cawston not complying with the notice, the District Council did the work at a cost as certified by their Surveyor of 717*l.* 11s. 9d. The Surveyor declared that sum chargeable against the frontagers and apportioned 372*l.* 12s. 4d. as being due from Mr. Cawston in respect of the frontages owned by him. This gentleman, however, disputed the apportionment and he appointed an arbitrator under the provisions of the Public Health Act, 1875. The District Council also appointed an arbitrator. The arbitrators having differed appointed an umpire who it was agreed should state his award in the form of a special case. At the hearing before the umpire, Mr. Cawston contended that he was entitled to dispute the right of the District Council or their Surveyor to charge part of the amount which was paid for work executed to the road, on the ground that such amount related to a sewer already vested in the District Council. The District Council's contention was that it was not competent to the umpire to inquire into the propriety of the items of cost, as they could not properly be questioned in this arbitration, which was limited by the provisions of Sections 150 and 257 of the Public Health Act, 1875. The question for the opinion of the Court, was whether the certificate of the Surveyor was conclusive evidence before the umpire of the total amount to be charged against the frontagers for the works executed on the road by the District Council.

At the conclusion of the arguments of Counsel, their Lordships held that the Surveyor's certificate for the purposes of the arbitration was binding upon the umpire as to the total amount.

Mr. Clarke Williams appeared for the District Council, and Mr. Morten Smith for Mr. Cawston.

BREAKING UP THE STREETS FOR TELEPHONE WIRES.

IMPORTANT ACTION.

THE case of the Attorney-General *v.* the National Telephone Company came before Mr. Justice Wills and a Special Jury in the Queen's Bench Division on the 12th inst.—an action by the Attorney-General on the relation of the London County Council, asking for an injunction restraining the National Telephone Company from breaking up the streets in the County of London for the purpose of laying their telephone wires underground without the consent of the London County Council.

Mr. Dickens, Q.C., and Mr. Daldy appeared for the London County Council; and Sir Edward Clarke, Q.C., Mr. Joseph Walton, Q.C., and Mr. Roskill for the National Telephone Company.

After the pleadings had been opened by Mr. Daldy, Sir Edward Clarke said that originally there were two sets of proceedings against the defendant company—one by the Postmaster-General and the other by the Attorney-General on the relation of the London County Council involving substantially the same questions—viz., whether there had been an interference with public rights and whether an injunction should be granted. The case of the Postmaster-General had been settled upon terms which restrained the defendants, as between the Government and itself, from doing any work for the purpose of extending the existing system of the Telephone Company in the streets of London. Such being the case, his clients had written to the London County Council suggesting that the present action should be allowed to stand over. The reply, however, was in the negative.

Mr. Dickens denied that the two sets of proceedings were identical. The injunction in the case of the Postmaster-General did not protect the interests of the London County Council in the event of the Postmaster-General and the Telephone Company coming to an arrangement.

Sir Edward Clarke said he was prepared, on behalf of the Telephone Company, to give an assurance that they would do nothing in contraven-

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tion of the order in the case of the Postmaster-General without giving notice to the London County Council, so as to give them an opportunity of bringing on their action.

Mr. Dickens asked that the case should stand over for a fortnight in order that he might consult his clients.

In the result his Lordship adjourned the case generally with liberty to the County Council to apply to have it restored.

POINT UNDER THE WORKMEN'S COMPENSATION ACT, 1897.

THE case of Cosgrove *v.* Partington came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Collins and Stirling, on the 13th inst. on the appeal of the defendant from an award of the County Court Judge of Oldham, in an arbitration under the Workmen's Compensation Act, 1897. In this case the injured workman was employed by the defendant, a builder, and at the time of the accident was engaged with other workmen in putting a fifth story on to a cotton mill. The work was done by means of scaffolding, and included the hoisting of iron girders by means of a steam winch. The County Court Judge found that the man was engaged in an "engineering" work within the meaning of the Workmen's Compensation Act, and made an award in his favour. The employer now appealed on the ground that the employment was not in an "engineering" work within the meaning of the Act.

In the result, the Court, without calling upon counsel for the workman, held that the case came within Section 7, Sub-Section 2, of the Act, and dismissed the appeal with costs.

Mr. Ruegg, Q.C., and Mr. G. Mellor appeared in support of the appeal, and Mr. Herbert Smith for the workman.

PLASTERER'S CLAIM UNDER THE WORKMEN'S COMPENSATION ACT, 1897.

THE case of Furguson *v.* Green came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Collins and Stirling, on the 14th inst., on the master's appeal from the decision of the County Court Judge of Oldham, reversing the award of the arbitrator under the Workmen's Compensation Act. The claim was first referred to the arbitrator by the County Court Judge and the claim was decided against the plaintiff. The plaintiff then appealed to the County Court Judge, with the result that the arbitrator's decision was reversed.

It appeared that the plaintiff was a working plasterer in the defendant's employ, the defendant having entered into a contract with the building-owners of some cottages at Middleton for the plastering work. The cottages had been roofed in and the scaffolding outside had been taken down, when, on October 18, 1899, the applicant was engaged in plastering the walls and ceilings of the rooms of the cottages. For this purpose he had constructed a platform in the kitchen of one of the houses by means of two tressles, across which he placed two boards. One of the boards of the plaster-table came loose, and in attempting to repair it with a hammer, a nail flew into the plaintiff's eye and so injured it that it had to be removed. It was admitted that the building was over 30 ft. high at the time of the accident, and that the defendant was the "undertaker" within the meaning of the Act, but the arbitrator dismissed the claim for compensation on the ground that the tressles and boards did not constitute "scaffolding" within the meaning of the Act. The County Court Judge, however, held, on appeal, that the arrangement was "scaffolding," and reversed the arbitrator's decision, and awarded the plaintiff the agreed compensation of 10s. a week.

At the conclusion of the arguments of counsel, their Lordships held that the arbitrator, having decided the case on a question of fact, and that there was no question of law involved, the learned County Court Judge had no jurisdiction to reverse his decision. The award of the arbitrator was thus reinstated and the appeal allowed with costs.

A CARPENTER'S INJURIES.

IMPORTANT POINT UNDER THE WORKMEN'S COMPENSATION ACT, 1897.

THE case of Ben Whitehead *v.* Wm. Reader came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Collins and Stirling, on the 13th and 14th insts. on the appeal of the defendant in the case under the Workmen's Compensation Act, 1897, from the decision of the County Court Judge sitting at Coventry.

Mr. T. Willis-Chitty appeared for the appellant, and Mr. Montague Lush for the respondent.

Mr. Chitty, in opening the case, said the question raised was whether the accident which resulted in personal injuries to the plaintiff, Ben Whitehead, arose out of, or in the course of, his employment. He was engaged by the defendant (a builder) as a carpenter, and on the occasion in question he was sharpening a tool on a grindstone. This was worked by a leather strap which passed over shafting connected with a gas engine. As Whitehead was sharpening his tool, the strap flew off the wheel, and in trying to replace it he sustained the injuries in respect of which this claim was made. It appeared that the man was working in one shed and the grindstone was in another. He had been expressly ordered not to touch the machinery. All he had a right to do was to sharpen his tools at the grindstone.

The Master of the Rolls said it was part of the man's work to sharpen his tools at the grindstone, and it was in a case of emergency that he was attempting to replace the band which had come off.

Mr. Chitty said that the learned County Court Judge, in awarding the plaintiff compensation under the Act, had found as a fact that the man Whitehead had express orders not to touch the machinery. That made all the difference in this case. He was not there to contend that if the machinery at which a man was at work happened to go wrong it was not part of his duty to do what he could in the matter. But in this case it was clear that the learned Judge had so found that in trying to replace the band Whitehead was acting contrary to express orders. The learned Judge, however, awarded the applicant compensation on the ground that he was in the course of his employment when the accident occurred. The learned counsel submitted that there was no evidence to support that decision, and that it was contrary to the judgment of the Court of Appeal in the case of Lowe *v.* Pearson.

Mr. Lush, in support of the decision in the Court below, said that the learned Judge had not found as a fact that Whitehead had been specifically told not to replace the band. Granted that he had received orders not to touch the machinery, what the learned Judge found was that the man was not acting in accordance with those instructions in trying to put the band back into its place. The question, therefore, was, with that view of the facts, whether there was any evidence upon which the learned Judge could hold that, although Whitehead received his injuries through touching the band, he was still acting in the course of his employment. The defendant had argued that it necessarily followed from the fact that the plaintiff had been told not to touch the machinery that he was not acting in the course of his employment in attempting to replace the band. Counsel contended that was not so.

The Master of the Rolls: I see the award was 12s. 6d. per week. Was that payment to continue for ever?

Mr. Lush: Only until further order. The learned counsel, continuing, said that if it were the fact that the workman was told not to touch the band of the machinery, that might make a great difference in this case. The learned Judge's note of the proceedings below was a little ambiguous on that point.

The Master of the Rolls said he should like to know what the orders given to the man really were.

Mr. Lush said he did not quite know on what facts to base his argument.

In the result their lordships directed that the case should stand over in order that the learned County Court Judge might be asked to furnish the Court with a more full note of the evidence taken by him.

Order accordingly.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

14,336.—PIPE-WRENCHES, SPANNERS, VICES, &c.: *W. J. L. Guest.*—For an adjustment of the movable jaw is devised a lever which carries a pawl that engages with teeth cut in the body or stem of the wrench or spanner; to effect the final grip which locks the movable jaw, the lever is to be pressed down, when it can be retained with a loop.

14,346.—HEATING AND MOISTENING AIR FOR BUILDINGS: *W. Brandon* (*Brandon & Co.*).—The apparatus, for use in houses, conservatories, churches, and so on, comprises oil lamps or stoves fitted with tubular pipes or flues whose ends are set within the hot air or smoke chambers above the lamps; upon the pipes is placed the water vessel or moistening-tray.

14,369.—A METHOD OF GLAZING: *H. P. H. Gilson and W. J. Booer.*—The leaden glazing-bars are fashioned so that they shall be convex along one side, and with the flanges along the other side diminished in order to facilitate the turning back of the wings for the insertion of the glass; packing-strips of some flexible substance, such as india-rubber, are used for effecting a weather-proof joint.

14,376.—CUPOLA FURNACES: *W. Littleton.*—Upon its way to the tuyères the blast is caused to pass through a series of superimposed segments which constitute the furnace's upper portion, and the blast is directed from the segments to the tuyères through passages that are made in the fireclay brick lining of the furnace's lower portion. The shallow hearth is made with a wide sectional area, and metal rods fitted in vertical grooves in the segments are employed for an air-tight jointing of the segments.

14,433.—ROOFS AND ROOF-GLAZING: *C. Darnley, W. H. Wallis, and G. R. Cartmel.*—Supporting-ribs are fashioned upon a rolled or pressed sheet steel or metal glazing-bar, and it has also a pierced channel which will serve for purposes of ventilation and of carrying off water of condensation. Between the glazing-bar's edges is inserted a leaden strip that has been folded over a metal wire or rod, and the strip's edges are then bent over the panes, the joints being packed, by preference with asbestos, or the sides of the bar may be rolled or pressed down closely together.

14,473-4.—MEANS OF HEATING BUILDINGS: *J. B. Rock.*—In an auxiliary apparatus for increasing the circulation of water in the pipes, it is contrived that flues leading from the furnace and steam pipes from a boiler shall heat the hot-water boiler, or the steam pipes alone may be adapted to that end. Steam passes in a pipe to the heater which effects the generation of steam in the upper portion of the outward flow pipe, which communicates with a steam separator, whereby circulation of the hot water is accelerated. When the steam has been condensed in the separator it is returned through a pipe into the steam boiler. By another method the same purpose is to be effected by causing steam which has passed into a receiver to generate steam in the out-flow pipe's upper part. Mixed water and steam are conveyed to the steam separator and hot water to the radiators, a pipe conducts the separated steam into a condenser, through which the return pipe is passed which conveys the cooled water from the radiators. In another shape the out-flow pipe is directed into a condenser, through which passes the return pipe. An expansion vessel may be substituted for the steam separator, and a boiler for the steam heating chamber.

14,506.—FASTENINGS FOR EMERGENCY EXIT DOORS: *H. C. Price.*—A pin upon the lower bolt is to be pressed by one of pivoted arms which carry a horizontal bar; racks and a pinion join the lower bolt to the upper bolt, and the two bolts become withdrawn from their respective sockets in the lintel and the sill when the bar is pressed towards the door. A swinging lever, whereon is a projection or lug that engages with a slot's lower end, holds the bolts when they are drawn backwards. By another arrangement, in lieu of the direct action of the pivoted arm upon one of the bolts, a fulcrum pin may be joined to the pinion or may constitute the pinion's axis.

14,540.—A COUPLING FOR PIPES: *F. G. S. Ham.*—For coupling together leaden and other pipes their ends are expanded into ferrules or sleeves, and then ferrules are inserted to hold the pipes to one another; the pipe-ends are burred down on to the ends of the ferrules, which, as also the collars, may be corrugated or ribbed, one of the ferrules over which the expanded pipe-ends are compressed is screw-threaded within so that it may take the next adjacent ferrule's projecting end, and on to the last ferrule is screwed a plug-cap which serves to stop the pipe-end. For joining the pipes to taps may be used screwed caps that engage with the outside ferrules.

14,577.—A FLUSHING CONTRIVANCE: *S. H. Adams.*—In this contrivance the inventor causes the flushing-head to be retained by a throttling of the flushing-inlet which is attached to the basin of the waste-water closet, and at the bottom of the basin he makes a channel, set diameter-wise, which communicates with the outlet that is formed in the shape of a funnel. The device admits of the flushing-cistern being situated immediately beneath the sink.

14,602.—PLATES FOR ROOFS AND WALLS: *F. Hoeniger.*—The plates or slabs intended for the construction of walls and roofs are made of cement, artificial stone, concrete, or other suitable materials, and are shaped into a corrugated form; they may further be provided with a framework of wire netting which is embedded in the plastic substance.

14,621.—PROPS FOR USE IN SHORING AND STRUTTING: *J. Gascoyne.*—A movable metallic crown, which is held in its place with tongues or by other suitable means, fits on to the upper end of the prop, which is made of metal and is of H-section; a wooden cap which bears against the roof is sustained with an auxiliary piece, also of wood, that can be held by the crown's upper surface as adapted for that purpose. The props may also be made of wood, and be formed to any section required.

14,638.—A HYDRAULIC APPLIANCE FOR USE WITH WINCHES AND THEIR LOWERING GEAR: *A. T. Dawson & J. Horne.*—The inventors' object is to furnish means for liberating the barrel when the load is to be lowered, and for freeing the band-brake of hydraulic winches. One end of a lever is joined to a rod and piston that move within a cylinder, whilst to the lever's other end are secured the ends of the band-brake. Under normal conditions, a spring presses the piston towards the right hand, so that the brake may remain in its place; but when it is desired to free the brake, water is caused to flow into the cylinder by means of a valve which lies at rest until the engine has been started for lifting the load and there is enough of pressure to move it. A friction clutch joins the barrel to the drum of the brake; a spring normally retains the clutch in action, but provision is made for releasing the clutch by means of a flow of water under pressure into a cylinder at the end.

14,669.—A FASTENING FOR DOOR KNOBS: *E. A. Allen.*—The knob and its neck have flanged portions pierced with squared holes, and the part of the knob that takes the spindle is made entirely of sheet, and not of cast, metal. When the socket-piece has been passed through, the knob and its necking can be clinched together by the doubling

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over of the sides of the socket-piece. The joint can be soldered and strengthening washers of steel, having squared holes, may be used.

14,721.—FLUSHING APPARATUS: *A. N. Pasman.*—The tank is supplied with water that flows from beneath it through the service pipe until a ball rises from its seating above the tank and so closes an upper opening which communicates with an air-pipe; another ball that the water pressure forces down upon its seating closes the outlet at the bottom of the tank, but the lower ball (acting as a valve) can be lifted by the movement of a handle which operates by means of a crank upon a block underneath the ball; as the ball floats the tank is emptied, but when the valve returns to its seating, the tank becomes again filled. In a variant form of the invention the tank is furnished with two outlet openings that are to be closed with balls mounted upon side-arms attached to the lifting-block.

14,740.—CONSTRUCTION OF CISTERNS: *W. P. Butterfield.*—Metal tanks and cisterns are made with inner flanges upon their side and end plates, and the flanges are to be riveted or otherwise held together; for the vertical jointing the plates are bent and lapped to one another; a pocket for taking the end and side plates is made by folding the bottom plate, the joint being riveted; in order to render the joints watertight they should be soldered, or the tank may be immersed in a galvanising bath.

14,763.—AN APPLIANCE FOR USE BY DRAUGHTSMEN AND OTHERS: *W. Leitz.*—For the carriage and support of angle-gauges, T-squares, and drawing-boards whilst being used out of doors are devised two supports formed with a stay, and having a neck strap or sling; to the supports are secured bars whose hinge-checks carry another bar whereof the outer end is hinged to a band screwed on to the drawing-board; the T-square will slide upon the board, which has iron strips at the sides of its upper face, and is retained in position with springs that slide upon bars. Guides are made upon the T-square for taking the foot of an angle-gauge which is pierced for adjustment with the pin of a spring.

14,800.—VICES: *Werkzeugmaschinenfabrik A. Schärff's Nachfolger.*—For the gripping of variously sized tubes, &c. Parts of one jaw are shaped to fit into corresponding parts of the other jaw; to render the putting of the tubes into place more easy, one side of the jaw is cut away, and very short tubes can be gripped, since one jaw has a projection that will register with a corresponding part of the other jaw. On the one jaw is a flattened stud which a set-screw retains within the rounded portion of a keyhole-shaped slot in its base, and a tubular nut of the other jaw engages with the adjusting screw around whose axis the two jaws can be turned together. There are bolt-holes through which screws may be passed so as to fix the vice in a horizontal or a vertical position.

14,806.—ELECTRICITY QUANTITY METERS: *G. di P. Magini.*—For registering the duration of supply to an arc or incandescent lamp, &c. The current is supplied through the coils of two electro-magnets, should it exceed the strength allowed a weighted lever is moved by a magnet and the circuit becomes opened; a lever and a clutch are moved by the magnet, under influence of the proper current, so as to join a shaft to a loose pinion geared to number-wheels. A weighted stop is turned by one of the electro-magnets in order to start the balance-wheel of a clockwork train that drives the clutch and shaft so that the train drives the number-wheels as long as an adequate amount of current flows through the coil; as it runs down the train gives one turn to a crank disc which—if the clockwork is not rewound—ultimately moves a cut-out lever for an opening of the circuit. The removal of the winding key, which is loose, is prevented by a cone-shaped lug upon the key which also retains the cut-out lever and thereby prevents the use of current whilst the key, which gears with the crank-disc, is left upon the winding-stem.

MEETINGS.

FRIDAY, NOVEMBER 16.

Sanitary Institute (Lectures for Sanitary Officers).—8 p.m.

Institution of Mechanical Engineers.—Mr. J. D. Twinberrow on "Capacity of Railway Wagons as Affecting Cost of Transport." 8 p.m.

SATURDAY, NOVEMBER 17.

Carpenters' Hall, London Wall, E.C.—Examination in Sanitary Building Construction. Vivâ-voce examination. 12 noon.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at knacker-yard, Winthrop-street, Whitechapel, E. 3 p.m.

Dundee Institute of Architecture.—Visit to Leuchars Church and Earlshall, Fife.

MONDAY, NOVEMBER 19.

Sanitary Institute (Lectures for Sanitary Officers).—8 p.m.

TUESDAY, NOVEMBER 20.

Institution of Civil Engineers.—(1) Paper to be further discussed, "The Metropolitan Terminus of the Great Central Railway," by Messrs. G. A. Hobson and E. Wragge. (2) Paper to be read, time permitting, "Machinery for the Manufacture of Smokeless Powder," by Mr. Oscar Guttmann. 8 p.m.

Society of Designers.—Mr. Philip H. Newman on "Design in the Future." 8 p.m.

Royal Victoria Hall (Waterloo-road, S.E.).—Mr. W. H. Shrubsole, F.G.S., on "The Medicinal Wells of Old London." 8.30 p.m.

WEDNESDAY, NOVEMBER 21.

British Archæological Association.—(1) The Rev. H. J. D. Astley, M.A., on "The Congress at Leicester." (2) Mr. W. A. Donnelly on "The Mound Dwellings of Auchirgaich, Dumbartonshire," with illustrations. 8 p.m.

Society of Arts.—Opening meeting of session. Address by Sir John Evans, K.C.B., F.R.S. 8 p.m.

Edinburgh Architectural Society.—Mr. C. B. Cownie on "Quantity Surveying."

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

THURSDAY, NOVEMBER 22.

Institution of Electrical Engineers.—Mr. John Gavey on "Telegraphs and Telephones at the Paris Exhibition, 1900." 3 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—8 p.m.

FRIDAY, NOVEMBER 23.

Architectural Association.—(Joint meeting with the Institution of Junior Engineers).—Mr. A. T. Walmisley on "The Use of Rolled Joists in Construction." 7.30 p.m.

Glasgow Architectural Craftsmen's Society.—Mr. W. U. Muir on "Duties of a Clerk of Works." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—8 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 1.—By DRIVERS, JONAS, & Co. (at Reading).

Sulhampstad Abbots, Berks.—Tyle Mill, house, and 5 a. 2 r. 21 p., f., r. 205*l.*	£3,600
Six cottages and 1 a. 3 r. 14 p. f.	800

By W. N. CHEATLE & HALL (at Rugeley).

Hill Ridware, Staffs.—Four enclosures, 13 a. 1 r. 4 p., f.	575

By WATERS & RAWLENCE (at Romsey).

Romsey, Hants.—The Duke's Head Inn and 2 r. 33 p., f.	2,450
Various enclosures of land, 86 a. 2 r. 26 p., f.	1,965
Plot of woodland, 6 a. 1 r. 20 p., f.	110
Stanbridge Ranville's Farm, 226 a. 3 r. 5 p., f.	2,930
Daman Cottage and 2 a. 3 r. 15 p., f.	405
Jewell's Cottage and 1 a. 2 r. 25 p., f.	240

November 5.—By HARDS & BRADLY.

Belgravia.—79 and 83, Claverton-street, u.t. 33 yrs., g.r. 10*l.*, r. 150*l.*	1,200
Lewisham.—3 and 4, Rhyme-rd., u.t. 95 yrs., g.r. 7*l.*	555

By WILLIAM HOUGHTON.

Bethnal Green.—42 and 44, Quilter-st., u.t. 24½ yrs., g.r. 8*l.* 8s.	405
15, Elwin-st., u.t. 21½ yrs., g.r. 4*l.* 4s.	180
Buckhurst Hill.—1 and 2, Hillside Villas, f., r. 56*l.*	730
Leytonstone.—5, 7, 11, and 13, Harvey-rd., and 1 to 6, Harvey-gardens, u.t. 75½ yrs., g.r. 19*l.* 18s.	1,480
Walthamstow.—Howard-rd., Normanhurst and Crowhurst, f.	845

By TYSER, GREENWOOD, & CRIER.

Turnham Green.—41, 43, 61, and 63, Clifton-gardens, u.t. 93 yrs., g.r. 20*l.*	925

By T. G. WHARTON.

Forest Hill.—Kilmorie-rd., f.g.r.s 49*l.* 10s., reversion in 98 yrs.	1,213
Tottenham.—Brereton-rd., &c., f.g.r.s 167*l.*, reversion in 98 yrs.	4,050
Beckenham.—Sirdar-ter., f.g.r.s 30*l.*, reversion in 96 yrs.	760
Fulham.—Bullow-rd., f.g.r.s 20*l.*, reversion in 98 yrs.	480

By ALFRED RICHARDS (at Tottenham).

Tottenham.—Northumberland Park, a plot of building land, f.	250
20 and 22, Stanley-rd., f.	550
Enfield.—8 and 10, Halifax-rd., u.t. 84 yrs., g.r. 6*l.*	300

November 6.—By GEORGE BILLINGS.

Stoke Newington.—136, Neville-rd., u.t. 64 yrs., g.r. 3*l.*, r. 32*l.*	365

By ROGERS, CHAPMAN & THOMAS.

Charing Cross.—22 and 23, Cockspur-st., area 2,300 ft., f., r. 565*l.*	22,150

By HEPPER & SONS (at Leeds).

Leeds.—28, 30, and 32, St. Paul's-st., f., r. 150*l.*	4,310
83, Kirkgate, f., r. 50*l.*	1,300
84 to 94 (even), Marsh-lane, and 3, Shannon-st., f.	1,880
5 to 11 (odd), Shannon-st., and 6, Burrell-ter., f.	480
11, Moorland-rd., f., r. 50*l.*	900

By DYER, SON, & HILTON (at Lewisham).

Lewisham.—37 and 39, Court Hill-rd., f., e.r. 62*l.*	750
Blackheath.—9, Bennett Park, u.t. 52 yrs., g.r. 11*l.*	380

By SEWELL & BARNES (at Forncett).

Forncett St. Peter, Norfolk.—A farmhouse and 4 a. 3 r. 3 p., f.	370
Two freehold cottages and 2 r. 1 p.	170

November 7.—By CHADWICK & SONS.

Balham.—1 to 21, Holly-grove, also Holly-grove, f.	4,922

By COLLINS & COLLINS.

Trafalgar-sq.—6, St. Martin's-mews, u.t. 28 yrs., g.r. 15*l.* 15s.	2,000

By FOSTER & CRANFIELD.

City of London.—Upper Thames-st., f.g.r. 45*l.*, reversion in 99 yrs.	1,225
Notting Hill.—29, Elgin-cres., u.t. 51 yrs., g.r., &c., 19*l.* 12s., e.r. 75*l.*	340
Ivinghoe, Bucks.—Myrtle Villa and 1 a. 1 r. 12 p., f., r. 30*l.*	540

By HUMBERT & FLINT.

Virginia Water, Surrey.—Lyne-lane, two freehold cottages	345
Holloway.—96 and 98, Brecknock-rd., u.t. 48½ yrs., g.r. 14*l.*, r. 110*l.*	£1,015
Grove-rd., i.g. rents 91*l.*, u.t. 62½ yrs., g.r. 7*l.* 14s.	1,680
Fonthill-rd., f.g.r. 17*l.*, reversion in 66 yrs.	460
Benwell-rd., f.g. rents 128*l.*, reversion in 63 yrs.	3,460

By MIDDLETON & CRACKNELL.

Fulham.—7, Alderville-rd., f.	440

By VENTOM, BULL, & COOPER.

Twickenham.—Cross Deep-rd., two plots of land, 8 a. 0 r. 25 p., f.	6,500

By WILLIS & CROUCH.

Maida Vale.—Blomfield-rd., Randolph House, u.t. 37 yrs., g.r. 4*l.*, e.r. 175*l.*	1,560

By W. N. WILLOUGHBY.

Norwood.—14 to 20 (even), Harpenden-rd., u.t. 95 yrs., g.r. 29*l.* 8s., r. 156*l.*	1,345

November 8.—By BOYTON, PEGRAM, & BUCKMASTER.

Acton.—51, Churchfield-rd. and 9, Burlington Mews, u.t. 76 yrs., g.r. 15*l.*, e.r. 95*l.*	595

By BRODIE, TIMBS, & Co.

Pimlico.—68, 81, and 85, Lupus-st., u.t. 27½ yrs., g.r. 33*l.*, r. 255*l.*	2,030
19 and 20, Glasgow-ter., u.t. 25 yrs., g.r. 12*l.* r. 80*l.*	575
St. John's Wood.—23 and 25, Queen's-ter., u.t. 19 years, g.r. 20*l.*, r. 106*l.*	730
Croydon.—22, 26, 28, 30, and 32, Handcroft-rd., u.t. 31½ yrs., g.r. 19*l.* 5s. 9d.	680

By CHESTERTON & SONS.

Lewisham.—87, Manor-rd., r. 36*l.*, also i.g.r. 6*l.*, u.t. 62 yrs., g.r. 13*l.*	300
Greenwich.—27, Egerton-rd., u.t. 72 yrs., g.r. 6*l.*, r. 33*l.*	400
Deptford.—200, Lewisham High-rd., u.t. 50 yrs., g.r. 9*l.* 6s., r. 60*l.*	600
Bethnal Green.—Ramsey-st., a plot of building land, f.	240
Barnes.—Church-rd., coach-house and premises, area 2,500 ft., u.t. 97 yrs., g.r. 8*l.*	325

By GLASIER & SONS.

Tottenham.—Ashford-rd., f.g.r. 36*l.*, reversion in 78½ yrs.	760
Headcorn-rd., f.g.r. 18*l.*, reversion in 78½ yrs.	380
Cranbrook-rd., f.g.r.s 32*l.*, reversion in 78½ yrs.	685
Brereton-rd., f.g.r. 22*l.*, reversion in 78½ yrs.	465
Battersea.—Wayford-st., f.g.r.s 15*l.*, reversion in 75 yrs.	325

By KNIGHT & Co.

Kensington.—27, Eldon-rd., u.t. 32 yrs., g.r. nil.	1,070

By NEWBON, EDWARDS, & SHEPHARD.

Islington.—2A, Rheidol-ter., u.t. 16 yrs., g.r. 6*l.*, r. 35*l.*	170
Highbury.—10 and 12, Aubert Park, u.t. 80½ yrs., g.r. 16*l.*, r. 90*l.*	1,040
20, Hamilton-rd., u.t. 47 yrs., g.r. 7*l.* 7s., r. 38*l.*	415
Barnsbury.—9 and 10, Matilda-st., u.t. 41 yrs., g.r. 10*l.* 10s.	550
Hornsey.—65, St. Mary's Hill, u.t. 88 yrs., g.r. 6*l.*	180
Wood Green.—8 and 9, Harcourt-rd., f., e.r. 68*l.*	840

By STIMSON & SONS.

Lambeth.—7 and 9, Newnham-ter., u.t. 22 yrs., g.r. 10*l.* 10s., r. 67*l.* 10s.	460
Peckham.—109, Bellenden-rd., f., r. 50*l.*	690
11, Carden-rd., at 65 yrs., g.r. 6*l.*, r. 32*l.*	310
Streatham.—18 and 20, Tankerville-rd., u.t. 79 yrs., g.r. 13*l.* 10s., r. 72*l.*	610
Battersea.—86 and 88, St. John's Hill, u.t. 94 yrs., g.r. 40*l.*, r. 150*l.*	1,400
Greenwich.—81, 83, 89, and 91, Woolwich Lower-rd., u.t. 56 yrs., g.r. 18*l.*	865
85 and 87, Woolwich Lower-rd., u.t. 56 yrs., g.r. 14*l.*, r. 87*l.*	825
Lewisham.—12 and 15, Spring-bank, u.t. 954 yrs., g.r. 25*l.*, r. 140*l.*	1,560

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.	
Hard Stocks	1	16	0	per 1,000 alongside, in river.
Rough Stocks and Grizzles	1	12	0	" " "
Smooth Bright Facing Stocks	2	18	0	" " "
Shippers	2	6	0	" " "
Flettons	1	10	6	" at railway depôt.
Red Wire Cuts	1	15	6	" " "
Best Fareham Red	3	11	6	per 1,000 at railway depôt.
Best Red pressed Ruabon Facing	5	5	0	" " "
Best Blue Pressed Staffordshire	4	7	0	" " "
Do., Bullnose	4	12	0	" " "
Best Stourbridge Fire Bricks	4	4	6	" " "
GLAZED BRICKS.				
Best White and Ivory Glazed Stretchers	13	0	0	" " "
Headers	12	0	0	" " "
Quoins, Bullnose, and Flats	17	0	0	" " "
Double Stretchers	19	0	0	" " "
Double Headers	16	0	0	" " "
One Side and two Ends	19	0	0	" " "
Two Sides and one End	20	0	0	" " "
Splays, Chamfered, Squints	20	0	0	" " "

See also next page.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Sewering, Levelling, Paving, &c.	Bromley U.D.C	Surveyor, Council Offices, Bromley, Kent	Nov. 19
Fireclay Goods	Manchester Corporation	C. Nickson, Town Hall, Manchester	Nov. 20
Bungalows, Whitehead, Antrim		J. Russell, Civil Engineer, 22, Waring-street, Belfast	do.
Schools, Salisbury-road	Plymouth School Board	H. J. Snell, Architect, 11, The Crescent, Plymouth	do.
Twenty-one Cottages, Sutton Court Drive, Eastwood		E. J. Hammond, Civil Engineer, New Brompton, Kent	do.
Mill, Stoneferry-road, Hull	Mr. J. Wilson	W. R. Nunns, Architect, Market-street, Bingley	do.
Carriage Shed, &c., Wakefield	Lancs & Yorks Railway Company	R. C. Irwin, Hunt's Bank, Manchester	do.
Shed, &c., Nelson, Lancs.	do.	Engineer, Hunt's Bank, Manchester	do.
Additions to Station, Southport	do.	do.	do.
Public House, Sheffield		G. A. Wilson, Architect, Hartshead Chambers, Sheffield	do.
Road Works, Camberley	Frimley U.D.C.	F. C. Uren, Civil Engineer, High-street, Camberley	do.
Shops and Residences, High West-street, Dorchester		F. Cooper, Architect, 77, East-street, Bridport	Nov. 21
Arc Lamps, &c.	Newcastle-on-Tyne Corporation	Hopkinson & Talbot, Engineers, 29, Princes-street, Manchester	do.
Granite Kerbing		E. R. Harmsworth, Shoreham	do.
Road Works	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall	do.
Eighteen Houses, Spencer-street, Keighley		J. Haggas, Architect, North-street, Keighley	do.
Infirmary Staircases, Hellingly	Hailsham (Sussex) Guardians	Clerk, Guardians' Offices, Hailsham	do.
Road, Hunger-hill	Otley (Yorks) U.D.C.	J. Waugh, Civil Engineer, Bradford	do.
*Repairs to Tar Paving at Brook Hospital	Metropolitan Asylums Board	Offices, Embankment, E.C.	Nov. 22
Ten Houses, Ingrow, Keighley		W. H. & A. Sugden, Architects, Keighley	do.
Engine House, &c., Tees Cottage	Darlington Corporation	T. & C. Hawksley, Civil Engineers, 30, Great George-street, S.W.	do.
Additions to Premises, Regent-road, Gt. Yarmouth	Mr. J. W. Argile	C. G. Baker, Architect, Great Yarmouth	Nov. 23
Bridge, Hogsthorpe	Spilsby R.D.C.	T. A. Busbridge, Civil Engineer, Spilsby, Lincs	do.
Electric Lighting Plant, &c.	Belfast Corporation	V. A. H. McCowen, Engineer, Town Hall, Belfast	do.
House, New Malden, Surrey		T. V. J. Davison, Bartley Lodge, New Malden	do.
Granite Road Metal	Romford U.D.C.	C. T. King, Council Offices, Romford	do.
Stone Lime	Maldens & Coombe U.D.C.	T. V. H. Davison, Engineer, Cambridge-road, New Malden	do.
*Alterations at Infirmary Mortuary	St. George-in-the-East Guardians	G. A. Wilson, Vestry Hall, Cable-street, E.	do.
Pipe Sewer, &c., Walshaw	Tottington (Lancs) U.D.C.	L. Kenyon, Surveyor, 33, Chapel-street, Tottington	Nov. 24
Waterworks	Wenlock Town Council	T. S. Stooke, Civil Engineer, Severn Villa, Shrewsbury	do.
*Engine House, &c.	Croydon County Council	Borough Engineer, Town Hall, Croydon	Nov. 26
Kerbing, &c., High-street, Ascot	Windsor R.D.C.	Mr. Menzies, Englefield Green, Surrey	do.
Hospital, Hill Top, near Bromsgrove		H. R. Lloyd, Architect, 33, Newhall-street, Birmingham	do.
Club Building, York-road, Maidenhead		Davy & Salter, Architects, High-street, Maidenhead	do.
Additions to Schools, Railway-road, Leigh		Banks & Co., Architects, Church-street, Leigh, Lancs	do.
Eight Houses, Llansamlet	Mr. E. E. Bevan	J. C. Rees, Architect, Neath	do.
Paving Works, &c.	Hastings School Board	A. Wells, Architect, Queen's-chambers, Hastings	do.
Street Works, Emscote-street	Halifax Corporation	J. Lord, Engineer, Town Hall	do.
Engine House, &c.	Newmarket U.D.C.	Beesley & Co., Engineers, 11, Victoria-street, S.W.	do.
*Repairs to Public Well at Canewdon, Rochford, Essex	Rochford U.D.C.	See Advertisement	do.
Schools, Wheeler-street	Hull School Board	B. S. Jacobs, Architect, Bowl Alley-lane, Hull	Nov. 27
*Iron Fencing	Walthamstow School Board	School Board Office, High-street, Walthamstow	do.
Electrical Equipment	Cardiff Corporation	A. Ellis, Electrical Engineer, Old Post Office-buildings, Cardiff	Nov. 28
Laundry Buildings	Sheppey (Kent) Union Guardians	W. L. Grant, Architect, Sittingbourne	do.
Road Works, Byron-road, &c.	Gillingham (Kent) U.D.C.	F. C. Boucher, Gardiner-street, New Brompton	Nov. 29
*Technical School	Watford U.D.C.	W. H. Syme, Architect, 4, High-street, Watford	do.
*Extension of Sewer	Brighton County Council	Borough Engineer, Town Hall, Brighton	Nov. 30
*Car Depôt and Workshops	Salford Tramways Committee	Tramways Engineer, Town Hall, Salford	do.
Sewerage Works	Dunstable Corporation	W. H. Radford, Civil Engineer, King-street, Nottingham	Dec. 1
*Schools, Gainsford-road, Walthamstow	Walthamstow School Board	G. E. T. Lawrence, 22, Buckingham-street, Adelphi, W.C.	Dec. 4
*Technical Schools	Southend-on-Sea Corporation	Town Clerk, Southend-on-Sea	Dec. 6
Sewerage Works	Walton-on-the-Naze U.D.C.	Beesley, Son & Nichols, Engineers, 11, Victoria-street, S.W.	do.
*Infant School	Romford School Board	Albert-road School, Romford	Dec. 10
Bridge, Houghton Coats	Lancs County Council	County Bridgemaster, Preston	do.
Drainage Works, South Holmwood	Dorking R.D.C.	W. Rapley, jun., Clovelly, Tower Hill, Dorking	Dec. 11
*Custom House at Southampton	H.M. Office of Works	Collector of Customs, Custom House, Southampton	do.
Business Premises, Alloa, N.B.	British Electric Plant Co., Ltd.	Secretary, 19, Waterloo-street, Glasgow	No date
Wesleyan Church, Beeston, Notts	Messrs. J. Kay & Sons	W. J. Morley, Architect, 269, Swan-arcade, Bradford	do.
Four Houses and Offices, Tenterden-street, Bury		Openshaw & Gill, Architects, 6, Fleet-street, Bury, Lancs	do.
Work at Electricity Station, Keighley	Messrs. Schunck & Co.	J. M. Smyth, Electrical Engineer, Bridge-street, Keighley	do.
Additions to Warehouse, Great George-street, Leeds	Messrs. Phillips & Son	Bedford & Kitson, Architects, Greek-street-chambers, Leeds	do.
Inn, Aberaychan	Kendal Corporation	W. Gardner, Architect, 14, Victoria-road, Newport	do.
Electrical Plant	Manchester Corporation	Handcock & Dykes, Engineers, 1, Victoria-street, S.W.	do.
Haslingden Grit Setts	Mrs. Stedall	Surveyor, Highways Department, Town Hall, Manchester	do.
House, Whitby		H. G. Walker, Architect, West Cliff, Whitby	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Application to be in
*Architectural Assistant	Newport (Mon.) Corporation	3*l.* per week	Nov. 21
*Junior Assistant	do.	80*l.* per annum	do.
*Clerk of Works	Enfield U.D.C.	3*l.* per week	do.
*Architectural Assistant	Garston U.D.C.	2*l.* 10*s.* per week	Nov. 21
*Engineering Assistants (2)	Grimsby Corporation	120*l.* per annum each	Dec. 3

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. —. Contracts, pp. iv. vi. viii. x. & xix. Public Appointments, pp. xvi. xvii. & xix.

PRICES CURRENT (*Continued*).

	£	s.	d.		
Best Dipped Salt Glazed Stretchers and Headers	12	0	0	per 1,000 at railway depôt.	
Quoins, Bullnose, and Flats	14	0	0	,,	,, ,,
Double Stretchers	15	0	0	,,	,, ,,
Double Headers	14	0	0	,,	,, ,,
One Side and two Ends	15	0	0	,,	,, ,,
Two Sides and one End	15	0	0	,,	,, ,,
Splays, Chamfered, Squints	14	0	0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.

	s.	d.	
Thames and Pit Sand	8	0	per yard, delivered.
Thames Ballast	6	9	,, ,,
Best Portland Cement	38	0	per ton ,,
Best Ground Blue Lias Lime	24	6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d.	per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d.		per ton at rly. dpt.

PRICES CURRENT (*Continued*).

STONE.

	s.	d.		
Ancaster in blocks	2	0	per ft. cube, deld. rly. depôt	
Bath ,,	1	7	,,	,,
Farleigh Down Bath	1	8	,,	,,
Beer in blocks	1	6½	,,	,,
Grinshill ,,	1	10	,,	,,
Brown Portland in blocks	2	2	,,	,,
Dadey Dale ,,	2	1½	,,	,,
Red Corsehill ,,	2	5	,,	,,
Red Mansfield ,,	2	4½	,,	,,
Hard York ,,	2	10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	8	per ft. super. at rly. depôt.	
,, ,, 6 in. Rubbed Ditto	3	0	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1	3	,,	,,
,, ,, 3 in. self-faced Ditto	0	9½	,,	,,

SLATES.

in. in.	£	s.	d.	
20×10 best blue Bangor	11	5	0	per 1000 of 1200 at ry. dep.
,, best seconds ,,	10	15	0	,, ,,
16×8 best ,,	6	2	6	,, ,,

PRICES CURRENT (*Continued*).

	£	s.	d.	
20×10 best blue Portmadoc	10	18	0	per 1000 of 1200 at ry. dep.
16×8 best blue Portmadoc	6	0	0	,, ,,
20×10 best Eureka unfading green	11	2	6	,, ,,
16×8 ,, ,,	6	15	0	,, ,,
20×10 Permanent green	10	0	0	,, ,,
16×8 ,, ,,	5	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles	42	6	per 1,000 at rly. depôt
Hip and valley tiles	3	7	per doz. ,, ,,
Best Broseley tiles	48	6	per 1,000 ,, ,,
Hip and valley tiles	4	0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000 ,, ,,
Do. ornamental Do.	60	0	,, ,, ,,
Hip tiles	4	0	per doz. ,, ,,
Valley tiles	3	9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes)	50	9	per 1,000 ,, ,,
Hip tiles	4	1	per doz. ,, ,,
Valley tiles	3	8	,, ,, ,,

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PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
" " 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
" " " 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
" " " 3 in. by 9 in.	13 0 0	14 0 0
" " battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	9 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small "	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
¾ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6
Compound Girders " "	12 5 0	13 10 0
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	11 7 6	12 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	9 15 0	10 5 0
Staffordshire Crown Bars, good merchant quality	10 10 0	11 0 0
Staffordshire "Marked Bars"	13 0 0	- - -
Hoop Iron, basis price	11 0 0	11 10 0
" " galvanised	17 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 5 0	- - -
" " to 24 g.	12 10 0	- - -
" " to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 15 0	- - -
" " 22 g. and 24 g.	15 5 0	- - -
" " 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 0 0	- - -
" " 22 g. and 24 g.	18 10 0	- - -
" " 26 g.	20 0 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 15 0	14 10 0
" " 22 g. and 24 g.	14 10 0	15 10 0
Cut nails, 3 in. to 6 in. (Under 3 in. usual trade extras.)	11 10 0	- - -
LEAD—Sheet, English, 3 lbs. & up.	20 5 0	- - -
Pipe in coils	20 15 0	- - -
Soil Pipe	23 15 0	- - -

PRICES CURRENT (*Continued*).

	£ s. d.	£ s. d.
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 1	- - -
Thin "	0 1 3	- - -
Copper nails "	0 1 3	- - -
BRASS—		
Strong Sheet "	0 0 11	- - -
Thin " "	0 1 1	- - -
TIN—English Ingots "	0 1 6	- - -
SOLDER—Plumbers' "	0 0 8	- - -
Tinmen's "	0 0 10	- - -
Blowpipe "	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	2¾d. " "
21 oz. thirds	3¼d. " "
" " fourths	3d. " "
26 oz. thirds	4¼d. " "
" " fourths	4d. " "
32 oz. thirds	5¼d. " "
" " fourths	5d. " "
Fluted sheet, 15 oz.	3¼d. " "
" " 21 "	4¼d. " "
½ Hartley's Rolled Plate	3d. " "
⅝ " " "	3¼d. " "
¾ " " "	4d. " "

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
" " " in barrels "	0 3 2
" " " in drums "	0 3 4
Boiled " " in pipes "	0 3 4
" " " in barrels "	0 3 5
" " " in drums "	0 3 7
Turpentine, in barrels "	0 2 7
" in drums "	0 2 9
Genuine Ground English White Lead per ton	27 5 0
Red Lead, Dry "	24 10 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 10 0

VARNISHES, &c.

	per gallon. £ s. d
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

W. S.—J. S. M. (Amounts should have been stated.) H. P. (Shall have attention).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

CARBIS BAY.—For proposed New Connexion Chapel near Carbis Bay. Mr. Sampson Hill, architect, Redruth:—

Jennings	£829	Glasson	£618
Hosking	798	Williams	600
Toy	776	Pearce, Carbis Bay*	578

EAST SHEEN.—For the erection of a residence in Blind-lane, East Sheen, for Miss Beachcroft. Mr. Ernest Pennington, architect, Richmond, Surrey:—

J. W. Brooking	£1,467	E. Seaber*	£858

EPSOM.—For rebuilding the Epsom Brewery for Messrs. Bradley & Son. Messrs. R. W. Andrews & Co., brewery architects and engineers, 148 and 150, Pentonville-road, London, N.:—

Shopland	£2,700	Harris	£2,387
Potter	2,569	Cropley Bros., Ltd.*	2,197

EXMOUTH.—For the erection of a new dispensary. Mr. Ernest E. Ellis, architect, Exmouth:—

T. Abell	£1,062 0 0
G. Hooper	914 0 0
Building.	
H. Dart	849 0 0
A. Hayman	799 0 0
W. J. Stokes	795 0 0
J. J. Lacey, Exmouth*	740 0 0
Plumbing.	
Webster	105 0 0
G. Bennett	86 10 0
Hubber & Son, Exeter, Exmouth*	85 0 0

Architect's estimate, £854.

EXMOUTH.—For the erection of a furniture depository for Messrs. Blackmore & Sons. Mr. Ernest E. Ellis architect, Exmouth:—

	First.	Amended.
F. Farrant	£558 0 0	—
J. J. Lacey	590 0 0	£476
Cooper & Son	531 0 0	590
W. H. Perry	524 0 0	485
H. Dart, Exmouth*	519 10 0	460
W. J. Stokes	493 16 10	385
A. Hayman	—	499

GODALMING.—For the construction of sewers, Farncombe, for the Corporation. Mr. J. H. Norris, Borough Surveyor, Municipal Offices, Bridge-street, Godalming:—

Clift Ford	£639 0	A. & A. Streeter, Meadrow, Godalming*	£457 0
Mitchell Bros.	577 0		
G. Richardson	508 10		

GODALMING.—For the construction of filter beds at the sewage farm, Unstead, for the Corporation. Mr. J. Herbert Norris, Borough Surveyor, Municipal Offices, Bridge-street, Godalming:—

A. A. Streeter	£1,437 7	Clift Ford, Harlesden, N.W.*	£1,297 0
Mitchell Bros.	1,375 0		

LEWES.—For building an electricity generating station for the Electrical Power Distribution Company, Limited. Mr. W. C. F. Gillam, architect, Brighton:—

Cooke & Co.	£5,150	Martin	£3,879
Longley & Co.	4,945	Hibberd Bros.	3,797
Patman & Fotheringham	3,973	Field & Co., Brighton*	3,777
Wallis	3,880		

NEWCASTLE-UNDER-LYME (Staffs.).—For the erection of a hospital for infectious diseases, for the Urban Sanitary Authority. Mr. J Lewis, Newcastle-under-Lyme, and Mr. Frank Emery, Stoke-on-Trent, joint architects. Quantities by architects:—

G. K. Downing	£6,213	Saml. Wilton, jun.	£5,752
Thos. Maddock	6,012	Bennett Bros., Burslem*	5,242
Thos. Godwin	5,960		
John Gallimore	5,775		

TEDDINGTON.—For structural and decorative repairs and new drainage at "The Weir House," Teddington, for Mr. H. J. Chinney. Mr. Ernest Pennington, architect, Richmond, Surrey:—

Seal & Co.	£936	C. Eldridge*	£530
J. F. Collinson	593		

TWICKENHAM.—For the completion of ten houses in Waldegrave-road and Southfield-gardens, for Mr. H. P. Edwards. Mr. Ernest Pennington, architect, Richmond, Surrey:—

E. Seaber	£2,300	G. W. Street*	£2,150

TWICKENHAM.—For the erection of two shops, with warehouses in rear, in Crown-road, Twickenham, for Mr. Vincent Bell. Mr. Ernest Pennington, architect, Richmond, Surrey:—

J. W. Brooking	£2,435	E. B. Tucker*	£1,617
Speechley & Smith	2,005		

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect:—

EARDLEY-ROAD (Enlargement)—Boys, 130; girls, 130; infants, 130; total, 390. Providing three new classrooms for each department, 50, 40, 40; new staircases for boys and girls; corridors and cloakrooms for each department; additional lavatory for girls; additional lavatory basins for infants; providing stock cupboards in infants' hall; internal female teachers' water-closet; re-arranging and providing additional water-closets for boys and girls, and providing new block of water-closets for infants; altering existing division wall between playgrounds; providing combined cookery and laundry centre, and removing and refixing girls and infants' covered playground:—

B. E. Nightingale	£8,785	W. Downs	£8,215
Bulled & Co.	8,509	W. Smith	8,187
F. & H. F. Higgs	8,423	Smith & Sons, Ltd.	8,152
Lawrance & Sons	8,254	Johnson & Co., Ltd.	8,022
Lathey Bros.	8,221	J. & C. Bowyer*	7,988

LYHAM-ROAD.—Repairing desks and seats:—

General Builders, Ltd.	£189 0	Hammer & Co., Ltd.	£135 0
London School Furniture Co.	145 0	Wake & Dean, Ltd.	96 8
		H. Bouneau	90 0
		T. Cruwys*	82 0

[*See also next page.*

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MARLBOROUGH-ROAD.—Repairing stoves :—

Wontner-Smith, Gray, & Co.	£79 0	Rockhill Bros.	£40 0
Lander & Co.	45 0	Hendry & Pattisson, Ltd.	39 15
Coules & Son	44 10	J. Bond*	36 0
Cannon & Sons	40 0		

UPTON HOUSE (Truant School).—Providing and fixing new steam boiler, including necessary connexions to main flue, connecting up to existing steam pipes, and running steam service to new swimming bath, also providing and fixing low-pressure steam heating apparatus to dressing-room, and auxiliary heating to new hall, including providing and fixing two spray baths and five ranges of cocks and pipes, &c., over the lavatory troughs, and laying on hot and cold water to same, also providing additional heating surface and overhauling existing heating apparatus :—

Fraser & Son	£1,087 10 0	Oldroyd & Co., Ltd.	£702 0 0
J. Grundy	1,080 0 0	Dargue, Griffiths, & Co., Ltd.	621 1 6
Cannon & Sons	925 0 0	Duffield & Sons*	560 0 0
J. Esson	798 0 0		
J. & F. May	740 0 0		

WHITE LION-STREET.—Erecting schoolkeeper's house :—

L. H. & R. Roberts	£1,095	Williams & Son	£997
Barrett & Power	1,082	Marchant & Hirst	944
T. L. Green	1,079	Stevens Bros.	932
Thompson & Beveridge	1,049	F. Bull	911
		R. S. Buckeridge*	824

WINSTANLEY-ROAD SCHOOL.—Improvements (boys and girls' departments). Providing new halls, staircases, cloak and teachers' rooms, and lavatories; re-dividing, re-stepping, and re-seating, and providing additional lighting to existing classrooms; removing steps from present staircase and forming corridor for access to classroom, also forming playgrounds under school for boys and girls; providing boiler-room and heating apparatus; altering division wall between playgrounds. Revised accommodation :—Boys, 292; girls, 290; infants, 387 (unaltered). Total, 967. Net loss of 76 places (boys and girls) :—

B. E. Nightingale	£12,531	Smith & Sons, Ltd.	£11,695
Marsland & Sons	11,765	Johnson & Co., Ltd.	10,984
W. Downs	11,581	J. & C. Bowyer	10,734
Treasure & Son	11,430	Stimpson & Co.	10,730
Kirk & Randall	11,337	Lorden & Son*	9,888
F. & H. F. Higgs	11,248		

Repairs to Buildings on the Schedule of Prices.

(i) FINSBURY—Group 6 :—

McCormick & Sons	+33½	per cent.	on	Schedule.
Barrett & Power	+25	,,	,,	,,
C. & W. Hunnings	+22½	,,	,,	,,
Stevens Bros.*	+22½	,,	,,	,,

(ii.) GREENWICH—Group 3 :—

W. Banks	+33⅓	per cent.	on	Schedule.
G. Kemp	+33⅓	,,	,,	,,
S. Musgrove	+30	,,	,,	,,
W. J. Howie*	+25	,,	,,	,,

(iii.) TOWER HAMLETS—Group 1 :—

J. Haydon	+35	per cent.	on	Schedule.
J. F. Holliday	+30	,,	,,	,,
A. E. Symes	+27½	,,	,,	,,
Bruce, Croom & Co.	+25	,,	,,	,,
D. Gibb & Co.	+25	,,	,,	,,
Barrett & Power*	+25	,,	,,	,,

Supply of COMPASS POINTS (paper), on a running contract :—

	1,000 sets.			2,000 sets.			3,000 sets.			5,000 sets.	
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.
David Allen & Sons, Ltd.	13	15	0	22	5	0	30	15	0	47	0
Standidge & Co., Ltd.	13	0	0	21	0	0	26	0	0	40	0
Waterlow & Sons, Ltd.	11	13	2	18	18	9	25	14	0	39	3
Alexander & Shepheard, Limited	10	10	0	17	0	0	25	0	0	39	0
F. Tarrant & Son	10	0	0	16	10	0	23	0	0	36	0
Vincent Brooks, Day, & Son, Limited	9	2	6	15	10	0	21	17	6	34	5
Hendersen & Spalding	11	10	0	15	10	0	19	10	0	27	10
Hazell, Watson, & Viney, Limited*	9	5	0	13	10	0	17	14	0	26	0

Supply of the following articles, on running contracts :—
Attendance boards for manual training centres, sand boxes, needlework boards.

	Attendance Boards	Sand Boxes.	Needlework Boards.
	Each. s. d.	Each. s. d.	Each. £ s. d.
H. Bouneau	4 0	*3 11	1 4 10
T. Cruwys	3 10	4 0	1 5 0
Educational Supply Association, Ltd.	—	—	‡0 14 3
R. H. Galbraith	7 6	6 6	—
General Builders, Ltd.		7 6	—
Hammer & Co., Ltd.	5 6	6 3	1 0 0
London School Furniture Co.	7 6	5 0	1 0 0
Lonnie & Co.	—	—	2 4 6
J. H. W. Martin	4 6	4 0	*0 17 6
Spencer & Co.	—	—	2 8 9
J. E. Tuckett	6 6	7 0	—
Wake & Dean, Ltd.	*3 0	4 0	—

‡ This quotation is not in accordance with the Board's specification.

Supply of the following articles, on running contracts :—
Cinder-sifters, teachers' fenders :—

	Cinder Sifters. Each. s. d.	Teachers' Fenders. Per Dozen. £ s. d.
Bird & Co.	1 6	9 15 0
Brightside Foundry and Engineering Co., Ltd.	—	24 0 0
Carter & Aynsley, Ltd.	*1 2	15 15 0
Rowland Hodges	1 4	—
R. H. & J. Pearson, Ltd.	—	16 10 0
Pryke & Palmer	2 11	—
G. W. Seymour	3 0	*6 9 0
Truman & Co.	—	9 12 0

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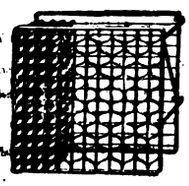

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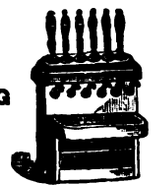

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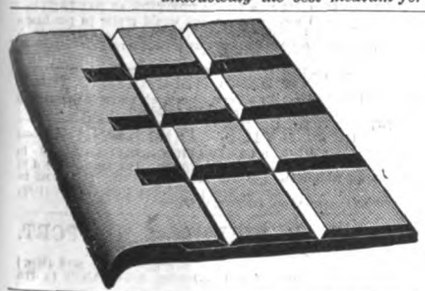

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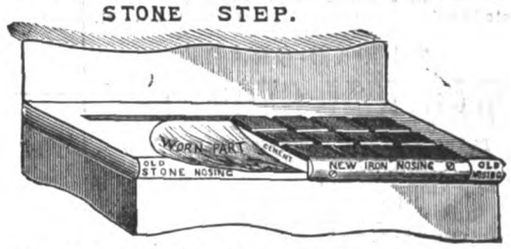

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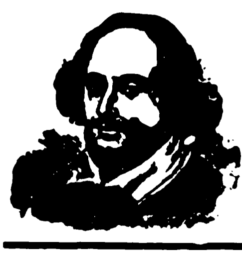

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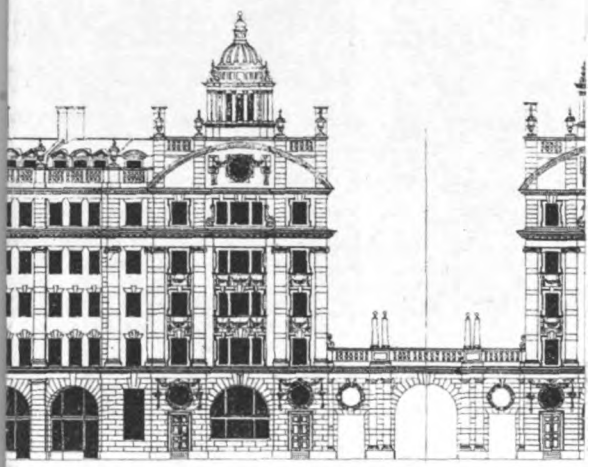

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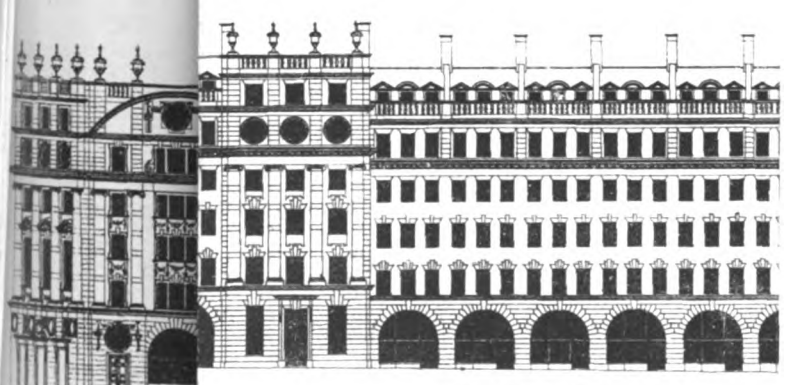

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Some Cities of Modern Italy.—Genoa.

GENOA and Venice—the two great mediæval republics, and formerly two of the most important commercial centres of Southern Europe—afford a singular contrast at the present day. Venice, in a state of senile decay, seems on the point of subsiding into the muddy lagoons which have been her chief protection all through the past centuries. Her ruinous old palaces, with unstable foundations, seem to have at last reached the limit of resistance to the combined influences of time and weather, and the squalid neglect of their present owners. Genoa, on the other hand, recovering in these latter years from the influences of French and Spanish intrigue which followed the downfall of her independence and her republican institutions, occupies a position of commercial supremacy in the Mediterranean superior to that of any previous period of her history. As the chief port of United Italy, as well as supplying the needs of that large district of Central Europe which circles round Switzerland, Genoa is becoming one of the great commercial centres of the world. The Genoese of to-day appear not unconscious of their destiny; the modern development of the city exhibits an enterprise not unworthy of the fellow-citizens of Christopher Columbus.

No longer prosecuting the affairs of trade under the leadership of warlike Doges and Admirals, or influenced by the crooked politics of the Middle Ages, a flourishing commercial community has sprung up in Genoa which can only be compared with some great trading centre of the north, and this wonderful development dates back but a few years. Within the last few months the inestimably important discovery of coal has taken place in Piedmont. This will, of course, influence the industries of the district which owns Genoa as capital to an incalculable extent. Up to the present time all the coal used in the countless factories and electric motors along the Riviera di Ponente has been shipped over from England. This importation will now cease, and not much to the detriment of England in the present scarcity.

Not only has Genoa, as a city, long since surpassed her ancient rival Venice, and gained a position far beyond the most ambitious dreams of her senators and statesmen six centuries ago, but what is of still greater importance at the present day, she now bids fair to successfully outstrip her great modern competitor, Marseilles. Marseilles still remains the larger of the two, but recent statistics show that Genoa is rapidly gaining on the great French port; and certainly the extraordinary difference in the appearance of the two cities amply confirms this statement.

The small old mediæval centre of Genoa, with its tortuous lanes winding up and down the steep rocky hills within the circuit of the ancient walls, still exists in remarkable preservation, together with the ancient gateways marking the line of mediæval fortifications. Outside this line, and within the limits of the great later defences, a thickly-populated city has come into existence during the past century. It is in this portion that the immense alterations and modern *sventramento* are taking place; the clearing away of slums, and the rebuilding of the city in the drastic manner now common in Italy.

Up to the present time this portion of the city has formed a complete block to all modern means of communication between the two sides of the port and the adjacent growing suburbs. The steeply-inclined streets were useless for vehicles, and a guide was necessary for any one wishing to penetrate into the town from the main artery landing from the railway station. The extension of the city on the north-east side is checked by a high range of cliffs, beyond which rise the first offsets of the Ligurian Alps. A long spur of these hills shuts the city in from the north-west, and this it has been necessary to perforate with several tunnels for the purpose of opening up communication with the enormous suburban elongation on the Riviera di Ponente. On the south-east the city was defended by an important mountain torrent and immense fortifications of the sixteenth and seventeenth centuries. Here it has been easy to bridge over the torrent in various places, and remove the fortifications. Immense alterations are now in progress, interesting from both architectural and engineering points of view. The means adopted for surmounting the extreme difficulties of so shut-in a site are highly ingenious, and the result in a few years will be to render Genoa one of the most imposing of modern Italian cities.

The *sventramento* was begun some years ago by the construction of a wide new street called Via Roma, from the highest part of the old mediæval centre in a north-east direction towards the fortified heights on that side. This road has an easy gradient, and it now forms the principal promenade of the city, lined with immense modern palaces. A sort of public park intersects this imposing street, and in this park a rocky eminence covered with trees has been furnished with a very considerable artificial waterfall; it has a somewhat singular effect in the centre of a busy city thoroughfare. Such a feature may, perhaps, have been suggested by the celebrated fountain of Trevi at Rome. As with most Genoese streets, the extreme inequalities of the rocky site occasion phenomenal arrangements of the new houses. This long street, Via Roma, has no side turnings towards the east except the above-mentioned park. A sort of rock cliff runs parallel with the street for a great part of its length on that side, and between this and the new palaces of Via Roma a covered gallery three stories high has been constructed of the usual Italian type—lighted from above. The houses and shops on one side back on to the rock; on the opposite side are the backs of the Via Roma palaces, with passages between them into the main street. This gallery forms an excellent promenade in wet weather.

The Via Roma is entered from a very irregular piazza, evidently the new centre of the city, which would be immensely improved by being enlarged and by the removal of an ugly old theatre blocking up part of it. Through this central piazza passes the main artery of modern Genoa, which extends in an interminable manner along the Riviera di Levante and the Riviera di Ponente. In other words, the three great channels of communication for the modern city meet at this point, and they are connected by numerous modern streets and

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roads which circle round this centre of the city.

The most extraordinary engineering feat connected with this new centre is the cutting of the Via XX Settembre through the irregular part of the city on the south-east. Here a street nearly 100 ft. wide has been constructed in the most uncompromising manner by simply clearing away the houses, some of which are twelve stories high, and also their rocky foundations, in some cases to the depth of more than 10 ft. Plenty of scope for ingenuity is naturally afforded by the difficulties of reducing the levels of branching side streets and lanes to the new thoroughfare. Many of the remaining houses of eight or more stories in height have to be provided also with new basements or ground floors. The enormous palaces and business premises at present being built on both sides of the new street display the enterprising development of the city, although artistic qualities are unfortunately wanting. Towards the middle of this street a very imposing viaduct, both for height and width, unites the upper levels of the city and forms part of the circumvallation tram system. In some places the outer circle electric trains are ingeniously contrived to pass the different levels of the city by penetrating the rocky cliffs on the north-east in circular tunnels allowing of a drop of many feet between the entrance and exit, which are of course close together. Everywhere one is impressed by the natural difficulties of the site, and by the outlay of wealth, and the enormous development of the city at present in progress.

In its curiously elongated suburbs Genoa seems to suggest the idea of some immense marine monster stretching out grasping arms to embrace the whole of this corner of the Mediterranean. Such a development is unique amongst modern cities on so large a scale; it is certainly quite unknown amongst the cities of the past. There are two principal reasons for stretching along the sea shores instead of penetrating inland in the more normal manner—the peculiar geological conditions of the site, and the ease with which in these days of the electric tram the old level road by the sea can be adopted as a means of communication. The city of Genoa may be said to occupy the whole of the sea coast of the Riviera for a distance of between twenty and thirty miles, that is to say, if a city may be considered to extend wherever the houses are built in unbroken continuity. For the present, this phenomenal strip of country is divided up in the old way into separate municipal governments with an octroi for each section; but soon this somewhat antiquated system is to be done away with, and the trams will no longer be delayed at different points by the custom-house officials.

At Sestri the immense workshops of the Società Ligure pour forth dense clouds of black smoke, reminding one of the "blackest" country in England, and even at Pegli the near approach of the great shipbuilding yards and their attendant iron forges, &c., has almost ruined this once favourite winter resort. For miles along what was once the famous Corniche road, the sea shore is now covered with coal stores, factories, and warehouses. In addition, deplorable slums of artizan dwellings line the train routes, and give an air of ruinous squalor to what was once the beautiful Gulf of Genoa. The forlorn old villas of the past, with their curtailed gardens, remain here and there amongst these unfortunate surroundings, their once brilliantly-painted fronts obliterated by decay and coal smoke. On the opposite side of Genoa, towards Nervi, the same process is gradually transforming the country, although perhaps not to quite so great an extent. The beautiful mountain country is gradually being divided from the sea by an interminable hedge of buildings lining both sides of the old coast road.

It must also be remarked that although the development of the city has mainly taken this curious elongated form, there are also some attempts being made to build on the heights which hem in the old centre on the north-east, and here several blocks of building of phenomenal height are at present being reared. It is, perhaps, singular that buildings already perched upon an eminence should rise to six or ten stories in addition.

The preservation of antiquities is not a matter receiving so much attention in Genoa as in most other Italian cities; there is in fact a remarkable absence of that desire to preserve and take care of the monuments of ancient and mediæval times which is such a striking characteristic elsewhere in Italy. This may be an advantage from a certain archæological point of view, but at the same time architectural monuments are frequently more interesting when they are disencumbered from the whitewash and squalid accumulations of the immediate past, and are in fact made more visible. As an example the interesting little piazza di S. Mattéo, surrounded by the splendid palaces of the Doria family, and with its ancient church and cloister, might certainly receive with advantage some careful and conservative attention. The beautiful old houses are, unfortunately, used as commercial offices, and are in private hands; and it is very difficult to make out their original design owing to the manner in which openings have been built up, and architectural features obscured by replastering and whitewash. The church and most interesting cloister are very well preserved, but in a state of filthy neglect. Altogether this most interesting little quarter of the city, although full of exquisite details and most attractive to the professional visitor, is practically lost for the average tourist. It is to be hoped the local Commission for Preserving Ancient Monuments will, in course of time, succeed in rescuing this most interesting example of fourteenth-century civic architecture, some of these small Doria palaces being amongst the most important historical monuments of Italy. Another very interesting church is that known as S. Giovanni di Prè, also in a most neglected condition. In this case a "judicious" restoration, carried out with care and rigorous regard for every fragment of antiquity, would certainly be very justifiable. This unfortunate church, dating from the twelfth century, and originally built by the Knights of S. John, was reduced to its present deplorable state in the present century. The altar was removed from the east end to the west, and a doorway cut through the apse. The decorations covering up the architecture, which appeared to be well preserved underneath, are of the same period.

The Cathedral of Genoa, a building of no very great size or interest, remains in an excellent state of preservation. A few trifling repairs are being executed to the outside under the control of the "Ufficio Regionale," but nothing will be done beyond what is absolutely necessary. Two of the ancient city gates are also being slightly repaired and preserved as evidences of the ancient boundaries of the city in republican times. One or two of the ancient palaces in the Piazza del Caricamento, a continuation of the vast hemicycle which borders the old port, are being restored. The lower stories, in the Gothic style of the thirteenth century, are being cleverly rebuilt without the least disturbance of the enormous masses of masonry above them, added in later ages. When finished, these restorations will have the effect of houses built during successive ages, but endued with a sort of perpetual youth, the thirteenth-century lower stories appearing equally new with the seventeenth-century upper stories. In this particular case a regular restoration of the buildings may perhaps be forgiven. The old houses had fallen into such a state of filthy decay that nothing else seemed possible.

Genoa, although such a very important Italian city, does not possess any headquarters of the Ufficio Regionale; monuments of art and historical importance are under the care of local societies, and there is a local Commission under the presidency of the prefect, which represents the "Ufficio" of the district of Turin, of which the Genoese Riviera forms part.

LAST WORDS ON THE PARIS EXHIBITION.

THE great Exhibition which has just closed at Paris has not been a commercial success, nor has it been quite so much the attraction and sensation of the year as its promoters, not without reason, probably expected it to be. For this the French no doubt have partially to thank the ill-disposed, vapouring, and vulgar natures among themselves, who unfortunately find only too ready an outlet for their insolence in a Press that is unworthy of a country which, we fully believe, it does *not* represent. There may also be something in the fact that great exhibitions have followed each other somewhat too closely during the latter years of this century, and that the world has begun to have a little too much of them. We cannot imagine, however, that even a surfeit of exhibitions, though it may have kept some visitors away from Paris, can have blinded any who did go to the superlative splendour and interest of this latest great show, or to the degree in which it has surpassed everything else of the kind that has been seen. Nor do we believe that the comparative commercial failure of the undertaking will stand in the way of France, on some future occasion, giving us a successor to it equal in splendour and once again varied in form and picturesque character. It is to the credit of the French that they do not, in such manners, work for mere gain, but for pride and glory in their artistic genius. Only we hope that they will not make the attempt again too soon, both for the sake of the exhibition and for the sake of Paris. Their last three exhibitions have been held at intervals of eleven years. In each case it is true there was a defi-

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nite excuse. In 1878 it was desired to show how France had risen again from the ashes of disaster; in 1889 there was the centenary of the Revolution to commemorate; in 1900 it was desired to make a brilliant close to the century. But eleven years is too short an interval to elapse between such great efforts; too short for keeping up the interest for such undertakings, and too short for allowing a city to obliterate the temporary derangement of its conditions and physiognomy which is inseparable from the circumstances. It will take Paris a couple of years to regain her normal state after this exhibition. Therefore we hope that in future such attempts will be made but once in a quarter of a century, and that a generation will be allowed to elapse before the next Paris exhibition. Then the memory of this one will have faded; the attraction will regain its novelty and freshness, and the period will be sufficient for new and important modifications in art, science, and manufactures to have been evolved and to claim illustration.

Almost at the last moment of the show we made an inspection of the collection of antique and modern furniture—the former principally French, the latter from many countries; and though the exhibition is now closed. some consideration of the impressions created by this collection may here be recorded; for the study of historic decoration may be taken as a guide to the real tastes and character of a generation and country; it supplies, besides, the index finger to the condition of the arts in whose day it was produced.

Take, for instance, the furniture of the Middle Ages, interesting examples of which had been collected from museums and private sources, and were on view at the Petit Palais; we saw examples there as early as the thirteenth century, when furniture resolved itself into the most serviceable kinds in accordance with the simple manners of the time. The chest or box, now rarely if ever used, was in those days a table, a seat, and a coffer, and in some instances was inlaid with the chequered pattern for the game of chess. The simple tables, stools, and chairs—mere carpenter's work—were decorated richly and effectively in a manner as homely and simple as the construction. The richer materials and designs were devoted to the furniture and decoration of public buildings and churches. Mutilated and splintered as many of these old pieces were, they can tell a tale of a past different in both form and spirit from that in which we live. How interesting is the gradual change from the ancient to the modern spirit—from the spirit of romance and colour that we call Gothic, to that spirit—so much more nearly akin to ours of the present day—of the early Renaissance. All the religion, intellect, and passions of man were involved in this change, the result of which is the chaste and beautiful work of Italy and the Netherlands, the countries which were in the vanguard of the movement and imported their productions to this and other countries. Every Italian of the fourteenth century was an art critic—which possibly led to the decline in the purity of this style; every craftsman had a reputation to keep up. Patronage became slavery, and the art was prostituted to the lust of the eye, to satisfy the pride and luxury of great persons. The change was one of attitude and of social condition.

The history of the furniture we use to-day is principally traceable to the Renaissance, and it is to those old craftsmen we owe the delicate mouldings, graceful turnings, and beautiful inlays of woods, ivory, and mother of pearl, which form the standard of excellence applied to the work of our own day. Probably the student of modern art turned his steps readily enough from the Petit Palais to the choice collection of French furniture in the gallery off the Esplanade des Invalides. Complete rooms were furnished respectively in the styles of Louis XVI., the First Empire, the Directory, Louis Philippe, and the Second Empire. It is not very likely that such an object-lesson as these rooms afforded, ever presented itself before the designers of 100 years ago, and it should have proved useful in keeping modern taste from falling into the grosser errors, which some of these magnificent examples of historic periods perpetuate. Restless and constantly influenced by foreign novelties and archæological research, there is yet a freshness and vitality about most of the older designs that is not altogether concealed by their fine feathers. It is interesting to notice the periods most free from gim-crack and affectation. The style of the Louis XVI. period is familiar to all. During the Directory less gilding was used and the forms were more natural and less architectural. That of the Constitutional Government is still more restrained, going back to straight lines in the legs of tables and to light and elegant construction in chairs, and with some good examples of well-designed marquetry. The First Empire is distinguished by handsome dark wood furniture, with well-placed gold ornaments of Egyptian character. The hangings and carpets are uninteresting and featureless, as they continue to be down to Louis Philippe. With the Restoration came a tendency to heaviness, furniture completely gilt, with a somewhat graceful Classic feeling about the larger designs. Louis Philippe furniture was carried out in maple wood, illustrated in the Exhibition by one or two perfectly designed cabinets, and the hangings are dainty and give a distinct pleasure. The Second Empire showed a motley collection of luxurious furniture, overladen with carving and gilt, with no sense of comfort or repose.

Fine as this collection undoubtedly was, individual pieces of the same periods, of even more merit, were found among the miscellaneous collection adjoining these special ones. Lovers of French taste must have been satisfied by the fanciful and beautiful examples among these. It was, in fact, a superbly representative collection. The feeling expressed by many people seemed to be one of regret that we could not afford to produce such things now. It is true we do not, and we doubt very much whether people would really care to furnish their houses with such highly decorated furniture, unless they were collectors.

Modern French taste seeks novelty in such productions as were on view at the Maison Byng, or contents itself with simple and very elegant furniture based on the national tradition of the requirements. The Maison Byng was very representative of the new Continental decorative art. It was a house completely furnished under the auspices of a designer of that name. The characteristic of this style of decoration is lininess—nervous, attenuated curves, breaking abruptly into a swelling, like the articulated ends of chicken-bones. The forms are often clumsy, and where the form is bad it is an aggravation to insist on the outline. Velvets are stamped with the same patterns as the wood is twisted into; the walls and friezes are covered with similar lines. It showed a search after novelty, with one great difficulty to overcome, viz., the unsuitableness of wood as a medium of expression. The same artist applied his principles with effect elsewhere in metal-work and jewellery.

From Germany were many instances of that style of decoration, illustrated from time to time in "Decorativ-Kunst," rather weird in character, but based on old work to a certain extent, and more within the proper limits of the materials than the French furniture at the Maison Byng. There is a corresponding search after novelty evident in England at the present day, but we do not regard it very seriously; English tradition supplies furniture that meets our modern requirements, as we could see in looking at our exhibits at Paris. It has been too often remarked how sparsely England was represented at the Exhibition, but in the field of art industries our exhibits evoked universal interest. Particularly was this the case in the decoration of the English house in the Rue des Nations, about which French artists have been most enthusiastic. Perhaps another generation will think it absurd that we were represented in architecture by a copy of a house 300 years old, but to observers at the present time the difficulties of the position may seem best solved by showing such a representative model. Between the years 1600 and 1660 the best English furniture was produced (we do not mean the heavy Elizabethan, fine as the early examples of that style are, in a ponderous way), and it was on the style of this period that a great part of the English house was furnished; our best firms of cabinet makers copied in many instances direct from examples of furniture at Knole from South Kensington Museum, while any originality was carefully based on the study of the traditional periods. The mere careful study of the old work is producing some very competent designers, and such old firms as Gillows—where the tradition of good furniture-making has held on through all the vicissitudes of the art of this century—had exhibits at Paris really fresh and charming in design, and (what is equally important) of sound workmanship. This was noticeable in their furnished nursery, a room in white wood, with unpolished oak furniture left its natural colour, delicately inlaid with ebony and boxwood. A yacht's cabin also showed originality, where the design of the whole was based on Pompeiian art. It was a great pity that Morris & Co. had no exhibit, or at least we did not see one. Morris was responsible very largely for the change in the taste of the educated English public in the latter half of this century, and it would have been instructive to have compared rooms furnished as he would have had them, with those of other countries, and more particularly with the fine rooms at the English house that were copies of the art of long ago.

BUST OF THE QUEEN, SHEFFIELD TOWN HALL.—A bust of the Queen, executed by Mr. Onslow Ford, R.A., was recently unveiled in the Lord Mayor's parlour at the Town Hall, Sheffield.

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NOTES.

The Workmen's Compensation Act.

The decisions on the Workmen's Compensation Act, 1897, have often been strange, but nothing more comical has ever come from the Law Courts than the decision of the Court of Appeal in Ferguson *v.* Green, which was given a few days ago.* An arbitrator found as a fact that a certain erection inside a room, formed by two trestles and some loose boards was not a scaffolding and, therefore, that a man injured when working on it was not entitled to compensation. The arbitrator, however, submitted the question to the County Court Judge by whom he was appointed, who found it was a scaffolding. When the matter came before the Court of Appeal that tribunal took the same ground as on previous occasions, that this being a pure question of fact they would not interfere with the finding of the Court of First Instance—in this case the arbitrator. But, strangely enough, in the previous case of Maude *v.* Brook a County Court Judge had held, on precisely similar facts, that such an erection was a scaffolding within the meaning of the Act. So that we have this extraordinary contradiction, namely, in one case a workman receiving compensation, in another unable to do so—though the facts in both cases were similar. "He therefore," said the Master of the Rolls at the end of his judgment, "thought that the award of the arbitrator must stand, although the result was that there had been two different findings on exactly similar facts!" No doubt it is desirable that the Court of Appeal should interfere as little as possible with questions of fact, but Courts do interfere every day. Why, therefore, the Court of Appeal should make it a hard-and-fast rule not to disturb questions of fact, even though by so doing the result is glaring injustice, it is difficult to understand.

The Widening of London Bridge.

The Corporation of London notify their intention of introducing a Bill in the course of next session for a widening of London Bridge on each side, for obtaining powers "to set back the kerbs of the existing footways on either side of the bridge, and throw the space now occupied by parts of the existing footways into the roadway of the bridge; to remove the side walls and parapets and recesses of the bridge, and to execute all incidental works"; and for "an alteration of the levels of the roadway of London Bridge and of the footways on either side thereof for the distance of about 90 yards southward from a point at or near the northern end of the bridge." The proposed changes extend to the arch over Upper and Lower Thames streets, and include the construction of a temporary foot-bridge for use during the progress of the new works. The necessary funds are to be raised on the credit of the Bridge House Estates and other property belonging to the Corporation. It appears, therefore, from this that the widening is, after all, to be divided between the roadway and the footpaths. We doubt whether there is any necessity for it at all proportionate to the disadvantage of meddling with a structure so unique as London Bridge; and at all events the drawings for the proposed alteration ought to be exhibited, and public criticism invited, before any further step is taken.

* See our last issue, p. 458, for a report of the case.

Sir F. Bramwell's Street Scheme.

It has been suggested at the County Council that the scheme of a two-story street proposed by Sir F. Bramwell should be made the subject of a special Report by their architect. It is to be hoped that the Council will not waste their time in discussing it. The suggestion entirely lacks the architectural merit of the Chester Rows form of street, and in any other sense it would prove absolutely impracticable. Apparently it is supposed to be a practical scheme because it is signed by an engineer.

An Electric Fire.

On Friday night of last week a fire broke out in a photographic studio in Regent-street. Luckily it was noticed before it had made much progress, and the promptness of the Fire Brigade prevented much damage being done. The fire is attributed to the fusing of the electric cables at the switchboard. In a joint letter in Monday's *Times*, several indignant citizens point out the dangers of photographic studios. As the writers disclaim all technical knowledge of electricity, we will pass over certain misconceptions in their letter; but the facts they collected from the officials of the photographic studio and the Fire Brigade are worth mentioning. It seems that in this studio twenty powerful arc lamps are employed. As five cables are used, it is probable that they were run four in series. Now it is stated that "only last month the current was increased." This could only have been done by short-circuiting some of the resistance in series with the lamps. As doubtless the cables and switchboard connexions had been calculated for a much smaller current, it is obvious that they would heat very considerably. Whether designedly or by inadvertence, one or more of these circuits had been left on all night, and the long-continued heating must have been sufficient to set the insulation of the cable on fire. The writers of the letter are, perhaps, a little hard on the Electric Light Company for supplying the "amateur electricians of a photographic studio" with enough electricity to light St. Pancras Station. The Company is obviously not to blame if its clients alter the wires in any unauthorised manner. The fire seems to have been due to a very simple cause, and illustrates the danger of amateurs tinkering with the resistances and fuses in arc-lamp circuits. The statement in the *Times* letter that the fire at the great charity bazaar in Paris was due to the fusing of electric cables is incorrect. It was due to the ether used for the kinematograph catching fire.

Discharge of Pipes.

Various diagrams have been published from time to time, showing the discharge of pipes, and yet another, by Mr. John H. Gregory, of Philadelphia, is reproduced in a recent issue of *The Engineering Record*. The diagram, which contains some new features worthy of attention, is based upon Flynn's tables of Kutter's formula, with $n=0{\cdot}013$, and is applicable to circular pipes, sewers and conduits flowing full, where the co-efficient of roughness of the lining is equivalent to that in ashlar and well-laid brickwork, in ordinary metal, earthenware and stoneware pipes in good condition, but not new, in cement and terra-cotta pipes not well jointed nor in perfect order, in plaster and planed wood in imperfect or interior condition, and also in surfaces of other material of equivalent roughness. Inasmuch as the effective capacity of a pipe decreases with its age, it is the practice of many engineers to add, say, 25 per cent. to the required discharge, as an allowance for deterioration, when computing the size of a pipe. In the diagram to which we refer it should be noted that the discharges are already discounted, and that, if new, the pipes will carry more than is indicated. Mr. Gregory's diagram may be briefly described thus:—The vertical lines, by reading the upper scale, give the frictional loss for pipes flowing under pressure, or for sewers the slope in feet per thousand; by reading the lower scale they give the velocity head and loss of head at entrance by the formulas $v^2 \div 2g$, and $0{\cdot}5\ v^2 \div 2g$. Horizontal lines indicate the discharge in gallons per minute, or by a conversion table in the margin, the discharge in million gallons per twenty-four hours, or cubic feet per second. Full diagonal lines inclining downward towards the left give the diameter of the pipes in inches, and broken lines give the lines to be used for determining the velocity head and the loss of head at entrance. Lines curving downward towards the left indicate the mean velocity in feet per second. Mr. Gregory cites a few examples for the purpose of demonstrating the exact mode of procedure, and it appears to us that the diagram is well adapted for the rapid solution of problems which frequently present themselves to engineers and others. We understand that a similar diagram will shortly be published dealing with the discharge through clean pipes, as calculated by Darcy's formula.

Tavistock House, Tavistock-square.

Tavistock House and the adjoining Bedford House, which have a spacious forecourt or garden abutting upon Burton-street, are now being pulled down. The former house was at one time occupied by Dr. Niblock, who dates the preface to the second edition of his English and Latin dictionary at "London High School, Tavistock House, Tavistock-square, October, 1836," and by Perry, of the *Morning Chronicle*. Henry Austin carried out some changes in the house for Charles Dickens, who removed thither in the autumn of 1851, and lived there nine years. During that interval he edited *Household Words*, and wrote portions of "Bleak House," "Hard Times," the "Tale of Two Cities," and "Little Dorrit." The children's schoolroom he converted into a theatre, planned for him by Cooke, of Astley's, the scenery being painted by Clarkson Stanfield.

No. 60, St. Martin's-lane.

Concurrently with the appearance of Mr. J. Munro Bell's volume of plates from the furniture books of Chippendale, Sheraton, and Hepplewhite, recently reviewed in our columns (p. 365, *ante*), we may here mention that Chippendale's workshop and store-yard, together with the adjoining house, in St. Martin's-lane, have just been pulled down. His premises there, latterly numbered "60," and since occupied by W. S. Johnson, founder of the Nassau Press, stood on the east side of the lane, between the ends of

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Garrick and New streets, and were marked by the carvings on the doorway and the ends of the ground-floor front, which as yet have not been destroyed.

St. Saviour's Grammar School, Southwark.

THE Governors of the St. Olave's and St. Saviour's Grammar School Foundation recently decided to dispose, either by sale or upon a building lease for ninety years, of the school premises in Sumner-street, Southwark. Six years ago, the Governors having succeeded to an inheritance, we read, of 23,000*l.*, together with certain endowments, the Charity Commissioners made a scheme for the school's future administration, and for extending its advantages to non-residents; and the Governors, it is stated, now propose to erect new buildings in a more convenient locality. Queen Elizabeth's Free Grammar School of St. Saviour, Southwark, was incorporated by a charter dated June 4, 1562, having been established by two notable residents in the Borough—Thomas Cure, the Queen's saddler, and William Emerson, with other "discreet and more sad inhabitants of St. Saviour's," for thirty boys of both rich and poor parishioners. On the south side of the churchyard of St. Saviour was then standing the "Green Dragon" tavern, previously Cobham's Inn, a town-mansion of Lord Cobham of Sterborough, part whereof was acquired for purpose of a schoolhouse. In the course of the fire which in May, 1676, consumed a large portion of that part of the Borough, the school and other buildings were destroyed with gunpowder in order to arrest the spread of the flames. Having been quickly rebuilt, the second schoolhouse gave way in 1839 to an enlargement of the Borough Market: there are illustrations of it in Wilkinson's "Londina" and in the *Mirror* of April 18, 1840. Dr. Charles Sumner, Bishop of Winchester, then gave a plot of land near St. Peter's Church, in Sumner-street, upon which were built the present premises, to the cost of which the trustees of Miss Hyndman's bequest, locally known as "Hyndman's Bounty," and the parishioners largely contributed. The buildings, of brick with stone dressings, were designed after the domestic Elizabethan style by, we gather, Christopher Edmonds.

Exhibition of Craft-Work.

MR. MONTAGUE FORDHAM has gathered together at 9, Maddox-street another small exhibition of craft-work, containing very many things that are interesting, and some things that are beautiful. We find beauty in the useful earthenware pots for plants made at Compton under the direction of Mrs. Watts. Their outline is vigorous, and delicate touches are added just where they are of value to hand and eye. Mr. Taylor, the headmaster of the Birmingham School of Art, has for some years been experimenting in the production of pottery, and has succeeded in getting a glaze exempt from the injurious lead, the poisoning from which produces such terrible diseases amongst the workers. He has also succeeded in colour, and in one or two charming shapes. Some tiles by Mr. Bait—though not new in design—have a true Oriental richness of colour that make them a telling decoration. Mr. Conrad Dressler shows some tiles, delicate in colour, but otherwise unremarkable. On the walls are hung some well-known nursery rhymes charmingly depicted by Mr. W. D. Adams. Outlined with the brush and washed in with slight tints of colour, they are the most forcible illustrations of this class of subject we have seen since Randolph Caldecott's work. As usual, there are some well-executed pieces of furniture, agreeable and unostentatious in design, the work of one or two well-known craftsmen.

British School at Rome.

THE Managing Committee announce that the British School at Rome will open in December. The Director, Mr. G. Rushforth, has gone to Rome, and communications can be addressed to him at the British Embassy, Rome. Intending students should apply for particulars as to admission, &c., to Professor Pelham, Trinity College, Oxford. According to the circular issued by the Committee, "the school is intended to promote the study not only of classical history and archæology, but of mediæval history, art, and literature. The Director will be happy to explain the principal recent discoveries relating to ancient and mediæval Rome to any University graduates, and members of the teaching staff of public schools, who may be visiting Rome during the Christmas or Easter vacations. Those who wish to avail themselves of this offer are requested to communicate with the Director as soon as possible."

The Architectural Association of Ireland.

THE Architectural Association of Ireland have organised an admirable programme of "Technical Demonstrations" of various classes of building work, which are to be made on the ground, on buildings in progress, or at large building yards. These demonstrations have been arranged for the purpose of affording architects' assistants and pupils opportunities for acquiring knowledge of the practical details connected with the building trades, which would not ordinarily be available to them. Special prominence will be given to the demonstration of good and bad materials, and to the customary tests by which the quality is ascertained. The proposed demonstrations include one on foundations and the work connected with them; one on building stones and mason's work; three on timber and woodwork; two on ironwork; one on limes and cements, one on drainage, &c. The idea is an admirable one, and speaks well for the spirit with which the Architectural Association of Ireland is carrying on its work. It is to be hoped that the opportunity will be appreciated by those for whose benefit it is instituted.

CHURCH CRAFTS LEAGUE. — The Bishop of Rochester presided over the first annual general meeting of this Society, on Tuesday evening last, at Bishop's House, Kennington Park. In moving the adoption of the annual report he made reference to the steady progress the League had made, in spite of the many difficulties which attended a new society in this already overcrowded age. At the inaugural meeting in February last, the League had twenty-nine artist and thirty-five ordinary members. The membership has now been raised to 104, of whom forty-three are artist members. After the formal business of the meeting had been transacted, discussion was raised on the objects and aims of the League. Mr. T. Stirling Lee reminded his hearers that since the time of Henry VIII. the divorce of art from religion had been absolute. Canon Rhodes Bristow, Mr. Henry Holiday, and the Rev. Percy Dearmer also took part in the discussion, and the Rev. C. R. D. Biggs, Vicar of St. Philip and St. James, Oxford, announced that he had arranged for a meeting to be held in Oxford to explain the methods and aims of the League.

EASTBOURNE AND NEIGHBOURHOOD.

IN that part of the County of Sussex situated immediately behind the modern watering-place of Eastbourne, are several buildings of some architectural interest, although in scale they cannot compare with some other districts of this interesting county.

In the "old town" of Eastbourne, is the fine parish church of St. Mary, standing well on high ground. The nave, Early English, has side aisles and porches; the chancel, including the chancel arch is rich Transitional Norman, with side chapels and a clearstory which have been altered at a later date. The windows throughout are Decorated, and under the east window is a vestry approached by a doorway on the south side of the altar, similar to some examples in Somersetshire. At the east end of the north chapel is a good three-light Decorated window, with flowing tracery. The interior is chiefly remarkable for the beauty of the Transitional work in the chancel, the delicate wood screens of Decorated date that now divide it from the side chapels, and for the arrangement of the altar, with its vestry to the eastward, the sedilia on the south side, and what was apparently intended for a tomb and Easter sepulchre on the north.

On the north side of the church is a picturesque group of buildings known as the "Old Parsonage," occupying two sides of a courtyard, and placed north and south, at right angles to the church. The western block is chiefly of flint with stone dressings, the brickwork of the chimneys being comparatively modern. There are several two-light mullioned windows on each side, and four centred doorways, and at the south end is a three-light transomed window, now blocked. The eastern block is of stone, with an upper story of timber, pierced at intervals with small two-light windows. The ground falls considerably north of the church, and the first floor of the "Parsonage" is on a level with the churchyard. At a little distance north-west is another group of buildings of about the same date, including a long barn and a dovecot.

The Lamb Inn, east of the church, possesses an ancient vaulted crypt, and in one or two of the houses near are picturesque details of late date.

The castles of Pevensey and Hurstmonceux, five and ten miles respectively from Eastbourne in a northerly direction, are now of no great architectural interest. Pevensey exhibits masonry of Roman as well as mediæval date, but beyond a stoup on the site of the chapel and a font, there is little but a picturesque grouping of ivy-covered walls and towers. Hurstmonceux, once a vast brick building planned round two courts with a deep moat, is still charming in colour, but the only point of architectural interest is the main entrance, still fairly perfect. Over the gateway is a panel with the arms of the Fiennes, three lions rampant, on a banner held by a wolf-dog, now mutilated, and on either side are brick machicolated towers and stone dressings.

The churches, like those in other parts of the county, mostly retain a good deal of early work, the later additions consisting chiefly in alterations to the windows in Decorated and Perpendicular times. After the parish church of Eastbourne the two largest churches are those of Pevensey and Westham, both near Pevensey Castle. Pevensey church has a good Early English arcade, but considerable alterations and additions have been made in recent years to the building, including an additional stage to the tower, and a great deal of its picturesque effect has been lost. Westham church has considerable remains of Norman work in its nave (including the clearstory), and the sturdy western tower is not unlike Eastbourne in its general effect. The north porch is of stone and flint, Perpendicular and effective, and in the windows of the chancel is some glass of the same date; in the east window figures of the twelve apostles, and in the north window some good examples of quarries with conventional foliage. Under the east window, outside, is a cross, of squared flints set in stonework, somewhat similar to that in the outside of the vestry at Boxgrove Priory Church. Outside the churchyard gate, to the westward, are two houses with overhanging timber upper stories. Of four doors, one is original, and in the spandrils are a rose and a buckle—the latter the badge of the Pelhams.

Across Pevensey levels, towards Hurstmon-

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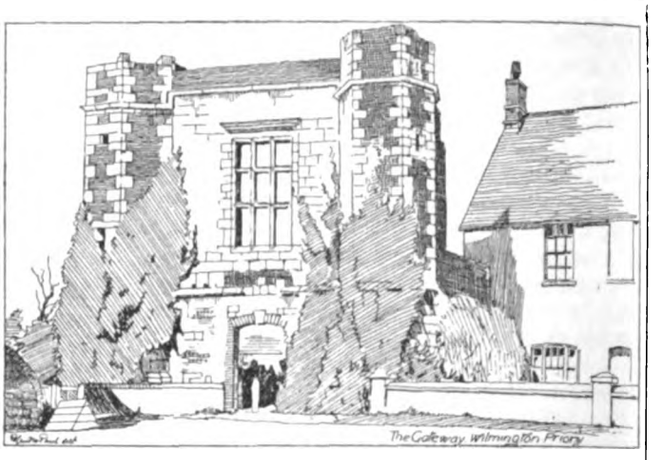
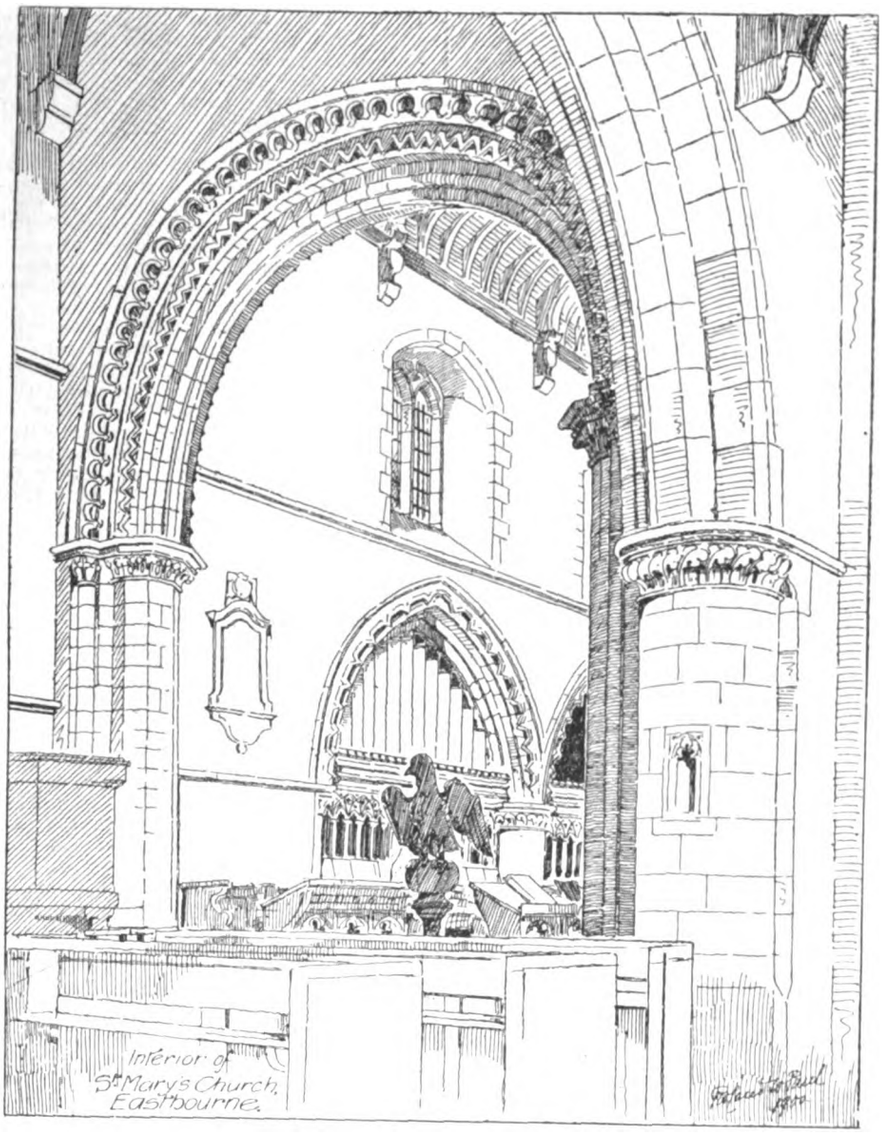


The Gateway, Wilmington Priory



Interior of St Mary's Church, Eastbourne.

Michelham Priory

ceux, is the small church of Wartling. On the outside of the chapel south of the nave is another example of the Pelham badge, cut in stone, and also three other stones, one having a St. Catherine's wheel, and the other two blank, heater-shaped shields. On the north side of the nave is a window of Perpendicular date of good design. Hurstmonceux church, standing on high ground west of the Castle, is very picturesque and interesting. The nave arcade is Early English work, of three bays, also the tower at the west end of the north aisle, crowned with a tall broach spire of slate. There is a south porch of apparently the same date, and one on the north side was added in 1874. The chapel on the north side of the chancel is of brick, and between them stands the fine monument of Thomas Fiennes, second Baron Dacre, and his son—two effigies on a panelled tomb with a canopy richly ornamented with painted shields. The helmets, shields, and crests on the south side, towards the chancel, are particularly good. There is an earlier tomb in the south aisle of the nave, a crisped arch of fourteenth century date enclosing a shield.

At Willingdon and Wilmington are churches of a characteristic Sussex type, simple in their detail and picturesque in grouping. The tower and spire at Willingdon is, as at Hurstmonceux, at the north-west angle of the church. Opposite is a picturesque group of buildings, modernised on the north side, still bearing date 1611. At Wilmington is a fine yew tree, and south of the church are considerable remains of the Alien Priory, with which the church was formerly connected.

There are remains of chapels at Langley Farm (between Eastbourne and Pevensey), and at Otham (near Polgate Station) is a so-called shrine or chapel—all that remains of a Premonstratensian foundation, afterwards removed to Bayham. The most interesting of the monastic remains are, however, the ruins of the Priories at Wilmington, already mentioned, and those of Mickleham, a foundation for Austin Canons about two miles west of Hailsham.

At Wilmington the buildings are roughly in the form of a letter L, with the entrance gateway at the south-west angle, and the present parish church on the north side. There is a vaulted room (now used as a sitting-room) near the gateway, and in the northern range are remains of wall-shafts for vaulting and a crypt below. The gateway itself is of brick and flint with stone dressings. The main walls and turrets appear to be of late fourteenth century date, but a large window with two transoms and a cornice of Renaissance date has been inserted in the south front, and the original doorway underneath it has given place to a modern one of brick. In the turrets are remains of the staircases that led to the upper floors and the roof, and there is a jamb of a large window in the east wall. The building is now a farmhouse.

The remains of the Augustinian Priory of Michelham, founded in 1229 by Gilbert d'Aquilla, are of greater extent. The site is surrounded by a moat, and on the west side is a fine gatehouse of three stories over cellarage, approached by a bridge.

It is about 37 ft. by 27 ft., and very simple in its design. The main entrance has a segmental-headed doorway on each face, and on the east side, near the south-east angle, is a stair turret, square on the outside, leading to the two rooms above. The outer walls are about 5 ft. thick, and the rooms themselves are, roughly, 27 ft. by 17 ft. Each room is lighted by two windows of two lights transomed on the north side, and a similar window in the east and west walls. The fireplaces occupy the centre of the south wall, the flues being taken through the thickness of the wall and out at the parapet. There were rooms on either side of the entrance passage, and cellarage below. The embattled parapet has been partly destroyed. The whole is crowned with a tiled, hipped roof.

The church, except its site and some foundations, has disappeared, but the site of the cloister court remains, and considerable remains of the buildings on its south and west sides. At

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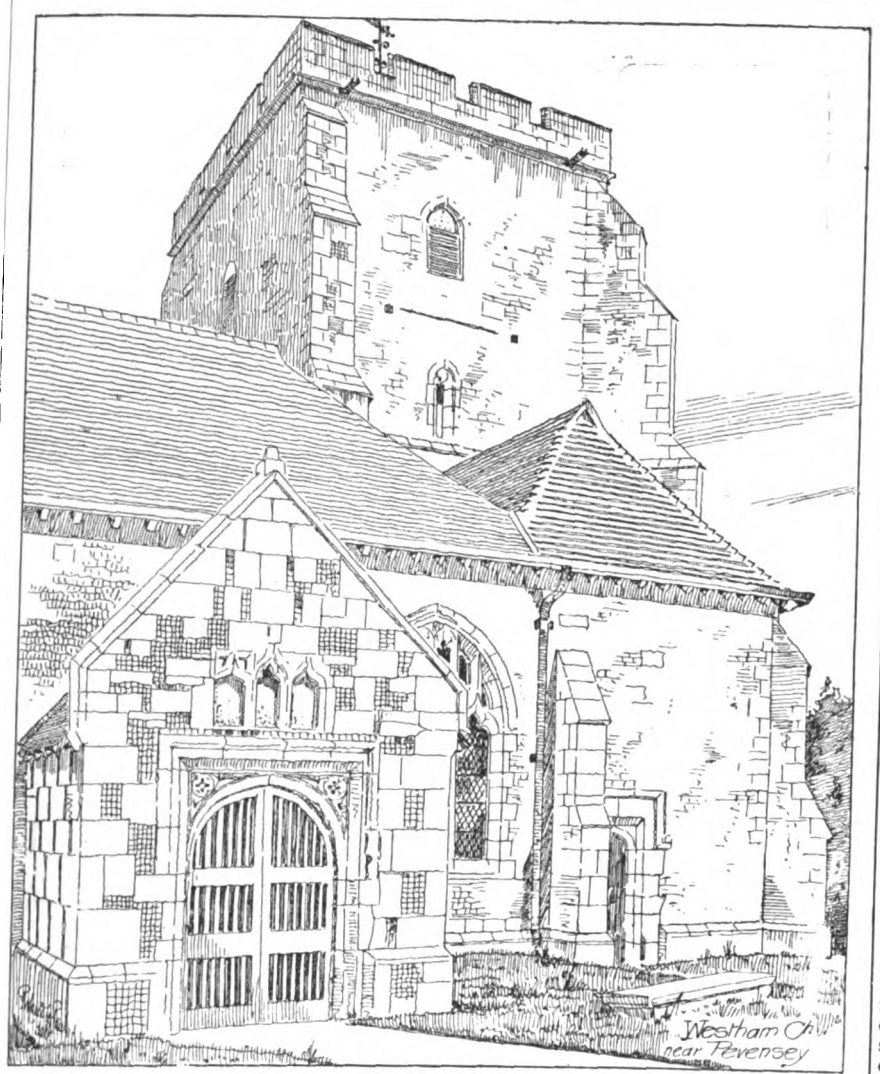

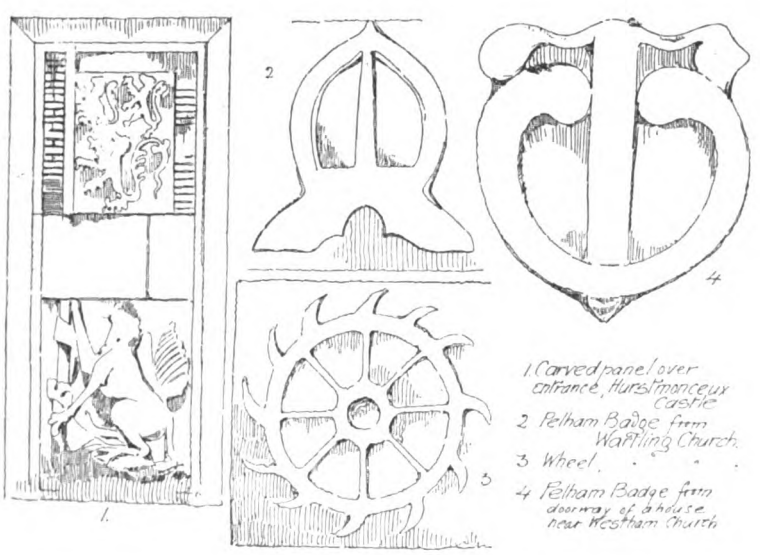

the south-west angle an addition has been made, apparently in Elizabethan times, and there is some good late panelling in the rooms. In the south wall of the cloister are two rich Early English arches, with a doorway to the west. The arches are probably the remains of the lavatory, and the doorway that which led to the frater.

The most interesting, however, is the block on the western side of the cloister, probably the remains of the cellarium. On the east side is a passage, the rest of the block being taken up by a vaulted room, with a central column. The north-east corner is cut off to allow the passage to pass round the stairs which existed here, and communicated with the upper floor. North of this the cellarage was apparently divided into two alleys by a row of columns down the centre. Above is a large double-hooded fireplace, and over it is the original gable and chimney, which is finished with an embattled top somewhat similar to the parapet of the gatehouse. With the exception of the chimney itself, which is probably late Decorated work, the remains are of the thirteenth century, and therefore belong to the original foundation of 1229. The house is now a farm, and various additions of modern date have been made from time to time, but the buildings of the monastery are of great interest. Some discoveries of doorways have been made during repairs that are now being carried out, and a good deal doubtless could be recovered by excavation.

An illustrated paper on Michelham will be found in a paper by the Rev. G. M. Cooper in Sussex Arch. Coll. VI., pp. 129-63, but no ground plan of the priory is given.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE third meeting of the session was held at 56, Great Marlborough-street, W., on the 16th inst., Mr. C. H. Strange, Chairman of the Section, in the chair. The debate of the evening was on "Party-Walls."

Mr. C. J. Smithem, in introducing the subject for discussion, referred to various points to be kept in view when dealing with party-walls. In the first instance, the building owner should be most careful to make his notice to an adjoining owner comprehensive, for it was frequently impossible to determine the condition of a wall until a complete examination had been made after stripping. It would be found very desirable, upon meeting the surveyor of the adjoining owner, to agree upon a third surveyor before proceeding to discuss the nature of the work involved in the notice. It should also be borne in mind that, after making an award, the work comprised therein should be commenced within the prescribed period, *i.e.*, six months after notice, as a postponement might necessitate the serving of a fresh notice. When dealing with the insertion of flues in a party-wall, either old or new, he considered it most essential that a sufficiency of brickwork should be left behind the flue next the adjoining houses, both as a safeguard against fire and to prevent sound penetrating through the wall. For his part, he would like to see all fireplaces and flues built out from the party-wall, so as to leave the wall uniform in thickness for its whole length on the individual floor.

A discussion ensued, in which the following gentlemen took part: — Messrs. F. G. W. Buss, S. Perks, W. A. Pite, E. Greenop, L. V. Hunt, H. T. Hare, G. Pearson, A. Harston, and J. Douglass Mathews. Special allusions were made to the following points:—

As to notice to adjoining owner when building is erected within 10 ft. from his building, and at a lower level than his foundation; security to be given both by building and adjoining owner, or either of them when required, for the payment of all expenses, costs, and compensation in respect of the work; the reconstruction of overhanging party-walls, involving loss of floor space to one or other of the owners and possible claim for compensation, and how this is to be dealt with; [claims for compensation by adjoining tenants for disturbance through building operations; default of either owner in nominating surveyor after notice to do so, and the course to be pursued in appointing a surveyor to act for the defaulting party; the question of measuring and valuing the cost of work done to a party-wall, and the desirability of including the measuring surveyor's name in the award when this can be fixed, so as to avoid possible objection afterwards; the charges of surveyors in settling party-wall differences, and how they should be regulated, a fixed scale being advocated by some speakers, while others considered this impracticable.

Mr. J. Douglass Mathews, who attended as Special Visitor, was of opinion that the provisions of the London Building Act defined very clearly the course to be followed in dealing with party-walls in the Metropolis, and if read with care there should be little difficulty to the surveyor. In the country complications sometimes arose through the irregularly-constructed division-walls, and the absence of any building regulations or by-laws to deal with such instances. He concurred in the opinion that a party-wall notice should be full enough to meet all contingencies, and that an award should be very explicit, and for preference should be drafted by a surveyor rather than by a solicitor, as had been suggested by previous speakers.

The Chairman announced that the next meeting will be held on November 30, when Mr. F. G. W. Buss will read a paper entitled, "Is the Quantity Surveyor a Necessity?"

COLSTON HALL, BRISTOL.—On the 27th inst. will be opened, with the first of a series of festival musical services, the new Colston Hall which has been reinstated and enlarged (after the fire of September 1, 1898) by Messrs. Jones & Cummings, whose plans and designs were accepted in open competition. The alterations comprise the removal of the inner range of columns, an addition of 25 ft. to the length of the hall, which is now 175 ft. long, and the provision of additional seating for 1,500 persons—the capacity now being for 1,500 on the floor, 700 in the grand tier, and 1,000 in the gallery, besides space for 700 in the orchestra. The new organ, by Willis, is the gift of Sir William Henry Wills, and cost 5,000*l*.

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ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—On the 14th inst., at the rooms, 36, Northumberland-street, Newcastle, the opening meeting was held of the winter session of the Northern Architectural Association. The President (Mr. William Glover, F.R.I.B.A.) was in the chair. The Hon. Secretary (Mr. A. B. Plummer, F.R.I.B.A.) read the address of the President, who, suffering from a severe cold, was unable to read it himself. He said it was sad when they looked through the past history of the Association to find that there were only four left who were connected with its formation—their past President and honorary secretary (Mr. Thomas Oliver), their past President (Mr. Archibald M. Dunn), and Mr. F. R. N. Haswell and Mr. Gibson Kyle. He quoted from the first proceedings of the Association, for 1858-9, giving the original members, and showing how, at a meeting held at the Exchange Hotel, on Saturday, November 13, 1868, a number of gentlemen formed themselves into a society to be called the Northern Architectural Association. The Association had since made steady and rapid progress. They had now 53 members, 70 associates, and 59 students, making a total of 182. He had little to report as to the progress of buildings in Newcastle, owing to the unfortunate strike that had prevailed for some time. It was a thousand pities that labour disputes could not be settled by arbitration, instead of by the disastrous method now adopted. He was exceedingly glad to know that the proposed new town hall and art gallery were now being seriously considered. As to the future home of their Association, he had hoped that a larger amount of help would have been promised. In his former address he offered to give 100*l.* if they would raise 900*l.*, and to double this offer if they doubled theirs. In his illness of last year he arranged that this promise should be carried out if he passed away. He now offered them 500*l.* if they would raise 500*l.*, or 1,000*l.* if they would raise 1,000*l.* before the close of the century; or he was willing to leave the offer open until the end of his Presidential year—March, 1901. By this means, they might be able to erect a building worthy of their Association, which would, no doubt, before then, be the largest allied society. He would like, before closing his address, to refer to the importance of their corporate bodies taking power to secure open spaces by assisting to provide them. The landowner in co-operation would ultimately benefit, as the property surrounding such spaces would be increased in value. He quoted statements supplied by Mr. Laws, the City Engineer in Newcastle, and by Mr. Bower, the Borough Surveyor at Gateshead. Mr. Laws's statement showed that within the boundaries of the city of Newcastle there had been built during the last twenty years 3,614 self-contained houses, including villas, and 6,910 flats, making the total number of houses erected 10,524. Within the borough boundaries of Gateshead, during the last five-and-twenty years, 720 acres of land had been laid out for building purposes; 158 superior self-contained houses, 875 workmen's self-contained houses, and 2,050 flats had been erected, and 130 flats were now in course of construction. He had also some interesting notes on Gateshead from Mr. L. H. Armour. From the information he had he estimated that there were about 800 acres of land within a radius of three miles of the monument laid out for building purposes, but not yet built upon. Assume twenty flats per acre on this area, and they had 60,000 houses and 32,000 tenements at an average of five to a house, giving accommodation for 160,000 people. On the motion of Mr. Oswald, seconded by Mr. G. T. Browne, Mr. Glover was thanked for his address, and the proceedings ended.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The annual meeting of the Leeds and Yorkshire Architectural Society took place on the 12th inst. at the Queen's Hotel, Leeds. Mr. W. Carby Hall, F.R.I.B.A., President of the Society, was in the chair, and in the course of his opening address he remarked that, unlike the immediate past, the building trade had not tasted the apple of discord of late. He noticed, however, that there was a probability of a lock-out of bricklayers in the North, and the masons of Leeds and district were asking for a half-penny per hour advance, so that they might earn the same wage as the bricklayers. Continuing, the President expressed pleasure that the Institute of Architects had actively taken up the question of the reform of the law relating to ancient lights, and said all would admit the injustice and injurious operation of Lord Tenterden's Prescription Act of 1832. He hoped that some comprehensive system of legislation would be passed by which an architect, when he had a building to erect on a site where ancient lights surrounded him, might know at once what he could do, instead of being put to all the annoyance and cost of a visit to London to repel the issue of an injunction, besides suffering delay in the erection of the buildings and the many other evils.—Mr. William Watson (Wakefield) moved a vote of thanks to the President for his address. Mr. Alfred Marshall (Otley) seconded. The President announced that there had been practically no competition for the prizes offered by the Society. There was no competition for the silver medal offered for measured drawings of old work, nor for the design or construction prizes. Mr. H. E. Henderson was presented with four guineas for an essay on "Ancient Ecclesiastical Architecture in the Neighbourhood of Leeds," half of this amount being given by the President in recognition of the creditable character of his work. Mr. S. R. Day won the sketching prize.

COMPETITIONS.

MUSSELBURGH NEW MUNICIPAL BUILDINGS.—At the monthly meeting of Musselburgh Town Council held on the 13th inst. the award was made of the premiums offered for competitive plans of reconstructed municipal buildings and town hall. The adjudicator was Mr. George Simpson, F.S.I., Leith, whose award was accepted by the Council. "Honestas," who got the first premium of 25*l.*, proved to be Mr. Wm. Constable, architect, Musselburgh; and "Bailie," who got the second premium of 15*l.*, was the *nom de plume* of Messrs. Findlay & Roques, architects, 16, George-street, Edinburgh, and also of London.

NEW INFIRMARY, BRISTOL.—The following architects have been selected by the Committee to compete for the New Infirmary for 1,000 patients for the sick poor of the city and county of Bristol:—Messrs. Crisp & Oatley, W. L. Bernard, W. L. Gough, W. S. Shurmer, — Williams, Frank Wills, and F. Bligh Bond (all of Bristol); Mr. C. W. Bevis (Portsmouth); Mr. Marshall (Nottingham); and Messrs. A. & C. Harston, H. Percy Adams, Giles, Gough, & Trollope, and Newman & Newman (London).

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loan. — On the recommendation of the Finance Committee, it was agreed to lend the Camberwell Guardians 2,550*l.* for alterations at Workhouse.

A Housing Department.—The General Purposes Committee brought up a Report recommending that with a view to the reorganisation of the housing work of the Council, and in order to secure more efficient and economical administration, a Housing Department be formed; that the head of the Department be styled "housing manager;" that a housing manager be appointed at a salary of 800*l.* per annum. That the duties of the housing manager be as follows: To be responsible for the charge and control of all estates and buildings laid out and erected by the Council for the housing of the working classes, including all lettings, small repairs, and the collection of rents subject to the supervision of the comptroller as at present; to advise the Committee as to the most suitable class of buildings to be erected, and generally on the whole question of dealing with the housing of the working classes; to advise as to the rents ruling in the neighbourhood of any particular scheme, and as to the amount which should be set apart annually for necessary repairs, and generally to prepare the estimates as to the financial effect after obtaining all necessary information from the various departments; to search for and advise as to sites suitable for the erection of working-class dwellings; that the valuation of land and the acquisition of property in connexion with housing schemes do remain in the hands of the Council's valuer; that the architect do prepare the designs for new buildings as directed by the Housing Committee, do supervise their erection, do advise thereon, and be responsible for the main structural repairs required to the dwellings; that the duties of the Medical Officer of Health in connexion with the housing work do remain unchanged.

The recommendations were unanimously agreed to.

Widening of King-street, Hammersmith.—The following recommendation of the Improvements Committee was agreed to:—

"That the estimate of 5,918*l.* submitted by the Finance Committee be approved, and that the Council do give its consent to and do contribute one-half of the net cost of the widening of King-street, Hammersmith, between No. 107, King-street and St. Peter's boys' school, both properties included, as shown upon the plan accompanying the letter, dated October 24, 1900, from the Vestry of Hammersmith, such contribution not to exceed the sum of 5,918*l.*"

Holborn to Strand Street—Architectural Features.—It was reported by the same Committee that they had opened the envelopes relating to the designs for the elevation of the buildings proposed to be erected fronting on the Strand and on the crescent road to be formed between Wellington-street and Clement's Inn. The names of the architects were as follows:—Mr. Ernest Runtz, Mr. Edward W. Mountford, Mr. Mervyn Macartney, Mr. Reginald Blomfield, Mr. Ernest George, Mr. Henry T. Hare, Mr. William Flockhart, and Mr. Leonard Stokes.

Mr. Shaw Lefevre asked the Chairman of the Committee whether the architect and valuer would be instructed to report on Sir Frederick Bramwell's suggestion for an upper row of shops in the new street, on the lines of the Chester Rows. He did not say he himself agreed with it, and, in fact, he thought it absolutely impracticable, but, coming from a man of such eminence, and considering the great interest taken in the project, it would be satisfactory to have expert opinion upon the matter.

Dr. White asked whether the Chairman could give any statement as to the use to be made of the designs.

Dr. Longstaff said the matter referred to by Mr. Shaw Lefevre would be considered. As to the second question, he was not in a position to give an answer, as the Improvements Committee were in communication with the Sites Committee on a question which complicated the matter very much.

Leicester-square Fountain.—It was agreed, on the recommendation of the Parks and Open Spaces Committee, to alter and repair the Shakespeare fountain in Leicester-square gardens at a cost of 250*l.*

Land at Falcon-court, Southwark.—The same Committee recommended the transfer to the Parks Committee of the portion of the Falcon-court area, cleared under the Housing of the Working Classes Act, 1890, for the purpose of an open space. This was agreed to.

Female Sanitary Inspectors.—A report was submitted by the Public Health Committee, based on a letter forwarded to them by the Vestry of St. George the Martyr, Southwark, with respect to the duties of female sanitary inspectors. The Committee recommended:—"That a letter be addressed to the Local Government Board expressing the Council's willingness to pay half the salaries of female sanitary inspectors who, in addition to their other duties, would take opportunities of inculcating habits of cleanliness and the best methods of utilising food."

The Earl of Meath hoped that the new Borough Councils would follow the example of Southwark, and appoint lady health visitors. He was fully persuaded that a great many evils associated with overcrowding would disappear if they had more of such inspectors.

The recommendation was agreed to.

Regent's Canal.—The Public Health Committee recommended:—"That a letter be addressed to the councils of metropolitan boroughs through which the Regent's Canal passes, referring to the nuisance which arose from the condition of the canal in July last, pointing out that its condition is such that it may, during hot weather, again give rise to serious nuisance, and asking them to keep the canal under careful observation." The recommendation was adopted.

Horton Asylum.—Medical Superintendent's House.—The Asylums Committee reported as follows:—

"Having previously decided to recommend the Council to carry out this work without the intervention of a contractor, on October 20 last we

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referred the Architect's estimate, amounting to 2,700*l.*, with the plans and specifications to the Manager of the Works Department for his examination and report, pursuant to standing order. The Works Manager has reported that it is necessary that he should be supplied with bills of quantities unless we are agreeable that he should do the work on the schedule of prices for the superstructure, plus a percentage of 10 per cent. for the reasons stated by him, viz. :—(*a*) The diminutive character of the work as compared with the main building ; (*b*) a rise of 5 per cent. in the wages of carpenters ; (*c*) a rise of 10 per cent. in the wages of plasterers ; (*d*) a general rise in prices of materials since the order was received for the superstructure in 1898. We do not think it advisable to have quantities prepared for work of this nature, and are of opinion that the terms stated by the Works Manager are reasonable, and that in the circumstances the work should be carried out by him. We would point out, however, that the sufficiency or otherwise of the Architect's estimate and the amount voted by the Council for this work (2,700*l.*) cannot be ascertained until the work is completed and measured up. In connexion with this work, in consequence of our having decided to provide a smaller house than at first proposed, the original design was revised, and we have agreed to reimburse the Architect his out-of-pocket expenses for the new drawings required, this work not being provided for in our original agreement with him. We recommend—That the erection of the medical superintendent's house at the Horton Asylum be carried out by the Works Department on the schedule of prices for the erection of the superstructure, plus an additional 10 per cent. for the reasons above stated."

The recommendation was agreed to.

Tenders.—The same Committee reported that the following tenders for work at the central station, Horton Asylum, had been received :—

The Edmundson Electricity Corporation, Limited, Broad Sanctuary-chambers, Westminster — Boilers, engines, dynamos, &c.	£17,825 0
Messrs. R. Warner & Co., 97, Queen Victoria-street, E.C.—Pumps, pumping machinery, &c.	1,674 10
Messrs. Doulton & Co., Lambeth, S.E.—Water softening plant	1,269 12
Messrs. Turner, Limited, Watford—Fencing	602 10

Electric Tramway Traction. — Mr. Baker moved :—" That, in view of the desirableness of no longer withholding from North and East London the advantages of electric tramway traction, and of the importance of providing a complete and united system of electric tramway inter-communication between the different parts of the metropolis, the Highways Committee be instructed to ascertain from the North Metropolitan Tramways Company at what price they will surrender the lease now held from the Council, which expires in July, 1910."

Mr. Beachcroft moved an amendment to the effect that the question be referred to the Highways Committee.

The amendment was defeated and the recommendation carried.

The Council adjourned at seven o'clock.

LONDON GOVERNMENT ACT, 1899.

AT the meeting of the London County Council on Tuesday the following Report of the Local Government and Taxation Committee was agreed to :—

"We have to report, for the information of the Council, that Letters Patent have been issued directing that from November 1, 1900, the Metropolitan Borough of Westminster shall be a city, and shall have all such rank, liberties, privileges, and immunities as are incident to a city ; and that the Borough Council shall be styled the Mayor, Aldermen, and Councillors of the City of Westminster.

Transfer of Powers.

Under the provisions of the London Government Act, 1899, the following powers of the Council are, as from the appointed day, viz., November 9, 1900, transferred to the various Metropolitan Borough Councils :—

London Building Act.—(*a*) Power under Section 84 to license the setting-up of wooden structures, and to take proceedings for default in obtaining or observing the conditions of a licence under that section.

(*b*) Power under Section 134 relating to the removal of unauthorised sky-signs, subject to the power of the County Council to act in default. (It may be noted that the work arising under this section is practically at an end.)

(*c*) Power under Section 109 to remove obstructions in streets.

Public Health Matters.—(*d*) Power under Section 28 of the Public Health Act, 1891, of registering dairymen.

(*e*) Power to enforce the by-laws and regulations for the time being in force with respect to dairies and milk, slaughterhouses, knackers' yards, and offensive businesses.

Main Roads.—(*f*) Power and duty of maintaining any main road existing at the passing of the Act.

Lists of premises, copies of by-laws and regulations, and other information relating to the public health powers transferred are being prepared and will be furnished to the respective Borough Councils and other Authorities concerned. Memoranda as to the practice of the Council with respect to the transferred powers is also in course of preparation, and will, when ready, be supplied to the Borough Councils. We have given directions for the attention of the committees concerned to be called to the powers and duties transferred by the Act and to the other powers mentioned in the Act which may be transferred, viz, the maintenance and repair of roadways and footways of embankments, bridges, &c. Several questions of doubt and difficulty have arisen with respect to the powers under the London Building Act and the Public Health Act to be transferred, upon which the solicitor is advising the respective committees.

Alterations in the County Area.

Arrangements have been made for the exercise of the Council's powers and duties in South Hornsey, and for the withdrawal of its services from Penge and Clerkenwell (detached) as far as practicable, and to the extent permitted by the various schemes. Under Section 10 of the Penge scheme, the London Building Acts, 1894 and 1898, will remain in force in Penge until the Local Government Board otherwise orders, and under Section 12 of the same scheme, Penge will continue to drain into London, the amount of contribution to be paid for the service being left to be settled by a scheme under the adjustment provisions of the London (Financial Arrangements) Scheme, 1900. The drainage of Clerkenwell (detached), with respect to which the Council is under an agreement with the Friern Barnet Urban District Council, will also be dealt with in a further scheme under the Act ; an intimation has, however, been received from the Hornsey Urban District Council, to whose district the detached area has been added, intimating that they propose to deal with the sewage of the area as soon as arrangements can be made for the diversion. We are considering this and other questions connected with the adjustment of property, debt, and liability, and will report to the Council thereon in due course.

Metropolitan Borough Boundaries.

We have had prepared a return giving a description of the boundaries of the various Metropolitan Boroughs as fixed by Orders in Council under the London Government Act, 1899. We have given directions for the return to be printed and circulated to the members of the Council, and placed on sale."

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

AT the meeting of the London County Council on Tuesday the following applications under the 1894 Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated :—

Lines of Frontage.

Paddington, South.—A building, to be used as a board-room and offices, on the south side of Harrow-road, Paddington, at the corner of Woodfield-road (Mr. F. J. Smith for the Board of Guardians of Paddington).—Consent.

Lewisham.—Two houses, with bay windows, on the eastern side of Laleham-road, Catford (Mr. H. Woodham).—Consent.

Bow and Bromley.—A station building, with an iron and glass shelter in front, on the south side of Bow-road, Bromley (Mr. C. A. Brereton for the Whitechapel and Bow Railway Company).—Refused.

Greenwich.—One-story shops on part of the forecourts of Nos. 76 and 78, London-street, Greenwich (Mr. C. Reilly for the Worshipful Company of Drapers).—Refused.

Hackney, North.—Two one-story shops on part of the forecourt of No. 91, Upper Clapton-road, Hackney (Mr. W. H. White).—Refused.

Lewisham.—Four houses with one-story shops on the south-west side of Elmer's End-road, Anerley (Mr. C. W. Notley).—Refused.

Lewisham.—One-story shops on part of the forecourts of Nos. 58 and 60, Laleham-road, Catford (Mr. J. Lawrence).—Refused.

St. Pancras, West.—The retention of a wooden fruit and flower-stall on the forecourt of No. 204, Euston-road, St. Pancras (Mr. S. Jacobson for Mr. S. Rabinnovitz).—Refused.

Projections.

Dulwich.—Wood and tile pents to five houses on the south side of Bourton-street, Lordship-lane, Camberwell (Mr. J. P. Glanville).—Consent.

Dulwich.—Wood and tile hoods over the entrances to twelve semi-detached houses on the south-east side, and twelve semi-detached houses on the north-west side of Eynella-road, Dulwich (Messrs. Allen & Hoar for Mr. J. Frampton).—Consent.

Hampstead.—A bay window, at the first-floor level, in front of No. 318, High-road, Kilburn (Messrs. Physick & Lowe for the London and South-Western Bank, Limited).—Consent.

Marylebone, West.—A balcony at the first-floor level in front of No. 12, Marble-arch, Edgware-road, St. Marylebone, and also the erection of a wood and glass screen on the north side of the portico at such premises (Mr. A. E. Nightingale for Mr. T. C. Reece).—Consent.

St. George, Hanover-square.—Wood and glass inciosures to a portico at the entrance to No. 103, Eaton-square, St. George, Hanover-square (Messrs. G. Trollope & Sons for Mr. C. Czarnikow).—Consent.

Hammersmith †—Wooden porches at the front entrances of Nos. 72 and 74, and a wooden covered way at the side entrance to No. 74, Davisville-road, Shepherd's-bush (Mr. C. G. Baker for Mr. G. Godfrey).—Refused.

Hampstead.—An addition to a porch at the entrance to No. 12, Belsize Park, Hampstead (Mr. P. Dollar for Mr. W. R. Walker).—Refused.

Strand.—An illuminated sign and illuminated letters over the principal entrance to the London Hippodrome at the junction of Cranbourne-street and Charing Cross-road (Mr. E. W. Bowles for Mr. H. E. Moss).—Refused.

Width of Way.

Bermondsey.—An office building on the site of Nos. 64 and 66, Alice-street, Bermondsey New-road, Bermondsey, at less than the prescribed distance from the centres of Alice-street and Green-walk (Messrs. G. Elkington & Son for Mr. W. P. Hartley, J.P.).—Consent.

Greenwich.—A building to adjoin the Convent on the western side of Wellington-grove, Croom's-hill, Blackheath, at less than the prescribed distance from the centre of Wellington-grove (Mr. C. E. Mercer and Messrs. F. J. Eedle & Meyers for the Reverend Mother of the Ursuline Convent). — Refused.

Whitechapel.†—Houses on the east side of Tenter-street East, Whitechapel, at less than the prescribed distance from the centre of the street (Messrs. N. and R. Davis).—Refused.

Width of Way and Construction of Building

Whitechapel.—Wood and iron roof over the water storage tanks on the east side of George-yard, Whitechapel (Mr. M. W. Jameson for the Board of Works for the Whitechapel District).—Consent.

Kennington.—A temporary wood and iron hall in the garden at the rear of Nos. 248 and 250, Kennington Park-road, Kennington, at less than the prescribed distance from the centre of Magee-street (Messrs. F. Smith & Company for the committee of the Kennington Branch of the Young Men's Christian Association).—Refused.

Space at Rear.

Lewisham.—No order with respect to the application of Mr. J. Lawrence on behalf of Mr. C. Hankins, for consent to the erection of a one-story stable and coach-house in a garden at the rear of No. 2, Glenfarg-road, Catford, without an open space at the rear.—Agreed.

Formation of Streets.

Wandsworth.†—That an order be issued to Mr. W. C. Poole sanctioning the formation or laying out of seven new streets for carriage traffic on the Magdalen College Estate on the east side of Garratt-lane, Wandsworth, and the widening in connexion therewith of portions of Burntwood-lane (for Messrs. Holloway Brothers). That the names Lyford-road (in continuation), Loxley-road, Herondale-avenue, Ellerton-road, Tranmere-road, Isis-street, and Littleton-street be approved for the new streets.—Agreed.

Hammersmith.—That an order be issued to Messrs. Cluttons, sanctioning the formation or laying out of two new streets for carriage traffic on the London Bishopric Estate, Stamford-brook, Hammersmith, and also a deviation in the formation of Emlyn-road (for the Ecclesiastical Commissioners). That the names Wendell-road (in continuation) and Aylmer-road be approved for the new streets.—Agreed.

Wandsworth.—That orders be issued to Messrs. Beadel, Wood, & Co., and Messrs. Peake, Bird, Collins, & Co., sanctioning the formation or laying out of new streets for carriage traffic on the Du Cane and Crooke-Ellison Estates on the south-west side of Streatham High-road, Streatham, and the widening in connexion therewith of a portion of Streatham High-road (for Mr. C. H. Copley Du Cane and the trustees of the Crooke-Ellison estate). That the names Ellison-road (in continuation), Guilderstield-road (in continuation), Arragon-street, Glencairn-road, and Hepworth-street be approved for the new streets.—Agreed.

Lewisham.—That an order be issued to Messrs. J. Edmondson & Son, refusing to sanction the formation or laying out of new streets for carriage traffic on the Old House Estate, Sydenham-road, Lewisham. —Agreed.

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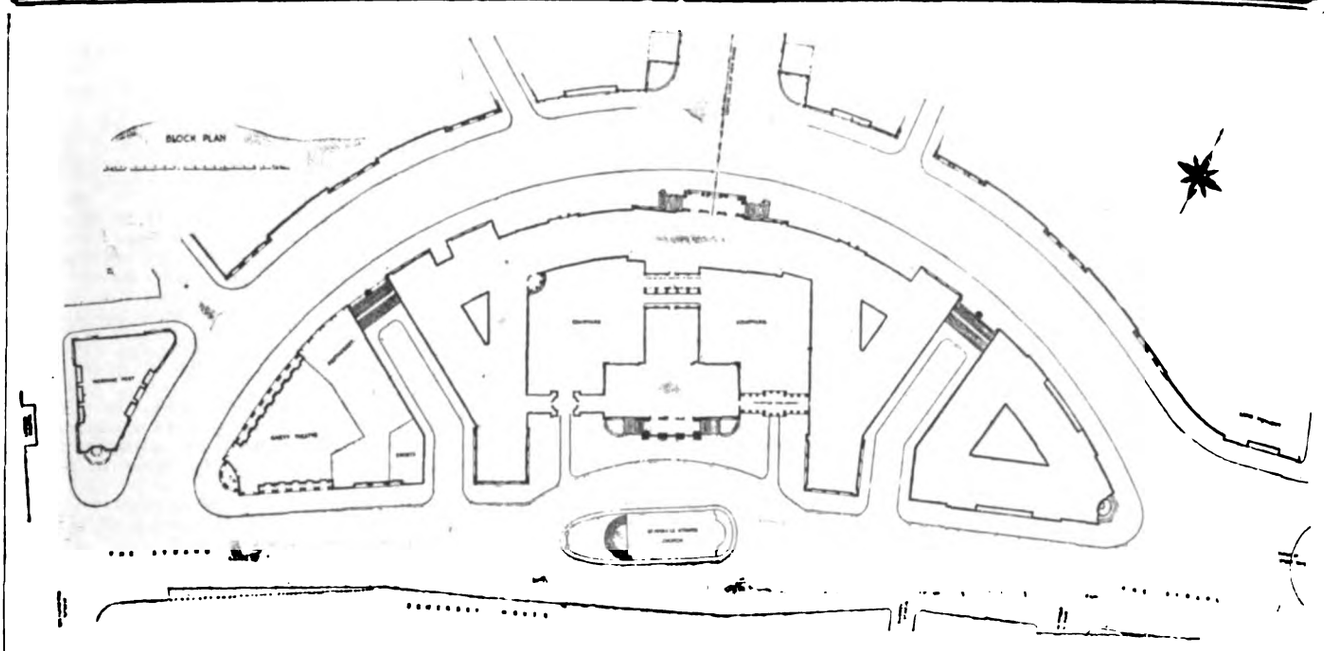

Design for New Street for the London County Council. No. 23. Plan.

Wandsworth.—That an order be issued to Messrs Farebrother, Ellis, & Co., refusing to sanction the formation or laying-out of a new street for carriage traffic on the Mount Clare Estate, to lead from Roehampton-lane to Priory-lane, Roehampton (for Mr. H. C. Smith).—Agreed.

Means of Escape from Top of High Buildings.

St. George, Hanover-square.—Means of escape in case of fire, on the seventh and eighth stories of the Empress Club, 35, Dover-street, Piccadilly, for the persons dwelling or employed therein (Messrs. J. T. Wimperis & Arber for the Hotel and Club Investment Company, Limited).—Refused.

The recommendations marked † are contrary to the views of the Local Authorities.

Illustrations.

DESIGN FOR NEW STREET FOR THE LONDON COUNTY COUNCIL.

WE illustrate in this issue the remaining two of the eight designs for the proposed streets in connexion with the Holborn to Strand improvement; those numbered 27 and 23. These two designs are, respectively, the most ornate and the plainest of the set, and afford in this respect an effective illustration of the variety of ways in which the same architectural problem may be regarded.

We have already commented fully on all the designs at the time they were exhibited. We may add that while, as before observed, we do not sympathise with the very florid style of No. 27, and think it too Parisian in manner for London, we must admit that, for that type of architecture, the design is carried out with much spirit and vigour.

THE ARCHITECTS OF THE NEW STREET DESIGNS.

THE London County Council having now broken the seal of silence in regard to the names of the architects of the eight designs for the new street, we may give the authorship of the various designs, as follows:—

Published in the "Builder," November 10.

No. 26.—By Mr. H. T. Hare.
No. 19.—By Mr. E. W. Mountford.

"Builder," November 17.

No. 17.—By Messrs. Ernest Runtz & Co.
No. 20.—By Mr. Mervyn Macartney.
No. 21.—By Mr. R. T. Blomfield.
No. 29.—By Mr. Leonard Stokes.*

"Builder," present issue.

No. 27.—By Mr. W. Flockhart.
No. 23.—By Messrs. Ernest George & Yeates.

* Mr. Stokes wishes us to add that he received much assistance in preparing the design from his friend, Mr. Rickards.

METROPOLITAN ASYLUMS BOARD.

THE fortnightly meeting of this Board was held at the Board's offices, Thames Embankment, on Saturday, Sir E. Galsworthy presiding.

The Works Committee, reporting with regard to the projected Southern Hospital, stated that the estimate previously submitted to the managers amounted in the aggregate to 316,400*l.*, and that the Local Government Board, having considered the same in connexion with the revised plans of this hospital, requested the managers to reconsider the question of cost. The committee's previous estimates were founded upon the reports of their professional advisers, but since then they had had the opportunity of two personal conferences with the architects (Messrs. Treadwell & Martin), the landscape architects (Messrs. Milner & Son), and the Engineer to the Board. As a result of their representations to the managers' professional advisers, and of their reconsideration of the whole question in the light of these representations, it had been found practicable to reduce the estimate by 32,100*l.*—namely, from 316,400*l.* to 284,300*l.*—and the cost per bed from 395*l.* to about 355*l.* It was agreed by all present at the conference that the mode of construction and the fitting-up and finishing of hospital buildings generally had reached a point which involved an ever-growing and, in some cases, unnecessary expenditure. The essence of the Southern Hospital scheme being the adoption of the cottage system, in order to afford the means of greater sub-division and separation of patients than had hitherto obtained, it was possible, they thought, in the case of the hospital to avoid the more costly modes of erecting and finishing which became necessary in the case of institutions composed of larger and more important groups of buildings. Such costly items as oak flooring, rounded corners to the walls of the wards, ceilings, and dormitories, glazed brick or tile linings to the walls of the corridors and passages, expensive forms of sanitary fittings of all kinds might, the Committee thought, legitimately be omitted without in any way impairing the efficiency of the hospital. The Committee recommended the adoption of the estimate of 284,312*l.*, and supplemented the recommendation with the following details, namely:—

"Structure of new buildings, 178,112*l.*; boiler-house, engine-house, and building in connexion with heating and hot-water supply, 5,000*l.*; works of drainage, 8,000*l.*; water supply—water tank and building in connexion with softening apparatus, and softening plant, 4,000*l.*; fittings and fixtures, including electric lighting, engineering works connected with laundry and wash-house, cooking apparatus and appliances, boilers, steam and hot-water supply, and heating apparatus, 34,600*l.*; boundary walls and fencing, 3,000*l.*; digging, carting, levelling, including road-making and laying out of grounds, stocking, planting, &c., 13,200*l.*; furnishing generally, 17,500*l.*; architects' charges, 8,000*l.*; quantity surveyors' charges, say, 1,600*l.*; salary of clerk of works, 1,000*l.*; lithography, 300*l.*; contingencies, 10,000*l.*"

The recommendation was, after a brief discussion, adopted.

The Works Committee reported that they had since the last meeting authorised an expenditure of an additional sum of 373*l.* 10*s.* upon certain variations in the new laundry building at another hospital, which have been necessitated by the requirements of the Engineer to the Board. The amount of Messrs. McCormick & Son's contract was 8,865*l.*, and the amount of extras previously reported upon 328*l.* The report was adopted.

Books.

A Digest of Cases Relating to the Construction of Buildings. By EDWARD STANLEY ROSCOE, Barrister-at-Law, &c. Fourth Edition. London: William Clowes & Sons, Limited, 27, Fleet-street. 1900.

MR. ROSCOE'S "Digest of Building Cases"—for so the book is generally styled—is too well known to call for much comment. The edition now before us is a new edition in reality as well as in name, although it contains only twenty-three pages more than the last. In respect of the remuneration of architects, the case of Whipham *v.* Everitt (1900) is referred to, and Mr. Roscoe's deduction from this is that the charges approved by the R.I.B.A. "are not legally binding in themselves, but they are so strongly evidence of reasonableness, that for practical purposes they have the force of law." This is an important dictum. Among the other new or amended matter in this edition are paragraphs dealing with non-completion of work by a builder (p. 13), enforcement of contracts (pp. 16-17), certificates (pp. 30 and 32-34), ownership of drawings (p. 38), quantities (pp. 51 and 54), and completion of works (p. 61). The forms of building agreements and leases, &c., given in the appendix, have also been altered and brought up to date. It may be pointed out that the subjects of Employers' Liability and Workmen's Compensation do not fall within the scope of the work.

The book is of great value, and every architect and builder ought to possess a copy.

Footpaths: Their Maintenance, Construction, and Cost. By A. TAYLOR ALLEN, M.S.E., F.I.S.E., &c. London: The Sanitary Publishing Company, Limited, 5, Fetter-lane, E.C. 6d.

THIS little book of thirty-seven pages contains a synopsis of "the law relating to existing pavements," and also describes and illustrates the various kinds of pavement in common use. The author lays no claim to originality, but trusts that students and others will find the compilation "handy and useful for reference." We believe that this will prove to be the case, but there are several passages in the book which

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would be all the better for a little careful revision. To say that "the quality of bricks depends *entirely*" upon certain particulars, among which pressure during manufacture is not mentioned, is scarcely correct. The statement that "Staffordshire bricks are blue" would lead one to suppose that no red bricks are made in that county, and the author seems to be unaware that there is such a thing as "self-faced" York paving. In the specimen quantities it would be better to give the concrete in superficial yards, the thickness being stated, and not in cubic yards, as labour forms such a large item in thin concrete layers.

The Sewerage Engineer's Note-book, being Standard Notes on Sewer Formulæ and Sewerage Calculations. By ALBERT WOLLHEIM, A.M.Inst.C.E. Second (revised) Edition. London: The St. Bride's Press. 1900.

WE noticed this book favourably in its first issue four years ago, and as this edition is in all essentials an almost exact reproduction of the first, little need be added to our original review. The only addition we have noticed is a sentence of three lines on p. 175 of the new issue (p. 137 of the first edition). The difference in pagination is due, not to any increase in the contents of the book, but to the fact that in the new edition the blank pages left for "Reader's Memoranda" are counted, whereas in the first edition the text only was considered. In reprinting, an error has crept into one of the formulæ on p. 21, $\frac{12}{2}$ being printed instead of $\frac{12}{3}$. It would also have conduced to clearness if the author had made a better use of brackets in expressing his equations on this and other pages. Thus, it is said that "Perimeter $= 7{\cdot}93 \times r + 2\pi \times \frac{4{\cdot}75}{12}$" This may be read in three ways with very different results, and it would therefore have been better to have inserted brackets thus, $(7{\cdot}93 \times r) + \left(2\pi \times \frac{4{\cdot}75}{12}\right)$, or to have simplified it to $7{\cdot}93\,r + 2\pi\frac{4{\cdot}75}{12}$. Formulæ ought to be so expressed that there is no possibility of mistaking their meaning. Fortunately, the author gives tables of results, so that the formulæ will not often be called into requisition. We congratulate Mr. Wollheim on having produced a labour-saving book of great value.

Stresses and Strains: Their Calculation and that of their Resistances, by Formulæ and Graphic Methods. By F. R. FARROW, F.R.I.B.A. London: D. Fourdrinier (*Builder* Office).

Structural Iron and Steel. By W. N. TWELVETREES. London: D. Fourdrinier (*Builder* Office).

THESE two small books, which form a part of "The *Builder* Student Series," have originally appeared in serial form in our "Student's Column," and are now reissued as small and convenient volumes, after careful revision on the part of their authors.

We cannot of course in these columns pretend to review these books; we merely call attention to them here, and may add that the object in both instances has been to furnish that kind and degree of practical information which may be really useful to architectural students, without burdening them with abstract theories and mathematical formulæ which are not likely to be applied in an architect's practice.

Mr. Farrow's book, it may be added, is specially intended as an aid to those who may be preparing to pass the Institute of Architects' Examination.

Technical Words and Phrases: an English-French and French-English Dictionary. By J. A. STANDRING and C. A. THIMM. London: E. Marlborough & Co.

FOR what class of persons this so-called technical dictionary of French and English terms is supposed to be of use we cannot say; but it can certainly be of no use to our readers. We looked, at random, for the following technical terms in building, not one of which is in the book:—"ashlar," "column," "concrete," "cornice," "king-post," "pier," "pillar," "rubble," "strut," "template," "tie," "tie-beam," and (to crown all) "wall"! The French equivalent of "bond" is given only as *obligation*; and *béton* and *moellon* are not in the French part. The book professes on the title-page to be a "dictionary of technical and business terms and phrases used in commerce, arts, sciences, professions, and trades." The compilers seem to be entirely ignorant of the terms of one "profession or trade," at all events; and they must be equally ignorant of engineering, for we see that "caisson" does not occur, nor "cantilever," "embankment," nor "pontoon." But it is useless looking further; the compilers have evidently been totally incompetent for their task.

BOOKS RECEIVED.

DIE ENGLISCHE BAUKUNST DER GEGENWART. Von Herrmann Muthesius. (Cosmos Publishing Company, Berlin.)

TECHNICAL WORDS AND PHRASES: An English-French and French-English Dictionary. By J. A. Standring and C. A. Thimm. (E. Marlborough & Co.)

Correspondence.

***To the Editor of* THE BUILDER.**

THE CURFEW.

SIR,—The ringing of the curfew is not nearly so rare in this country as Mr. H. Rose apparently thinks, judging by the remarks in his paper read recently before the Architectural Association Discussion Section. Many other instances beside that quoted by Mr. J. Lorimer Miller at Berwick-upon-Tweed might be mentioned. For instance, it is rung here in Exeter every night, all the year round, at 8 o'clock, upon "Peter," the great bell in the northern Norman tower at the Cathedral. It has been rung, in precisely the same way and time, without a break, ever since A.D. 1112 (when William Warelwast, third Bishop of Exeter, A.D. 1107-36, erected the towers in question), but not continuously upon the same bell. The present one was the gift of one Bishop Peter Courtenay (A.D. 1478-85), and it is named after him. It was brought from Llandaff Cathedral, by whose Bishop it was exchanged for several of our smaller bells. This great bell was recast by Thomas Purdue in A.D. 1676, and weighs 6 tons 5 cwt.

Immediately the ancient clock—which was made in the reign of Edward III. (A.D. 1327-77), and is reputed to be the oldest in England—has concluded striking the hour of eight upon the bell in question, the Curfew is struck as many times as there are days in the respective month, and then it strikes eight strokes more.

After that, all decent folk were supposed to go to bed!

Exeter. HARRY HEMS.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

19.—ELECTRIC LIFTS—MOVING STAIRCASES—TELPHERAGE — ELECTRIC HEATING — COOKING — SPECIAL APPLICATIONS—VENTILATING.

AS most electricity supply stations have nearly all their machines lying idle during the daytime, the problem of finding a day load for them is one of the greatest importance to electricians. Hence they encourage their consumers to use electricity for motive power and for heating and cooking by supplying them with energy for these purposes at much cheaper rates. They also in many cases provide motors, electric radiators, &c., on hire. In Bradford, for example, of 560 motors supplied from the Corporation mains in May, 1900, 379 were lent on hire. The load taken by these motors was 14 per cent. of the entire load on the station and was almost entirely a day load.

Ten years ago nearly all lifts were worked by hydraulic power. The simplicity of the gearing employed and the slow rate at which all parts of the mechanism worked were advantages that every one could appreciate. It had this serious drawback, however, that it used the same quantity of water for a light as for a heavy load. The work done by a good electric motor is nearly proportional to the energy consumed, and hence with variable loads a considerable saving of energy can be effected by means of the electric motor.

Shunt motors are usually employed for working electric lifts, as their speed is constant. In some cases a few series windings are put on the field-magnets as well, in order that a powerful torque may be developed at the moment of starting. The current taken by these motors is almost exactly proportional to the load, and as they have their maximum load only for a few moments, small motors can be employed. As they are lying idle for about half their time there is no danger of the armature over-heating. A good lift motor ought to require very little attention, hence the bearings are usually made self-lubricating. A lift motor must also be capable of running in either direction, and the brushes must adjust themselves automatically as they wear away.

A drawback to the use of small motors is the high speed at which the armature rotates. We have seen that the weaker the magnetic field the more rapidly does the armature revolve. In order to get a strong magnetic field and therefore a slow speed armature, we require plenty of iron in the field-magnets and hence a large motor. In practice, owing to the great first cost of such a machine, it is more economical to use a small motor and reduce the speed by means of gearing. Belts were first employed to connect the motor to the winding-drum, but now positive gearing is always employed. Spur gearing is the simplest for this purpose, but the noise it makes prevents its use in many cases, so worm gearing is almost invariably employed. The worm and the wheel run in an oil bath, and the efficiency of the transmission is over 80 per cent. It is found that although the worm gearing works smoothly, an unpleasant vibration is sometimes transmitted to the lift-cage. This can be remedied by making the shaft of the worm-gear drive the rope-drum through intermediate pads of india-rubber. The cage is supported by wire ropes which, after going round pulleys, coil on the rope-drum.

A great deal of ingenuity has been expended over the starting and regulating gears, and some lifts now are entirely automatic. In this country, however, a skilled attendant is usually employed who manipulates a simple hand-rope. The starting of the motor by means of this rope is a difficult problem. If we switch a shunt motor directly on to the mains there is a great risk of blowing the main fuses, as there is an enormous initial rush of current. When the motor gets up speed this current diminishes very rapidly, as the back E.M.F. developed in the armature prevents much current getting through. In order to prevent the rush of current at the start, it is usual to have a resistance in series with the armature, and cut out this resistance gradually as the motor gets up speed. There are many ways by which this can be done automatically. One of the most successful is the governor-controlling gear invented by Mr. H. W. Ravenshaw. He uses a simple centrifugal governor actuated from the spindle of the armature and controlled by a spring. When at rest all the resistance is in circuit with the armature, but when it is rotating it actuates a switch which cuts out resistance proportional to the speed of the motor. When the motor attains a certain speed just below its maximum, the switch cuts out all the resistance. A motor fitted with this gear behaves in a very similar way to a steam-engine, the governor throttling the current just as the governor of a steam-engine regulates the steam supply. Most central station engineers insist that motors be fitted with starting resistances before they are connected on to the supply mains. When inefficient resistances are used a blink is caused on all the glow-lamps connected to the neighbouring mains whenever the motor is switched on to the circuit. Considerable difficulties were experienced in many places in remedying this defect.

In some electric lifts an auxiliary magnetic brake is fitted in addition to the ordinary brake. The magnetic brake acts automatically whenever for any reason the current to the motor is interrupted. For this reason it is safer than the mechanical brake. Mr. Ravenshaw states that an ordinary electro-magnet of reasonable size can be made to give a pull of one ton through a distance of half an inch.

The Otis Company have recently invented an automatic lift suitable for private houses. In order to get the lift at a particular floor all that it is necessary to do is simply to press a push-button on that floor and then the main push. The cage immediately moves towards that floor and automatically stops there. Whenever the car is in use all the pushes on the various landings are thrown out of action so that it is impossible for any one to interfere with it. Automatic locks and door contacts

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are used, so that accidents through carelessness cannot occur, and the arrangements are so simple that they can be understood by any one.

The cost of an electric lift is from 10 to 20 per cent. dearer than the cost of a hydraulic lift, but if it be much used the saving in annual expenses far more than counterbalances the extra initial outlay. The following figures given by Mr. Hawtayne show the expense of working an electric lift designed to carry 1,000 lbs., which was fitted up in the office of the Sun Insurance Company at Glasgow. The rise of the cage was 74 ft. 9 in., and its average velocity was 170 ft. per minute. The energy was supplied by direct current at a pressure of 220 volts.—

Load.	Weight in lbs.	Time in secs.	Amperes.	Cost at 1d., per unit.	Total.
1 man	149	Up 24	1·5	0·0022	
		Down 26	2·6	0·0446	0·0468
2 men	289	Up 25	4·0	0·0061	
		Down 28	19·0	0·0324	0·0385
3 ,,	457	Up 26	7·0	0·0118	
		Down 28	15·0	0·0258	0·0376
4 ,,	597	Up 26	10·0	0·0157	
		Down 28	10·0	0·0169	0·0326
5 ,,	757	Up 26	15·0	0·0231	
		Down 27	7·0	0·0115	0·0346
6 ,,	911	Up 26	19·0	0·0302	
		Down 27	5·0	0·0082	0·0384
7 ,,	1,051	Up 27	25·0	0·0413	
		Down 26	2·0	0·0031	0·0444
8 ,,	1,225	Up 29	29·0	0·0500	
		Down 26	1·0	0·0015	0·0515

To find the cost at any other price per unit, say 3d., we have only to multiply the last column by 3. It is interesting to note that the cage is so counterbalanced that the cost of coming down is about equal to the cost of going up when it is carrying about half its maximum load.

Owing to the great height of buildings in New York, high-speed lifts are often used, a velocity of 700 ft. per minute being sometimes attained. The lifts are nearly all worked by electricity, and it is stated in the American *Engineering Magazine* for 1898 that there are more than 6,000 in operation in the city of New York alone. It is to be noted that in tall office buildings the average load will be much less than the maximum load. Even with lifts worked to their fullest capacity the average load was less than a fifth of the maximum load, and hence electrical lifts which consume power almost in exact proportion to the load have many advantages over hydraulic lifts which consume the same power whatever the load.

Several large shops have recently adopted "moving stairways," or "inclined elevators," instead of lifts. In the Reno inclined elevator we have small boards mounted on wheels, which run on rails up the inclined way. All the boards are joined together, and have fastened to them a series of rubber-covered longitudinal ridges. The feet of the passenger rest on these ridges, and are slid off as they arrive upon a comb-shaped landing consisting of iron prongs, which fit into the grooves separating the ridges. The endless tread-chain passes over a sprocket-wheel at the upper end, and this is rotated by an electric motor, either through reduction gearing or by a belt. The moving incline has a velocity of 90 ft. per minute. The handrail is made to move with the same velocity as the inclined way in order to steady the passengers. The capacity of a moving stairway is equal to that of five or six lifts, and as it fulfils the fire regulations as to a staircase no other staircase is required. It can be started and stopped by a handle at the bottom and the top of the way, and requires practically no attention. It is adopted by the New York elevated railways, and where a continual stream of packages or luggage is going up it is much cheaper than a lift. It can carry 2,000 passengers per hour 20 ft. high at an expenditure of four Board of Trade units. With power at 3d. per unit this would be 1s. per hour. Running unloaded for an hour it would not consume one unit. Although many millions of passengers have been already carried by these stairways, it is stated that no accident has yet occurred.

Aerial telpherage, in which the telpher-car was suspended from a fixed cable and pulled along by means of another, was never extensively used. A new system has now been introduced, in which the car is operated by electricity. It has been largely adopted in America, and to a less extent in this country, for transporting goods from one portion of a works to another across intervening yards or buildings. It is also very useful for transporting materials across rivers or valleys, and economies have been sometimes effected by transporting coal from the railway trucks to the boiler-house of a power station by means of an electric cable-way.

The method of distributing parcels or mails by the "Electric Tube Despatch" is a somewhat similar industry. Miniature electric trains run in tubes varying in size from 2 ft. to 3 ft., and carry parcels or letters. Such a system can be combined with an aërial telpherage system, so that there is no necessity to unload the cars. Branch lines can also be arranged to feed into one main line, and the cars are so controlled that they cannot come into collision. The "Consolidated Telpherage Company" of New York state that for short distances a speed of fifty miles an hour can be maintained, but they recommend speeds varying from twenty to thirty-five miles per hour.

The electric heating of houses and buildings is a problem which has been exercising the ingenuity of electricians since the introduction of electric lighting. At first sight the problem does not look a promising one. If we take the amount of heat necessary to raise the temperature of 1 gramme of water 1 deg. C. as 4·2 joules, it is easy to show that the Board of Trade unit, if all converted into heat, would raise the temperature of 18·9 lbs. of water from freezing to boiling point. Hence, even if we pay only 1d. per unit, this amount of heat is not cheap. A pound of coal on combustion will give out five times as much heat as this, and hence, to buy heat in the form of electric energy is apparently very extravagant. There are a few cases, however, where it is both convenient and economical to produce the heat we want electrically.

Electric radiators for warming rooms are made like fire-screens. Single-plate radiators are suitable for placing against a wall and double-plate radiators for the middle of a room. Electric currents pass through metallic wires embedded in asbestos or cement, and the heat is transmitted to the surface and there radiated. When once switched on their temperature rises rapidly to a maximum and then remains constant. They are fitted with several switches so that the temperature can be exactly regulated, and there is no dirt, smoke, or smell. Some of them also are portable, and can be moved about where required.

In estimating the amount of power required for heating a room it is usual to calculate 500 watts for every 1,000 cubic feet. For heating small offices in winter-time it is also customary to assume that this power will be required for about two hours per day and about a third of this power for the remainder of the time. For heating public halls or theatres electric radiators are often used. For example, in the stalls of a theatre in winter time the cold air is often unpleasant, as it naturally seeks the lowest level in the building. The Vaudeville Theatre, London, has been heated throughout with Crompton radiators for the last six years with satisfactory results. Radiators are also often used in dressing-rooms, green-rooms, &c., as there is absolutely no danger of fire and they can be placed in any position.

An objection to electric heating by radiators is that there is no cheerful glow as when a coal fire is used. To get over this objection Mr. Dowsing has invented a luminous radiator, which has already become very popular. He uses four large lamps which, however, glow only at a red heat, and by means of a reflector diffuse a cheerful radiance in the room. In appearance the electric radiator resembles an open fire, but, of course, there is no combustion, or fumes, or flues. It can be used for all domestic purposes where heat is required, such as toasting, warming food, and heating domestic apparatus.

A small electric radiator costs between 2*l.* and 3*l.* and consumes about a Board of Trade unit per hour. Most electric supply companies and corporations lend out an electrical heating apparatus, delivering and bringing it away free of charge. They also guarantee to maintain it in working order, and, as a rule, will fix a separate meter for measuring the current used by the apparatus, which they will charge for at a reduced rate. The rent the Westminster Company charge for a radiator is 5s. a month and they charge for energy consumed at the reduced rate of fourpence a unit. The hirer, however, has always the option of purchasing the radiator.

For cooking purposes electricity has many advantages. The ease with which an absolutely equable temperature can be maintained the perfect cleanliness and the entire absence of smoke, smell, or dirt are great advantages when compared with cooking by gas or oil. The cost of cooking by electric ovens when electricity costs 4d. a unit is the same as the cost of cooking with gas at 3s. per 1,000 cubic feet. When water has to be heated the electrical method is much more expensive, but still it is extensively used owing to its extreme convenience. The electrical apparatus used is in itself highly efficient, as nearly all the heat the current can give is utilised. For example, a pint of water can be boiled in an electric kettle in 3·7 minutes, and takes 10 amperes at 100 volts. Theoretically, if all the heat had been utilised it would have taken 3·3 minutes, and hence the efficiency is 90 per cent. The energy consumed to heat the water is less than the fifteenth part of a unit, and is therefore only a fraction of a penny. Electric hot plates, frying pans, stewpans and saucepans, ovens, &c., are all used, and are often economical. In addition, billiard table irons, laundry irons, heaters for curling-tongs, cigar lighters, are all examples of convenient applications of electric energy.

Some special trades make numerous applications of electricity in their workshops. In bookbinding, for example, the small tools used in gilt lettering are heated by being placed on hot plates. The glue pots, the wax pots for sealing purposes and the ovens and plates for heating the backs of books are sometimes all heated electrically. The advantages claimed are that the risks of burning and overheating which occurred with gas are avoided, and that much greater cleanliness is secured. Electric soldering irons and branders are very rapid in their action. Electric heat is often usefully applied to goffering machines, presses, gold-beaters' skin heating, bottle drying, steel tempering, softening hardened steel plate in the places required for rivet holes, medical cauterisers, &c.

Electricity can be applied to ventilate rooms by using a small motor and fan. Motors of about quarter a horse-power usually make from 1,000 to 1,500 revolutions per minute, and when attached to a 14-in. Blackman fan are capable of removing about a thousand cubic feet of air per minute. They consume about the fifth part of a unit per hour. Larger motors and fans are more economical in proportion. Direct and alternating current motors for coupling on to fans can be readily obtained, but absolutely silent running is in most cases indispensable.

GENERAL BUILDING NEWS.

CHURCH, ST. ANNE'S, VAUXHALL, LONDON.—The foundation-stone has just been laid of the new Church of St. Anne, Vauxhall, by the Roman Catholic Bishop of Southwark. When the church is completed it will have a total length of 140 ft., and consist of a nave, 33 ft. by 90 ft., flanked by processional aisles and transepts. The chancel will be 36 ft. by 23 ft., with two side chapels, together with sacristies. There will also be a confraternity chapel, 33 ft. by 18 ft., with parish-room over it, parallel with the nave, opening by an arcade to the processional aisle. The style is that of the thirteenth century, and the exterior of the building will be entirely of red brick. There will be accommodation for 700 people. Mr. F. A. Walters, F.S.A., is the architect, and the contractors are Messrs. Goddard & Sons, of Farnham and Dorking.

CATHOLIC CHURCH, PORT CLARENCE, DURHAM.—On the 6th inst. a Catholic Church was opened at Port Clarence, the new church taking the place of a school-room. The church, which is dedicated to St. Thomas of Canterbury, stands on a site one acre in extent. Its length is 112 ft. and the breadth 43 ft., providing sitting accommodation for 550 persons. The exterior of the building is Gothic, the bricks being pressed Accrington, relieved with dressings of red sandstone. The stained windows are by Messrs. Atkinson, of Newcastle. Messrs. Pugin & Pugin have been the architects, and Messrs. Bastiman Brothers the contractors, the building having cost 4,200*l.*

MISSION CHAPEL, OSSETT, YORKSHIRE.—The new mission chapel dedicated to St. Aidan, at Low Common, Ossett, was dedicated recently. The buildings have cost about 1,200*l.* They are in

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plans by Messrs. C. H. Marriott & Sons, Dewsbury, and are in the late Gothic style, stone-faced throughout. The main room measures 50 ft. by 22 ft., and on week days it will be used as a school. The various works have been, or are, in the hands of Mr. Richard Oldroyd (Ossett), mason; Mr. J. W. Harrop (Gawthorpe), joiner; Mr. W. H. Thompson (Batley), slater; Messrs. Parkinson Brothers (Heckmondwike), plasterers; Mr. J. Shepley (Dewsbury), plumber; and Mr. J. H. Jubb (Dewsbury), painter.

CHURCH, GREAT HARWOOD, LANCASHIRE.—The formal opening of the Great Harwood Emmanuel Church (Free Church of England), took place recently. The building is not yet completed. The cost of the present structure is about 1,300*l.*, and in the future it is proposed to take out the north end of the church and extend it a distance of about 12 ft. to allow for the erection of vestries and sanitary conveniences. The floor is boarded on coke breeze concrete, and the woodwork of the interior is of pitchpine, with the exception of the seats which are of ordinary pine. The church is heated on the low pressure system. The building is expected to hold about 300 persons. Mr. Fred. Parkinson, Blackburn, was the architect for the building.

TOWER OF ELBERTON CHURCH, GLOUCESTERSHIRE.—The tower walls of the parish church of Elberton, as well as the spire, have recently been found to be in an unsafe condition. Mr. C. Ponting (Diocesan Surveyor) made an examination, and a committee was appointed to carry out the work in accordance with the architect's report. The tender of Messrs. Cowlin & Son, of Bristol, was selected, and the work is now in progress.

WESLEYAN CHAPEL, WALLSEND.—On the 14th inst. the foundation-stone of a new Wesleyan church was laid at Wallsend. The designs were prepared by Mr. J. W. Taylor, of Newcastle, and the contract was given to Mr. MacHarg, builder, of Wallsend. The church will accommodate 820 worshippers, and comprises a nave with aisles and transepts. The principal entrance will be in High-street and has two central doors, which lead into a porch, on each side swing doors giving access to the body of the church and galleries. There will also be separate entrances to each from the main street. The choir gallery and organ chamber will be at the north end, behind the rostrum in an octagonal recess, and have an independent staircase direct from Laburnum-avenue. There will be four vestries available for church purposes, also school-room and class-rooms.

CHURCH, TUNDERGARTH, DUMFRIESSHIRE.—The new parish church at Tundergarth, near Lockerbie, was opened recently. The church has been erected from designs by Mr. James Barbour, architect, Dumfries, at a cost of about 2,000*l.*

CONGREGATIONAL CHURCH, NORWICH.—A permanent church is to be built on the site of the present iron Congregational Church in Magdalen-road, Norwich. Plans have been prepared by Messrs. E. Boardman & Son.

HOLY TRINITY CHURCH, AYR.—This building, which was recently opened, has been erected from the designs of the late Mr. J. L. Pearson, R.A. The style is thirteenth-century Gothic. The dimensions over all are:—Length, 124 ft., and breadth, 70 ft. The chancel, side chapel, clergy and choir vestries, organ chamber, and organ aisle, were erected twelve years ago. Two gables are shown of nave and south aisle, 52 ft. and 48 ft. high respectively, each capped by a carved stone cross. The tower forms the north-west angle, and at present rises to a height of only 40 ft., but is intended to be carried up 92 ft. The spire will rise 92 ft. higher, giving a total height of 184 ft. The base of the tower rises from a boldly-moulded plinth and sur-base, and its first stage is formed by panelled recesses, which are alternately pierced for the windows. The tower is 19 ft. square. Owing to the limits of the site, the narthex is formed within the walls of the church. The entrance consists of two moulded archways with single shaft in centre, supporting a tympanum with circular moulded panels. The south-west angle is terminated by a pinnacle, which commences at a low level of the adjacent buttresses, and is carried to a height of 56 ft. The church has a triple roof covered with red tiles, the ridges of nave and chancel being continuous. The interior is faced throughout with hewn stone. Entering from the west, the narthex is 20 ft. by 6 ft. 4 in. From the porch there is an entrance by two doors, one leading into the south aisle and the other into the nave. The interior consists of nave, north and south aisles, chancel and side chapel, and organ aisle. The extreme length of the interior of the nave is 70 ft. 6 in., and the width 57 ft. 4 in. The walls, from which the roof of nave and aisles springs, are carried to a height of 34 ft. The nave is divided into four bays by moulded piers, the shafts of which are carried up from the caps of the arcade, and from which spring transverse arches at a higher level. The walls between the nave and aisles on either hand are pierced by five arches, springing from piers with moulded caps. Transverse arches divide the aisles into corresponding bays. These arches are carried by wall shafts with moulded caps and bases. Each bay is lighted by a lancet window, placed, owing to the exigencies of the site, 10 ft. from the ground, and rising to a height of 12 ft. Over the narthex a small gallery is formed. The interior face of the narthex shows a projecting front, in which are inserted two arched recesses, with stone seats. The tower opens into the north aisle with an arch 24 ft. high, with moulded shafts and caps. The arch gives access to the baptistry, 11 ft. square, which is lighted by four lancet windows, and closed with a vaulted ceiling 30 ft. from the floor, constructed to allow the bells to be raised to the upper story of the tower. In the south-west angle of the baptistry a door opens into a turret stair, which leads to the gallery over the narthex, and to the upper floors of the tower. The open-timber roofs of the church are of pitch-pine. The floors are of wood blocks laid in herring-bone pattern. The passages of nave and aisles are laid with plain red tiles. The seating throughout is of Burmese teak. The church is lighted with gas, from pendant gaselliers of special design. The system of heating is hot water. A wrought-iron railing protects the street frontage. The side chapel built twelve years ago has now been completed by the erection of an altar and sanctuary. The organ, by Lewis, of London, has now been completed. It occupies a chamber 16 ft. above the floor on the north side of the chancel, and shows a front both towards the chancel and north aisle of the nave. Several gifts have been made to the church, including a new altar cross, a processional cross, &c. Exclusive of gifts, the cost of the nave and aisles is about 10,500*l.* The church has been built of local stone. The chancel and side chapel, &c., cost about 5,000*l.* Mr. F. L. Pearson, London, has carried out the plans of his father. Mr. Leigh has been the clerk of works, and the builders are Messrs. Cowlin & Son, of Bristol, whose foreman is Mr. Bale.

RE-OPENING OF EAST UNITED FREE CHURCH, ABERDEEN.—This church was re-opened on the 11th inst. after alteration. The work has included the erection of an organ chamber for the accommodation of an organ which has been presented to the church, and the introduction of electric light. The back gallery has been shortened and re-seated, and the joists which supported the old plaster ceiling have been renewed. The following were the contractors:—Mason, Mr. John Morgan; carpentry and glazier work, Messrs. James Garvie & Son; plaster work, Messrs. J. Scott & Son; painter work, Messrs. A. Ferguson & Co; electric lighting and power, the Aberdeen Electrical Engineering Co.; plumber work, Mr. A. B. Robertson; heating engineering, Mr. Robert Tindall; upholstery work, Messrs. John Falconer & Co. The work was carried out under the direction of Mr. William Kelly.

BOARD SCHOOLS, REDFIELD, BRISTOL.—The Redfield Board Schools, St. George's, Bristol, were opened on the 12th inst. The buildings are in two blocks, each with a central hall and classrooms for fifty scholars. One block accommodates 400 infants, the other 650 mixed scholars. Mr. Herbert J. Jones, of Bristol, was the architect, and Messrs. G. Downs & Sons the general contractors, the amount of their contract having been 10,405*l.* Mr. A. S. Scull executed the plumbing work, and Messrs. Skinner, Board, & Co., the hot-water engineering.

COTTAGE HOSPITAL, WHITBY.—The old bank premises of the York Union Banking Company are to be converted into a centre for the Whitby Cottage Hospital. The alterations have been planned by Mr. E. H. Smales.

PROPOSED INFECTIOUS DISEASES HOSPITAL, HEVER, KENT.—A Local Government Board inquiry into an application by the Kent County Council for permission to borrow 5,700*l.* for the erection of an isolation hospital for infectious diseases to serve the parishes of Chiddingstone, Cowden, Edenbridge, and adjoining parishes, was held by Mr. R. Deane Sweeting at the schools, Chiddingstone, on the 16th inst. Mr. Guy Ewing, surveyor, stated that the site was in the parish of Hever, and was a meadow, known as Meachlands, a little over six acres in extent. Plans of the proposed hospital were explained by Mr. Maberly Smith, architect.

OPERATING THEATRE, SHEFFIELD ROYAL INFIRMARY.—A new operating theatre was opened recently at the Royal Infirmary, Sheffield. The addition is on the top floor of the detached building known as the "Victoria Block." The operating theatre is 38 ft. 3 in. long by 17 ft. 9 in. wide, and is fitted with two tables. Adjoining the theatre is an anæsthetic-room, and patients will pass, after operations, into a recovery-room. The architect was Mr. Keith D. Young, and the contractors were Messrs. Longden & Sons, of Sheffield.

DRILL HALL, BLAYDON, DURHAM.—A drill-hall for the volunteers of Blaydon and Winlaton has been erected at the Old Pit, midway between the two villages. The drill-hall measures 90 ft. by 40 ft. Mr. M. H. Graham, of Newcastle-on-Tyne, was the architect.

MINERS' HALL, HIRST, NORTHUMBERLAND.—The new hall for the Woodhorn and Linton miners, at New Hirst, was opened on the 10th inst. Mr. Osborne Blyth, of Hirst, was the architect, and Messrs. Braithwaite, of Heaton, were the builders. The hall is 60 ft. by 28 ft., and there are two anterooms, 14 ft. by 15 ft. The building is of brick, with stone facings. The heating is by hot water, the apparatus having been supplied by Messrs. Emley & Sons, of Newcastle.

BURTON-ON-TRENT CO-OPERATIVE SOCIETY'S NEW PREMISES.—These premises, which have been erected in Byrkley-street by the Burton-on-Trent Co-operative Society, Limited, at a cost of between 8,000*l.* and 9,000*l.*, were opened on the 15th inst. The building, the style of which may be described as English Renaissance adapted to modern business requirements, stands on a site previously occupied by shops and cottages. The premises comprise:—Basement with strong room, coal stores, and heating-chamber; ground floor, with four shops for the grocery and provision, drapery, boot and shoe, clothing and outfitting, and butcher's departments; first floor, with showroom, board-room, manager's and general offices, with the necessary lavatory accommodation; and on the second floor is a concert-hall to seat 500 persons. The ceiling is coved and panelled with enriched plaster ribs and the front of the proscenium is executed in modelled fibrous plaster, the windows being of leaded lights specially designed in the studios of Messrs. Pearce, of Birmingham. Provision is made for ventilation by means of tubes and exhaust ventilators in the roof. The building is fireproof throughout, being built with steel stanchions and girders cased and protected; the floors and staircases are of concrete and, together with the stanchions and girders, were executed by Messrs. Lindsay & Co., of Westminster, on their patent system, the floors being finished with wood blocks by Messrs. Ward & Co. The heating is on the low-pressure hot-water system by pipes and radiators, this work and the ventilation being in the hands of Messrs. John King, of Liverpool. The lighting is by electricity, the installation being by Messrs. Gardner Bros., of Burton-on-Trent; the current is supplied by the Corporation. A service of gas is also laid for emergencies. A complete system of fire appliance has been fitted by Messrs. Merryweather & Sons. Messrs. T. Lowe & Sons, of Burton-on-Trent, carried out the general contract, and the plans were prepared by Mr. R. Stevenson, architect, of Burton-on-Trent, under whose superintendence the whole of the work has been carried out.

POLICE OFFICE, &C., MOTHERWELL, LANARK.—The new police office and barracks erected by the Burgh of Motherwell for the accommodation of the local division of the county police has now been finished and occupied. The architect was Mr. Alexander Cullen, F.S.A., Motherwell, and the cost 10,000*l.* The buildings, which have a frontage to the High-road, provide accommodation on the ground flat for the usual offices and cells, superintendent's and sergeants' rooms, muster room, and a gymnasium. On the first floor are the single men's bedrooms, dining-rooms, reading and billiard room.

HOSPITAL, BOSCOMBE, BOURNEMOUTH. — The opening of the first portion of the new hospital at Boscombe, in future to be known as the Royal West Hants and Boscombe Hospital, took place recently. The first or foundation stone of the new hospital was laid on June 28 last year. The plans for the new building, the original contract for which amounted to 8,000*l.*, without extras, were prepared by Mr. A. Bligh Livesay, architect, of Bournemouth; and the work of erection has been carried out by Messrs. Miller & Sons, contractors, of Lansdowne. The plans as a whole provide for a hospital to consist of an administration block and three pavilions, containing wards for men, women, and children. The committee arranged to begin the new hospital by the erection of two pavilions, each containing ten beds for men and women patients. This constitutes about one-third of the entire scheme, which, when complete, will have cost nearly 30,000*l.* The site of the new hospital is at the rear of the existing hospital. The main approach is from the Ashley-road, and the building is a short distance from Boscombe Railway Station. The two pavilions are 50 ft. long, 27 ft. broad, and 13 ft. high. The wards have a cubic air-space per bed of 1,755 cubic ft., and a floor area per bed of 135 sq. ft. The buildings are connected with each other by a corridor and with the present hospital by a temporary corridor. Each pavilion contains ward kitchens, larders, stores, lavatories, &c. There is also an isolation ward opening into the main corridor, which is carried right through the building. For the present the isolation ward has been temporarily fitted up as an operating ward. The whole of the buildings will be built on arches. The pavilions are built of Bridgewater bricks with Portland stone dressings. The floors and ceilings are fireproof, and the walls have been built to carry another story if necessary. The whole of the floors are of marble mosaic. The wards are entirely separated from the kitchens and stores, &c., by the main corridor. On the south side of each pavilion there is a balcony overlooking a carriage drive. The buildings are lighted by electric light, and the water mains and electric light cables are carried in a subway under the main corridor. The new yards are connected with the old building by a temporary corridor until the future administrative block is built.

SPALDING CORN EXCHANGE ENLARGEMENT.—The enlargement of the Spalding Corn Exchange, which has been carried out by the Spalding Urban District Council, at a cost of 2,500*l.*, is now completed. The accommodation has been increased from 60 to 75. The hall has also been fitted with a permanent stage for public entertainments. The contractors for the alterations were Messrs. Turner & Sons, of Wainfleet. The architect is Mr. Corby, of Stamford.

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SANITARY AND ENGINEERING NEWS.

SEWERAGE SCHEME, CONISBOROUGH, YORKSHIRE.—A Local Government Board inquiry into an application by the Doncaster Rural District Council for sanction to borrow 10,000*l.* for purposes of sewerage and sewage disposal for the contributary places of Conisborough and Denaby was held by Mr. E. A. Sandford Fawcett, at Conisborough, on the 14th inst. The scheme, which has met with considerable opposition, was explained by Mr. D. Balfour, of Messrs. Balfour & Son, Newcastle-on-Tyne.

SOUTHWOLD SEWERAGE SCHEME.—The Local Government Board have sanctioned a loan for thirty years for the construction of anaerobic beds and bacteria oxidation polarite filters for the treatment of the whole of the sewage of Southwold; also a loan for twenty years for the erection of a small refuse destructor of a new design, to which we hope to refer at an early date. The bacterical oxidation polarite filters are wholly on the aerobic system, the sewage being distributed over the beds by Candy automatic revolving sprinklers, whereby large volumes can be rapidly oxidised and the effluent charged with as much dissolved oxygen as is present in many of the best drinking waters. The engineer for the scheme is Mr. F. Ball, of Southwold.

STRATTON SEWERAGE.—An inquiry was held at the board-room of the workhouse at Stratton St. Margaret, on the 15th inst., before Colonel A. J. Hopper, R.E., one of the Inspectors of the Local Government Board, into the application of the Highworth Rural District Council for sanction to borrow 11,500*l.* for works of sewerage and sewage disposal for the parish of Stratton. The scheme was explained by Mr. H. Bertram Nichols, of the firm of Messrs. Beesley, Son, & Nichols, of Westminster, the engineers to the scheme. The population to be dealt with is about 4,000, and the scheme of sewage disposal is on the bacterial system.

DOCK SCHEME, DOVER.—A scheme of dock extension has been announced by Sir William Crundall, a Commissioner of the Dover Harbour Board. It was recently proposed that a scheme involving an outlay of 600,000*l.* on dock improvements should take place; but after further consultations, the Commissioners decided to increase the powers asked for by the Bill they are promoting to 1,000,125*l.* Berths are to be constructed which will accommodate vessels as large as the *Oceanic*, new quay space of 14 acres being provided. The Hamburg, Bremen, Antwerp, Amsterdam, and Rotterdam lines to America have intimated to the Harbour Board their intention to call at the port on completion of the improvements. Sir William Crundall announced that the railway companies have agreed to an additional poll-tax, which will provide the funds for this great dock extension. These works are entirely distinct from the National Harbour at Dover, on which the Government is spending 4,000,000*l.* Altogether the new town and railway schemes will involve an additional outlay of nearly 2,000,000*l.*

MISCELLANEOUS.

DRAINAGE BY-LAWS FOR LONDON.—At the meeting of the Council of the Sanitary Assurance Association, held at the offices, 5, Argyll-place, Regent-street, on the 12th inst., Mr. Andrew Stirling in the chair, the new drainage by-laws, as drafted by the London County Council, were under consideration, and on the motion of Mr. W. S. Halsey, seconded by Dr. E. H. Willoughby, the following resolution was passed:—"That, in the opinion of the Council of the Sanitary Assurance Association, the drainage by-laws proposed by the London County Council ought to be submitted to the New Metropolitan Borough Councils before they receive the force of law, and that the President of the Local Government Board be requested to submit the proposed by-laws to the said Councils before deciding as to their confirmation."

BUILDING AT EASTBOURNE.—The maintenance of activity in the building trade in Eastbourne is remarkable. At a rough computation, about 2,000 new properties have since the last census been added to the town, which is rapidly spreading in all directions; nor is this development entirely a reaching out, for in the central district, where old properties are giving place to new, the few available open spaces are being eagerly taken possession of. At Old Town a new colony of bricks and mortar has come into existence, and at the present moment the seclusion of Love-lane is under threat of immediate invasion; at Seaside, the region of Klondike has yielded a plentiful crop, and range after range of new dwellings point the way to the Crumbles. Willingdon has lately come more nearly into touch with the town, and, whatever its administrative future, will soon attain to practical incorporation with Eastbourne. In the meantime, a great business improvement has been effected in Seaside-road, which will become more manifest when the fine shops there constructed are all occupied; and in and at the rear of Grove-road and at the corner of Water-lane the work of demolition or reconstruction of old property, of excavation for new premises, and the erection of these is being vigorously proceeded with.—*Sussex Daily News.*

CARDIFF NEW ASYLUM.—At a meeting of the Asylum Committee of the Cardiff Corporation on the 12th inst. the Town Clerk read further letters with regard to the plans sent in by one of the competitors, Mr. Kirkland, who had been selected as "one of the six" by the assessor, Mr. Hine. It will be remembered that the Committee offered premiums to induce architects to send in plans for the proposed new asylum at Velindra. Six were to be selected from the total, and the selected architects were to enter a second competition. The ultimate winner would get the premier awards, and the other five would receive premiums of 100 guineas each. Since the award was made, the Committee had been informed that Mr. Kirkland had been in Mr. Hine's service, but at the time the plans were sent in he was engaged in Cornwall. The Committee felt that it would be better that Mr. Kirkland should withdraw, and wrote to him to that effect. He replied, offering to withdraw upon certain terms, which the Committee at their last meeting refused. Mr. Kirkland now wrote withdrawing his offer to withdraw, and Mr. Hine sent a letter, marked "confidential," in which he contended that, as there was nothing about Mr. Kirkland's entry that could be objected to under the conditions of the competition, he could not reject the plans. He thought that Mr. Kirkland's terms should be accepted, intimated that if the Committee rejected the plans he should have to retire, and pointed out that this would cause considerable trouble. The Committee, without committing themselves to any course, asked the Borough Engineer to visit and discuss with the two gentlemen in question. The Committee's leaning, however, was to settle the matter by rescinding their former resolution and adopting Mr. Kirkland's offer.—*Western Mail.*

THE ROMAN PAVEMENT AT DORCHESTER.—A Roman pavement has been discovered at Dorchester. It has been purchased by Mr. Alfred Pope, a member of the Dorset Antiquarian Society, and presented by him to the Dorset County Museum.

OPEN SPACES.—The Sumner-road recreation ground has been opened to the public. The site, covering half an acre, was acquired by the St. Giles Camberwell Vestry, for 1,000*l.*, towards which sum the London County Council contributed 500*l.*; the Metropolitan Public Gardens Association laid out the ground at an expense of 300*l.* The London County Council have agreed to contribute not more than 2,800*l.*, being half the computed cost, towards the acquisition of the Home Park Estate, extending over eight acres, at Lower Sydenham. A few days ago the Hornsey District Council, having already voted 35,000*l.*, resolved to subscribe 2,000*l* of the balance required for the purchase of the Alexandra Palace and grounds; a recent contribution of 2,000*l.* by the Tottenham District Council completes, we understand, the required total of 150,000*l.* On the 10th inst. the Chestnuts recreation ground was opened at Tottenham.

THE IRON GATES, CARSHALTON HALL.—We read in the *Athenæum* that the iron gates of Carshalton Hall have been sold for, it is said, 1,500*l.* They are, it seems, a replica or copy, in part, of one of the designs depicted in plate 20 of the reprint of Jean Tijou's very rare work, "New Book of Drawings," with letterpress by Mr. Starkie Gardner (Batsford, 1896). The design is described as being for two panels of the screen at Hampton Court, with a pair of gates and pilasters.

THE METROPOLITAN POLICE-COURTS.—It is well known that the London police-courts are quite inadequate in both their number and the accommodation they provide to meet the increasing requirements of the Metropolis. In terms of the Act 60 and 61 Vict., c. 26, the courts were transferred from the charge of the First Commissioner of Works to that of the Receiver for the Metropolitan Police District, with authority to him to borrow 200,000*l.* for additional buildings, &c. It is announced that a new police-court is about to be built in Shoreditch, with two courtrooms, to replace that in Worship-street; another at Clerkenwell, adjoining the present one; one in Tooley-street, with two courts and a police-station, near the Tower Bridge south approach; and one for Westminster. Some greatly-needed improvements are also about to be carried out at the Thames, Lambeth, and Marlborough-street Courts. Mr. Dixon Butler is, we believe, the Official Architect to the Receiver for the Metropolitan District, which extends for a considerable distance around London.

THE INSTITUTE OF SANITARY ENGINEERS.—At a meeting of the Election Committee, held on the 14th inst. the following were elected:—As Members: Messrs. T. R. Atkinson, Penrith; F. B. Howarth, Sedgley, near Dudley; H. E. Milton, Gravesend. As Associates: H. J. Hammick, Stonehouse, Plymouth; H. P. James, Chesham; J. Jenkins, Harlow; E. Vittorio, Surbiton.

THE STRAND IMPROVEMENT SCHEME.—At the Westminster Guildhall, on the 21st inst., Messrs. Thurston & Co., billiard-table makers, of Catherine-street, Strand, were awarded by a special jury 9,237*l* damages for the compulsory acquisition of their business premises by the London County Council in connexion with the Strand improvement scheme. The claimants had occupied the same house in Catherine-street since the year 1814.

UNDERGROUND TRANSFORMATION.—Parliament early next session will be asked to pass a Bill, it is stated, sanctioning agreements between the British Westinghouse Company on the one hand and the Metropolitan and District Companies on the other for the introduction of electrical traction on those systems. The British Westinghouse Company, who are promoting the Bill and finding the capital in the first instance, will take over the systems while the conversion is being made, and they will ask for authority to suspend temporarily the running powers vested in the London and North-Western, Midland, Great Western, Great Northern, and South-Eastern and Chatham Companies. Traffic, however, will be conducted over both systems during the time the company are engaged in the adaption, although to a much more limited extent. The work is expected to be well in hand by the latter part of next year.

REREDOS, ST. SIMON AND ST. JUDE'S CHURCH, LIVERPOOL.—On the 2nd inst. a reredos was unveiled in the Church of St. Simon and St. Jude. The tabernacle work of the reredos extends entirely across the chancel, a width of 28 ft. Its greatest height is 15 ft. The centre portion, immediately behind the communion table, and standing in front of the three centre lights of the main east window, contains, in the centre panel of rough marble, the monogram "I.H.S." and "This do in remembrance of Me." The two side panels of Connemara green marble bear the letters "A" and "O." Opposite the side lights of the east window there are two panels in rouge marble, one lettered with the Lord's Prayer and the other with the Creed. These five panels are recessed with carved columns, buttresses, tracery, pinnacles, and pediments, extending on both sides of the communion-table down to the chancel floor level. On each side of this central reredos there are two panels of rich rouge marble, upon which the Ten Commandments are lettered in Old English text, and one panel of Pavonazzo marble, the carved work being carried out to match the central reredos. Caen stone is the material used for framing the two panels. The work has been carried out by Messrs. John Stubbs & Sons, Liverpool, from designs made by the architect of the church, Mr. George Bradbury, the Diocesan Surveyor.

UNDERGROUND ELECTRIC RAILWAYS.—The Central London Railway have given notice of a Bill to be presented to Parliament during the coming session to enable them to construct a double line from the Bank Station to a new station to be made under Liverpool-street Station. A small extension is also proposed to be made at Shepherd's Bush.—Two schemes for underground electric railways will, it is stated, be shortly placed before Parliament. The new lines will be known as the King's-road Railway and the North and South Junction Railway. The King's-road Railway will be three miles long, and will be run from Victoria to Parsons-green, and the North and South Junction Railway will run from Paddington, via the Marble Arch, Hyde Park Corner, Victoria, Vauxhall, Kennington Oval, to Kennington Park, a distance of nearly five miles.

THE CARPENTERS' COMPANY EXAMINATIONS.—The Carpenters' Company held their annual examination in sanitary building construction during last week in their hall. Though the number of candidates was somewhat less than last year, the average of merit of the papers is more than kept up, the marks gained being higher than ever before. The board of examiners included Professors T. Roger Smith and H. E. Robinson, Messrs. John Slater, F.R.I.B.A., A. Wynter Blyth (M.O.H. Marylebone), and W. H. Seth-Smith (President of the Architectural Association). The board has awarded the same number of medals as last year. The following is the list of successful candidates arranged in order of merit:—

Mr. W. H. Johnson, Mr. Jno. Sanderson	*aeq.*	Gold medals.
Mr. C. B. Burnett, Mr. Hugh Byron	*aeq.*	Silver medals.
Mr. F. C. Brown, Mr. W. J. Collins, Mr. J. S. Knight, Mr. J. I. Lonnen	*aeq.*	Bronze medals.
Mr. J. W. Devonshire.		
Mr. E. W. F. Martin.		
Mr. Joseph Rees, Mr. A. W. Stiles, Mr. Robert Phillips, Mr. W. T. Sweett.	*aeq.*	
Mr. Allan Storey.		
Mr. W. H. Gale.		
Mr. A. J. Griffiths.		

The names of candidates who sat to improve their positions, but who failed to do so, do not appear in the above list.

THE DISTRICT MESSENGER CO.—The Postmaster-General has intimated that the views of his Department in regard to the District Messenger system are so far modified that he consents to grant them an additional term of five years. As this extension with the prospect of its revocation at the end of that period, is not satisfactory, the company have secured the support of several Members of Parliament to a Bill which will confirm their privilege permanently. It is to be hoped this measure will be passed, as the District Messenger Company is undoubtedly an institution of great service to the public.

A PROPOSED FIREPROOFING EXHIBIT.—An important feature of the coming Building Trades Exhibition next year will be a special section devoted solely to fire-resisting materials, methods of

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construction, and appliances. This section, which will form the first collective exhibit of its kind, is to be organised by the Executive of the British Fire Prevention Committee. A separate hall has been set aside for the fireproofing exhibits, and the space in this hall has been very carefully set out, so that there will be a possibility of a thoroughly practical display on the part of the firms interested. A special sub-committee is being formed by Mr. Edwin O. Sachs, the chairman, in conjunction with Mr. F. R. Farrow, who presides over the Commercial Section of the British Fire Prevention Committee; and it is proposed to issue invitations to the leading authorities on fire protection, &c., throughout the country to participate by attendance and otherwise in the Exhibition in question. The whole of the business arrangements will be in the hands of Mr. Montgomery, of Essex-street, Strand, the organiser of the Building Trades' Exhibition, but all questions of scientific interest and practical display will be in the hands of the Fire Prevention Committee, with the view of making the section thoroughly useful to the architectural, surveying, and engineering professions, as well as to the Local Authorities and insurance companies. The Fire Prevention Committee will themselves exhibit a model of their testing station, reports, photographs, &c., and will prepare a special technical catalogue and analysis of the section in question.

CAPITAL AND LABOUR.

EMPLOYMENT IN THE BUILDING TRADES DURING OCTOBER.—The *Labour Gazette* for November reports that employment in the building trades during October remained fairly good in most branches. The percentage of unemployed union members among carpenters and plumbers at the end of the month was 2·5, compared with 2·1 in September and 1·1 in October last year. The trades in London are described as being "scarcely so busy." Returns from 185 branches of eight unions paying unemployed benefit, with a membership of 13,730, show that 378, or 2·8 per cent., were unemployed, compared with 1·6 per cent. in September and 0·9 per cent. in October, 1899. The stonecarvers describe employment as good, the plumbers as moderate, the carpenters and joiners and stonemasons as fair, the bricklayers and painters and decorators as dull, and the plasterers as bad. Two disputes commenced during the month, one at Leeds and one at Tamworth. The Leeds dispute affected eighty-nine bricklayers, and was as to provision of accommodation for meals, increase in wages on account of distance from work, and other matters. The demands were granted after the dispute had lasted thirteen days. The dispute at Tamworth affected sixty-four builders' labourers who required an advance in wages from 5½d. to 6d. per hour. The dispute lasted eight and a half days, and was settled by an advance of ½d. per hour being granted.

DEPRESSION IN THE ABERDEEN BUILDING TRADE.—A depression in the building trade at Aberdeen has to be chronicled at the present time, and an unfortunate consequence is that because of this, along with other causes, it is calculated that about 200 masons in the city are out of employment. Happily trade in the monumental line is fairly brisk, but things in the building line have been dull for a considerable time back. It is anticipated, however, that there will be an improved out-look in the spring as a large number of big building contracts will have to be gone on with before long. Amongst the number will be the new lunatic asylum, the new electric station, the new Post Office in Crown-street, &c. It is reported that a large number of masons are out of employment in other towns in Scotland. Edinburgh masons are likely to have a hard time the coming winter. Speculative building has been overdone in the outskirts of the city, the labour market is unsettled generally, and employers are besieged with applications for work. It is estimated that nearly a thousand operatives are idle just now, and after the recent prolonged and unfortunate strike a period of trade depression is one of the worst things that could happen to them.—*Aberdeen Free Press.*

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

14,813.—LIFTS FOR STAIRWAYS, &C.: *F. W. Reno.*—From one floor to the other next above it extends a latticed girder frame, at the ends of which are mounted sprocket wheels over which a conveying-band passes, the band being composed of grooved slats that are bolted through their flanges on to the chain links, and the slat-ends having rollers that run in angle-iron guides; in order that the band may be lifted for a certain distance from the guides, and may automatically take up any slack, the idle sprocket-wheel is formed with a diameter less than that of the driver; for a tread, affording a practically horizontal surface, transverse rubber-faced blocks are fastened on to the slats, whilst an endless chain that is driven with the conveying-band and is passed around sprocket-wheels constitutes a travelling hand-rail which rides within guides; for driving the shaft by means of a train of spur-gearing a motor is made fast to a base-plate upon the upper floor.

14,825.—A SELF-CLOSING VALVE: *P. K. Haidin.*—Rubber and metal rings at the top of a casing (into which the supply-pipe enters) provide a seating for a ball of cork, or other suitable material, which is to be pushed down, for the opening of the valve, with a sliding plunger, by the pressure of a flexible diaphragm when operated upon by a thumb-push within the upper portion of the valve's casing.

14,852.—A METHOD OF MOULDING BRICKS: *T. Griesemann.*—After the clay has been passed from between a pair of rollers within the hopper it is mixed by means of knives and blades arranged within cone-shaped boxes and a round chamber; at each side of the latter is an outlet die or mouthpiece, and as the stream of clay emerges from the outlet it is cut into bricks. Pulleys and toothed gearing drive the pug-mill shaft from one end or both.

14,869-70.—TRAPS FOR DRAINS AND SEWERS, AND VENTILATION APPLIANCES: *G. S. Morgan and W. Williams.*—The flap-valves that act as traps are fashioned in sections which are hinged to one another so that they shall rise in turn together with the rising of the sewage level; the arrangement enables a smaller free opening for the back-flow of the gas to be used. For purposes of ventilation, the inventors divide the sewer into sections with their flap-valves and provide a ventilating shaft for each of the sections; the shaft consists of an exhaust pipe which is set concentrically within an inlet pipe whose top is not as high as that of the exhaust pipe and is furnished with a cap having side openings covered with non-return flap-valves. The inlet pipe is divided into two parts so as to constitute two shafts that will communicate with different sections of the sewer, whilst the exhaust pipe is joined to only one section through an opening made in the side of the inlet pipe that surrounds it.

14,950.—FIRE EXTINCTION AND DISINFECTION: *T. A. Clayton.*—Closed apartments are to be fumigated for purposes of extinction of fire or disinfection with a fumigating apparatus that comprises a fan which impels air through a pipe into a furnace so that it may form sulphur dioxide in its current over trays of melting sulphur; the mixed gas is then directed through a pipe to the bottom of a trap-chamber and thence through pipes again to the compartment which contains the fan. Before air is readmitted into that compartment the gases already within it should be cooled by causing them to go through a water-tank furnished with supply and overflow pipes, and arranged around a by-pass communicating with the water-tank.

14,952.—A WATER-LEVEL INDICATOR: *C. Strutt and O. Hockey.*—To a crank-shaped rod is affixed a float; the rod's end carries an indicating arm at whose end is a pivotted disc, of which the horizontal diameter will always rest in the plane of the water-level, and which is weighted so as to cause one same diameter to be always horizontal and to indicate the level. The indicating-arm may travel over a scale, in which case the disc can be discarded and its movements may be transmitted by means of levers, links, &c., to a record-register at a distance.

14,962.—A PIPE-WRENCH: *N. Williams.*—Upon a piece for which a housing is fashioned in the upper jaw's stem is mounted a screw that will engage with threads upon the lower jaw's stem which is passed through slots cut in the housing and in the piece, and may be rocked together with the piece in its housing—the rocking motion being suitably limited.

15,014.—TILES FOR ROOFS: *F. G. Cox.*—Of two tiles taken together one has at its one edge a recessed rib that will engage with and fit over the rib of the other and adjoining tile, and beneath its lower edge a rib that will lie under a corresponding rib formed upon the upper edge of the tile next underneath it, a rabbet cut along the upper end of the rib of the under tile takes the lower end of the recessed rib along the edge of the upper tile.

15,025.—A METHOD OF MOUNTING CIRCULAR SAWS: *F. Hill.*—In order to prevent a "flush-side" saw from buckling, &c., a packing of some imperishable material is put between the saw and the plate on to which it is rivetted. For the packing may be used sheet metal, or sheet-gauze, or woodite, so as to constitute a surface that will yield to irregularities upon the saw's side towards the plate, and the plate is caused to abut against a shoulder projecting from the spindle.

15,034.—A CONTRIVANCE FOR USE IN THE TEACHING OF DRAWING: *W. T. Perry and W. G. Tye.*—A contrivance to be used in the teaching and testing of model and perspective drawing consists of a metal, or celluloid, or other frame in the middle of which is cut an opening with rounded sides, whilst the frame's turned-up edges serve as guides for a vertical slide, a wire pointer is pivotted on to a stem which equally divides the opening and another pointer is pivotted on to a projection of the vertical slide. In use the frame is to be held by the pupil at arm's length, so that he may obtain a measure of the object by means of the slides and their attached scales, and may measure the angles and receding faces by an adjustment of the two pointers.

15,041.—CONSTRUCTION OF SCAFFOLDING: *R. F. Bungard.*—Two scaffold poles may be secured to one another angle-wise by means of a pair of chains which are fastened at right angles to another pair of chains that are joined with links to the clips, of each pair of clips one clip has a slot or lengthened bolt-hole, and the other clip will take a bolt through its screw-threaded bore. For joining two poles together lengthwise parallel chains and clips are employed, the bolt may be passed into an open slot in the one half-clip from its pivot upon the other half-clip.

15,080.—A REFRACTORY SUBSTANCE FOR BUILDING AND OTHER PURPOSES: *A. G. Salamon.*—By way of an improvement of the process specified in No. 4,628 of 1898, the inventor rejects, either wholly or partially, the use of sodium bicarbonate, and employs bicarbonate of calcium, or of strontium or magnesium, which he prepares by hanging the chalk or carbonite of the alkaline earth in water and directing a current of carbonic acid gas through it until the solution has become fairly clear. Asbestos that has already been mixed with chalk and impregnated with sodium silicate solution is saturated with the resultant liquid, then the sodium monocarbonate is washed out and the material is dried.

15,094.—AN APPLIANCE FOR DRAWING-COMPASSES: *G. Tucker and G. Daws.*—For locking the pivot of the legs when they have been adjusted, the barrel which holds the pencil is formed out of a metal blank that is cut to a particular shape, the ears of the cut blank being bent backwards so that they shall take the end of the other leg and being pierced for the shank of a turn-button; in one of the ears is formed a wedge or incline in such a manner that when the button has been turned parallel to the pencil the legs become locked in position.

15,102.—TILES, CEMENTS, BUILDING-BLOCKS, SLATES, &C.: *F. C. Sellars.*—A plastic compound is made of ground slate waste or refuse mixed up with silicate of soda, silicate of potash, or a solution wherein an acid has precipitated the silica. After they have been moulded into their several shapes the dried articles are treated with sulphuric acid, hydrochloric acid, alumina, silicate of soda, or with a solution of silicate of soda and a salt of iron. The composition is specified as being available for use as a fireproof mortar or cement, either with or without the admixture of Portland or some other cement in small quantities, for the moulding of hearthstones *in situ*, or for roofs, walls, partitions, and so on.

15,165.—MEANS OF ESCAPE FROM FIRE: *F. Whiteley.*—The links of folding-ladders are jointed to one another with rungs, and the ladders will slide in channel-iron guides laid upon the floors, being fitted with racks that gear with pinions to be turned with a hand-wheel and toothed gearing. To each ladder's inner end is attached a platform, and a continuous ladder from the top of the building to its base is formed by the engagement of the rungs of the section below with the lower ends of the upper ladders. In another modification of the apparatus the ladder is caused to slide within a frame mounted upon the guides, when it is lifted and taken away it is caused to slide within the frame until the topmost rung touches a double hook pivotted on to the frame, then both the ladder and frame will slide with one another in the guides.

15,224.—A FLUSHING APPARATUS: *S. H. Adams.*—Two compartments, whereof one supplies the other by means of a cock, constitute the siphon flushing-tank; an auxiliary inlet from the bell siphon extends into one division or compartment. The siphon is fitted with an inlet air-vent pipe whose outlet is sunk below the water-level, and also with a deep trap at the foot of its longer leg. The air becomes compressed with the rising of the water-level, until the seal in the inlet air-vent pipe has been forced out by the increased pressure, and the siphon's action is thereupon started. Under certain modified applications of the principle involved, an auxiliary starting-siphon may itself be started by means of the overflow in the main siphon, and, when the smaller siphon shall have exhausted a little container, air is admitted for arresting the larger siphon's action; or else a second siphon may be substituted for the bell-siphon's auxiliary inlet, the vent being depressed into a separate pocket of water set beneath the flushing-tank.

MEETINGS.

FRIDAY, NOVEMBER 23.

Architectural Association.—(Joint meeting with the Institution of Junior Engineers).—Mr. A. T. Walmisley on "The Use of Rolled Joists in Construction." 7.30 p.m.

Glasgow Architectural Craftsmen's Society.—Mr. W. U. Muir on "Duties of a Clerk of Works." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—8 p.m.

SATURDAY, NOVEMBER 24.

London and Provincial Builders' Foremen's Association (Memorial Hall, Farringdon-street, E.C.).—Monthly Meeting. 7.30 p.m.

MONDAY, NOVEMBER 26.

Surveyors' Institution.—Mr. A. T. Walmisley on "The Roofing of Farm Buildings." 8 p.m.

Society of Arts (Cantor Lectures).—Professor J. A. Fleming, F.R.S., on "Electric Oscillations and Electric Waves." I. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. P. Manby on "The hygiene of byres, lairs, cow-sheds, and slaughter-houses, and all places where animals destined for the supply of food are kept; and the hygiene

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of markets, dairies, and other places where food is stored, prepared, or exposed for sale, and transported." 8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. A. T. Bolton on "The Dome as the Basis of an Architectural System." 6.30 p.m.

TUESDAY, NOVEMBER 27.

Institution of Civil Engineers.—I. Paper to be further discussed: "The Metropolitan Terminus of the Great Central Railway," by Messrs. G. A. Hobson and E. Wragge; II. (time permitting) Mr. Oscar Guttmann on "Machinery for the Manufacture of Smokeless Powder." 8 p.m.

Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at the Metropolitan Cattle Market, York-road, N.

WEDNESDAY, NOVEMBER 28.

St. Paul's Ecclesiological Society.—Rev. T. Perkins on "Wells Cathedral," illustrated by lantern views. 7.30 p.m.

City of London College Science Society (White-street, Moorfields, E.C.).—Mr. W. J. Tennant on "Wrinkles in Patent Law and Practice." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—8 p.m.

Institution of Civil Engineers.—Students' visit to the London and South-Western Railway Locomotive Works, Nine Elms. 2.30 p.m.

Northern Architectural Association.—Mr. F. Baker, C.E., on "The Armour and Costumes of Mediæval Times." 7.30 p.m.

FRIDAY, NOVEMBER 30.

Architectural Association (Discussion Section).—Paper by Mr. F. G. W. Buss, entitled, "Is the Quantity Surveyor a Necessity?"

Institution of Junior Engineers (Westminster Palace Hotel).—Inaugural meeting of twentieth session. Sir Lowthian Bell, Bart., F.A.I., will deliver his presidential address. 8 p.m.

Architectural Association of Ireland (Technical Demonstrations:—II.).—Messrs. Edmund and A. P. Sharpe on "Building and Decorative Stones." 4.30 p.m., at 17, Great Brunswick-street.

SATURDAY, DECEMBER 1.

Dundee Institute of Architecture.—Mr. J. J. Henderson on "Grammar of House-planning." 7 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 8.—By JOSHUA WALKER (at Bawtry).

Everton, Notts.—House, three cottages, and o a. 3 r. 29 p., f. £475
Freehold house and 96 a. 2 r. 13 p. 1,349
Various enclosures, 48 a. 3 r. 25 p., f. 1,169
Mattersey, Notts.—Enclosure of land, 5 a., f. 132

November 9.—By HEPPER & SONS (at Leeds).

Leeds.—155 and 157, Woodhouse-lane, f., r. 105*l.* 3,490
Back Ibbetson-pl., cottage, stables, and plot of land, f., r. 30*l.* 800
48 to 54 (even), Burley-st., f. 850
24, Kirkgate, and 6, New York-st., f., r. 80*l.* 3,025
3 to 12, Danby-court, and 23, Crown-st., f. 1,220
24, 26, and 28, George-st., and 1 to 6, Chambers-yard, f. 1,600
17 to 19, Bridge-end, f., r. 180*l.* 4,000
Black Bull-st., a plot of building land, area 1,525 yds., f. 3,355
10, Brunswick-pl., f., r. 32*l.* 615
14 and 15, Brown's-sq., f. 345
71 to 77 (odd) and 81, Skinner-la.; also the Plasterer's Arms b.-h., f. 3,010
Sheepscar Beck, a block of land, area 1,461 yds., f. 1,260
Hobberley-la., four copyhold cottages 555
Thorner, Yorks.—The Holes Farm, 27 a., o r. 1 p., f. 1,700
Wetherby, Yorks.—A close of land, 1 a. 2 r. 32 p., f. 280

November 12.—By WM. WESTON.

St. Pancras.—68, Euston-st., u.t. 19 yrs., g.r. 18*l.*, r. 40*l.* 180
Paddington.—245, Harrow-rd., u.t. 44 yrs., g.r. 10*l.*, r. 95*l.* 1,102

By ROGERS BROS. (at Peckham).

Peckham.—10, 12, 13, and 14, Piermont-rd., u.t. 78 yrs., g.r. 23*l.* 10s. 1,310
Dulwich.—3, Rye-villas, u.t. 78 yrs., g.r. 7*l.* 7s., r. 36*l.* 340
52 and 54, Henslowe-rd., u.t. 78 yrs., g.r. 10*l.* 420
Camberwell.—10, Vicarage-rd., u.t. 50 yrs., g.r. 7*l.*, r. 52*l.* 375

By MARGETTS & TOWNLY (at Cricklewood).

Willesden Green.—Villiers-rd., Aberdeen House, f., r. 132*l.* 12s. 995
Neasden.—5, 6, and 7, London-ter., u.t. 81 yrs., g.r. 25*l.* 4s., r. 90*l.* 795

By JENKINS & SONS (at New Cross).

Lewisham.—3, Beacon-rd., f., r. 50*l.* 770
Welling, Kent.—1 to 7, Albert-grove West, f. 860
1 to 6, Albert-grove East, f. 760
1 to 9, Albert-place, f. 1,995
New Cross.—39, Lewisham High-road, u.t. 30 yrs., g.r. 10s., r. 45*l.* 555
Deptford.—83 to 89 (odd), Childers-st., u.t. 46 yrs., g.r. 8*l.* 835
169 to 175 (odd), Childers-st., and 98, Rolt-st., u.t. 65 yrs., g.r. 20*l.* 1,140

November 13.—By DEBENHAM, TEWSON, & CO.

Chelsea.—63, Cheyne-walk and 3 and 4, Cross Keys-yard, area 3,500 ft., f., r. 92*l.* 2,460
Clapton.—34, Almack-rd., f., r. 35*l.* 610
Rushmore-rd., f.g.r. 5*l.*, reversion in 70½ yrs. 135

By COOK, SMITH, & WAGHORN.

South Lambeth.—18 to 30 (even), John-st., u.t. 60½ yrs., g.r. 24*l.* 10s. 1,245

By E. H. HENRY.

Battersea.—48, York-rd., u.t. 66½ yrs., g.r. 7*l.* 19s. 11d., r. 36*l.* 250
Clapham.—25, Cautley-avenue, u.t. 48 yrs., g.r. 14*l.*, r. 50*l.* 500
Macaulay-rd., Stagshaw, u.t. 72 yrs., g.r. 21*l.*, e.r. 100*l.* £1,000
6, Durand-villas, u.t. 96 yrs., g.r. 12*l.*, e.r. 55*l.* 565
Chiswick.—40, Oxford-rd., u.t. 66 yrs., g.r. nil, r. 55*l.* 550
Beckenham.—80 and 82, Ravenscroft-rd., u.t. 70 yrs., g.r. 10*l.* 290

By PROTHEROE & MORRIS.

Tottenham.—894 and 896, High-rd., f., r. 38*l.* 935
1 to 4, Waggon-lane, f. 400
Leytonstone.—40, Wallwood-rd., f., r. 38*l.* 525
Leyton.—25, Tyndall-rd., u.t. 86½ yrs., g.r. 4*l.* 10s. 210

By ROGERS, CHAPMAN, & THOMAS.

Chelsea.—116, Marlborough-rd., f., r. 100*l.* 1,925
Pimlico.—50, 60, and 64, Sussex-st., u.t. 33 yrs., g.r. 27*l.*, r. 165*l.* 10s. 1,300
168, Lupus-st., u.t. 33 yrs., g.r. 9*l.*, r. 52*l.* 10s. 400
South Kensington.—5, Waligrave-rd., u.t. 58 yrs., g.r. 5*l.*, r. 36*l.* 370

By G. B. HILLIARD & SON (at Billericay).

Billericay, Essex.—High-st., &c., six freehold cottages 575
Back-lane, three freehold cottages 125

By WILLIAM ROLFE (at Masons' Hall Tavern).

Aldersgate.—Bartholomew-close, the Goldsmiths' Arms p.h., u.t. 39 yrs., r. 150*l.*, with goodwill 1,600
Notting Hill.—Portobello-rd., the Freemasons' Arms p.h., u.t. 44 yrs., r. 100*l.*, with goodwill 1,720

November 14.—By ARTHUR BARTON.

Hoxton.—76 and 78, Gopsall-st., u.t. 35½ yrs., g.r. 11*l.*, r. 72*l.* 505
Dalston.—23, Brougham-rd, u.t. 42½ yrs., g.r. 3*l.* 10s. 260
Walthamstow.—68 and 70, Milton-rd., and 19 to 22, Aubury-rd., f. 1,070

By W. J. BEARD.

City of London.—2, Pancras-lane, u.t. 56½ yrs., g.r. 145*l.*, r. 395*l.* 2,950

By W. EYDMAN & SON.

Kensington.—152, Addison-gdns., u.t. 96½ yrs., g.r. 10*l.*, r. 65*l.* 690

By HAROLD GRIFFIN.

Battersea.—2 and 3, Millgrove-st., u.t. 67 yrs, g.r. 8*l.* 365
37, Bridge-rd. West, u.t. 34½ yrs., g.r. 5*l.*, r. 26*l.* 205
42 and 43, Linda-st., u.t. 43 yrs., g.r. 4*l.* 11s. 405

By ROBINSON & SONS.

Mortlake.—56, 58, and 60, High-st., f., r. 83*l.* 1,690
1 to 4, Jubilee Cottages, f. 1,000
1, 2, and 3, Senior-pl., f. 340
Putney.—1 and 2, Priest-bridge, f. 700
Barnes.—High-st., the Waterman's Arms b.-h., f., r. 50*l.* 1,500

By TOWERS, ELLIS, & Co.

Kennington.—Dolland-st., f.g.r. 85*l.*, reversion in 55 yrs. 1,800

By WESTON & SONS.

Brixton.—251, Brixton-rd., u.t. 42½ yrs., g.r. 11*l.*, e.r. 75*l.* 720
2 to 16 (even), Eastlake-rd., u.t. 64 yrs., g.r. 32*l.*, r. 296*l.* 3,370

By DOUGLAS YOUNG & CO.

Catford.—Laleham-rd., the Catford Sports Ground, 9 a. 2 r. 28 p., f. 7,500
Old Kent-rd.—Nos. 575, 577, 579, and 581, f., r. 205*l.* 3,300
Lovegrove-st., Kent Cottage, f. 300
Clapham.—21, Chelsham-rd., u.t. 62 yrs., g.r. 4*l.*, r. 50*l.* 640

By WYATT & SON (at Chichester).

Donnington, Sussex.—A freehold house and 1 a. o r. 10 p. 310
Westbourne, Sussex.—A freehold meadow, 4 a. o r. 22 p. 200

November 15.—By H. J. BLISS & SONS.

Brixton.—332, Coldharbour-lane, u.t. 52 yrs, g.r. 4*l.*, r. 40*l.* 470
Mile End.—83 to 87 (odd), Burdett-rd., f., r. 125*l.* 1,510
9, Maplin-st., u.t. 34 yrs., g.r. 5*l.*, e.r. 50*l.* 270
Hackney Wick.—276 and 278, Wick-rd., u.t. 37 yrs., g.r. 5*l.* 10s., r. 56*l.* 500
Hackney.—7 to 11, Blanchard-st., u.t. 47 yrs., g.r. 25*l.* 1,125
5, New-st., u.t. 47 yrs., g.r. 5*l.* 235
22 and 23, Blackstone-rd., u.t. 47 yrs., g.r. 10*l.* 460

By Messrs. CRAWTER.

Cheshunt, Herts.—Appleby-st., nursery grounds, area 1 acre, beneficial lease for 12½ yrs., r. 17*l.* 170

By DOLMAN & PEARCE.

Hyde Park.—54, Gloucester-ter., u.t. 39 yrs., g.r. 10*l.* 1,660
Pimlico.—57, Cumberland-st., u.t. 37 yrs., g.r. 9*l.*, r. 57*l.* 10s. 500

By FAREBROTHER, ELLIS, & Co.

Fleet-street.—7, Bell-yard, u.t. 77 yrs., g.r. 50*l.*, r. 240*l.* 3,500
Stroud Green.—Osborne-rd., f.g.r. 28*l.*, reversion in 77 yrs. 725
Hampstead.—West End-lane, Fern and Lawn Cottages, with buildings adjoining, area 1 a., f. 5,500

By MARK LIELL & SON.

West Ham.—51 to 57 (odd), Union-rd., u.t. 75 yrs., g.r. 20*l.* 545
Upton Park.—58 and 60, Woodstock-rd., u.t. 86 yrs., g.r. 3*l.* 10s. 295

By C. C. & T. MOORE.

Acton.—65, Avenue-rd., and 13, Park-rd North, u.t. 66 yrs., g.r. 13*l.* 10s., r. 63*l.* 12s. 580
Peckham.—123 and 125, Albert-rd., u.t. 64½ yrs., g.r. 10*l.* 510
187, Albert-rd., u.t. 49 yrs., g.r. 3*l.* 290
85 to 93 (odd), Scylla-rd., u.t. 49 yrs., g.r. 7*l.* 10s. 955
Dulwich.—62, Upland-rd., u.t. 77 yrs, g.r. 6*l.*, e.r. 32*l.* 350
Poplar.—60 to 66 (even), Barchester-st., u.t. 62 yrs., g.r. 12*l.* 700

By F. S. PRIEST.

Harlesden.—128, 132, 136, 138, 140, 152 and 156, High-st., u.t. 80 yrs., g.r. 42*l.* 4,645
144, 146 and 148, High-st., u.t. 80 yrs., g.r. 35*s.*, r. 160*l.* 2,230
78, Craven Park-rd., u.t. 64 yrs., g.r. 5*l.*, r. 85*l.* 1,205
84, Craven-rd., a profit rental of 43*l.* 10s. for 63½ yrs. 485
1A, St. Mary's-rd., u.t. 64 yrs., g.r. 5*l.*, r. 36*l.* 420
1, Buckingham-rd., u.t. 80 yrs., g.r. 5*l.* 270
31 and 33, Buckingham-rd., u.t. 80 yrs., g.r. 10*l.* £1,050
Hammersmith.—33, 35, and 37, Letchford-gdns., u.t. 84 yrs., g.r. 15*l.* 650
Willesden.—5 to 8, Lennox-villas, u.t. 74 yrs., g.r. 30*l.* 1,165
Manor Park.—608, Romford-rd., u.t. 70 yrs., g.r. 6*l.*, r. 50*l.* 550

By STIMSON & SONS.

Plaistow.—31 and 33, Surrey-st., f. 250
Brixton.—68 and 70, Wiltshire-rd., u.t. 61¾ yrs., g.r. 21*l.*, r. 126*l.* 1,120
Herne Hill.—6, Milkwood-rd., u.t. 65 yrs., g.r. 6*l.*, r. 56*l.* 700
219, 225, 233, 235, 239, and 249, Milkwood-rd., u.t. 66 yrs., g.r. 30*l.*, r. 152*l.* 1,755
Camberwell.—140, Coldharbour-lane, u.t. 64 yrs., g.r. 7*l.*, r. 38*l.* 365
62 to 72 (even), Avenue-rd., u.t. 80 yrs., g.r. 30*l.* 2,150
Peckham.—236 to 242 (even), Commercial-rd., u.t. 80 yrs., g.r. 24*l.* 1,120
2, 4, and 6, Furley-st., u.t. 56 yrs., g.r. 15*l.* 700
68, Nunhead-grove, u.t. 69 yrs., g.r. 6*l.*, e.r. 28*l.* 265
59, Gibbon-rd., u.t. 43 yrs., g.r. 10*l.* 250
Forest Hill.—290, Stanstead-rd., u.t. 82½ yrs., g.r. 9*l.* 470

November 16.—By JONES, LANG, & Co.

City of London.—2, Fell-st., u.t. 44 yrs., g.r. 133*l.*, e.r. 59*l.* 3,200
Pimlico.—31, Westbourne-st. and 39, Graham-st., u.t. 20½ yrs., g.r. 18., r. 100*l.* 1,240

By FARADAY & RODGERS.

Westcliff-on-Sea, Essex.—75, Hamlet-court-rd., f., r. 152*l.* 2,564

By FISHER, STANHOPE, & DRAKE.

Stoke Newington.—70, Evering-rd., u.t. 75 yrs., g.r. 10*l.*, r. 55*l.* 600

By CHARLES VARLEY.

Dalston.—108, Greenwood-rd., u.t. 50½ yrs., g.r. 7*l.*, r. 40*l.* 110
Harringay.—3, Colina-rd., u.t. 79½ yrs., g.r. 6*l.*, r. 32*l.* 255

By WOODS & SNELLING.

Stockwell.—1 to 4, Irving-grove, u.t. 67¼ yrs., g.r. 24*l.*, r. 113*l.* 1,100
Clapham.—6 and 8, Avenue-rd., u.t. 43½ yrs., g.r. 10*l.*, r. 56*l.* 560
Peckham.—5 to 9, Dennett's-grove, u.t. 167 yrs., g.r. 21*l.* 840
Camberwell.—13, Edgecombe-rd., u.t. 76 yrs., g.r. 5*l.* 10s., r. 28*l.* 270
Stockwell.—Studley-rd., i.g.r. 22*l.*, u.t. 37 yrs, g.r. 13*l.* 165

By G. A. WILKINSON & SON.

City of London.—Monument-st., Dalmary House, area 3,150 ft., u.t. 75½ yrs., g.r. 818*l.*, e.r. 2,236*l.* 18. 7,500
16, Newgate-st., area 3,200 ft., u.t. 6 yrs., g.r. 6*l.*, r. 850*l.* 1,750
Bloomsbury.—2 and 3, Powis-pl., f., r. 36*l.* 1,350
Tottenhoe, Beds.—Fee farm rents of 4*l.* 11s. per annum 100

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 16 0	per 1,000 alongside, in river.
Rough Stocks and Grizzles	1 12 0	" " "
Smooth Bright Facing Stocks..	2 18 0	" " "
Shippers	2 6 0	" " "
Flettons.....	1 10 6	" " "
Red Wire Cuts ..	1 15 6	at railway depôt.
Best Fareham Red	3 11 6	" " "
Best Red pressed Ruabon Facing.	5 5 0	" " "
Best Blue Pressed Staffordshire ..	4 7 0	" " "
Do., Bullnose	4 12 0	" " "
Best Stourbridge Fire Bricks	4 4 6	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers.....	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers..	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamfered, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers..	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamfered, Squints	14 0 0	" " "
Seconds Quality White and Dipped Salt Glazed	2 0 0	" less than best.

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PRICES CURRENT (*Continued*).

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	,, ,,
Best Portland Cement	38 0	per ton ,,
Best Ground Blue Lias Lime	24 6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.	

STONE.

	s. d.	
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt
Bath ,,	1 7	,, ,,
Farleigh Down Bath	1 8	,, ,,
Beer in blocks	1 6½	,, ,,
Grinshill ,,	1 10	,, ,,
Brown Portland in blocks	2 2	,, ,,
Darley Dale ,,	2 1½	,, ,,
Red Corsehill ,,	2 5	,, ,,
Red Mansfield ,,	2 4½	,, ,,
Hard York ,,	2 10	,, ,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super. at rly. depôt.
,, ,, 6 in. Rubbed Ditto	3 0	,, ,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,, ,,
,, ,, 3 in. self-faced Ditto	0 5½	,, ,,

SLATES.

in. in.	£ s. d.	
20×10 best blue Bangor	11 5 0	per 1000 of 1200 at rly. dep.
,, best seconds ,,	10 15 0	,, ,,
16× 8 best ,,	6 2 6	,, ,,
20×10 best blue Portmadoc	10 18 0	,, ,,
16× 8 best blue Portmadoc	6 0 0	,, ,,
20×10 best Eureka unfading green	11 2 6	,, ,,
16× 8 ,, ,,	6 15 0	,, ,,
20×10 Permanent green	10 0 0	,, ,,
16× 8 ,, ,,	5 12 6	,, ,,

TILES.

	s. d.	
Best plain red roofing tiles	41 6	per 1,000 at rly. depôt
Hip and valley tiles	3 7	per doz. ,, ,,
Best Broseley tiles	48 6	per 1,000 ,, ,,
Hip and valley tiles	4 0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 ,, ,,
Do. ornamental Do.	60 0	,, ,, ,,
Hip tiles	4 0	per doz. ,, ,,
Valley tiles	3 9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000 ,, ,,
Hip tiles	4 1	per doz. ,, ,,
Valley tiles	3 8	,, ,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0 ,, ,,	,,
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	9 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,,	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6

PRICES CURRENT (*Continued*).

	At per standard. £ s. d.	£ s. d.
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
½ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6
Compound Girders ,, ,,	12 5 0	13 10 0
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	11 7 6	12 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	9 15 0	10 5 0
Staffordshire Crown Bars, good merchant quality	10 10 0	11 0 0
Staffordshire "Marked Bars"	13 0 0	- - -
Hoop Iron, basis price	11 0 0	11 10 0
,, ,, galvanised	17 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 5 0	- - -
,, ,, to 24 g.	12 10 0	- - -
,, ,, to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 15 0	- - -
,, ,, 22 g. and 24 g.	15 5 0	- - -
,, ,, 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 0 0	- - -
,, ,, 22 g. and 24 g.	18 10 0	- - -
,, ,, 26 g.	20 0 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 15 0	14 10 0
,, ,, 22 g. and 24 g.	14 10 0	15 10 0
Cut nails, 3 in. to 6 in.	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 5 0	- - -
Pipe in coils	20 15 0	- - -
Soil Pipe	23 15 0	- - -
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 1	- - -
Thin ,,	0 1 3	- - -
Copper nails ,,	0 1 3	- - -
BRASS—		
Strong Sheet ,,	0 0 11	- - -
Thin ,,	0 1 1	- - -
TIN—English Ingots ,,	0 1 6	- - -
SOLDER—Plumbers' ,,	0 0 8	- - -
Tinmen's ,,	0 0 10	- - -
Blowpipe ,,	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, ,, fourths	3d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths	5d. ,, ,,
Fluted sheet, 15 oz.	3¼d. ,, ,,
,, ,, 21 ,,	4¼d. ,, ,,
½ Hartley's Rolled Plate	3d. ,, ,,
⅓ ,, ,, ,,	3¼d. ,, ,,
¼ ,, ,, ,,	4d. ,, ,,

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes	0 3 1	per gallon
,, ,, ,, in barrels	0 3 2	,,
,, ,, ,, in drums	0 3 4	,,
Boiled ,, ,, in pipes	0 3 4	,,
,, ,, ,, in barrels	0 3 5	,,
,, ,, ,, in drums	0 3 7	,,
Turpentine, in barrels	0 2 7	,,
,, in drums	0 2 9	,,
Genuine Ground English White Lead	27 5 0	per ton
Red Lead, Dry	24 10 0	,,
Best Linseed Oil Putty	0 9 6	per cwt.
Stockholm Tar	1 10 0	per barrel

VARNISHES, &c.

	per gallon. £ s. d
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

H. H. & M.—J. F. W.—G. N.—W. J.—(Amounts should have been stated.) W. C. (Below our limit.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BARNSLEY.—For the erection of school buildings, Barugh Green, for the School Board. Messrs. R. & W. Dixon, architects, 5, Eastgate, Barnsley. Quantities by the architects:—

Masonry and Brickwork.—G. Rymer, Summer-lane, Barnsley*	£1,215 0
Carpentry and Joinery.—Tinton Bros., Pontefract-road, Barnsley*	400 0
Plumbing and Glazing.—E. Broley, Park-road, Barnsley*	98 10
Plastering.—M. Fleming, Eastgate, Barnsley*	50 0
Tiling.—Dawber & Son, Eastgate, Barnsley*	144 0
Painting.—E. R. Fletcher, Church-street, Barnsley*	22 16
Heating.—S. Rushforth, Eldon-street, Barnsley*	118 0
	£2,048 6

CALSTOCK (Cornwall).—For the erection of school buildings for the School Board. Mr. H. J. Snell, architect, The Crescent, Plymouth:—

Wm. Stephens	£1,650
Hobbs & Son, Liskeard, Cornwall†	1,550

CROSS KEYS (Mon.).—For additions to Waenfaur Schools, for the Risca School Board. Mr. Geo. Rosser, architect, Risca, Mon.:—

W. T. Sier	£2,196 10	Chas. H. Reed	£2,131 0
J. Pritchard, Pontymister*	2,140 0		

DURHAM.—For rebuilding Fishburn Bridge for the Durham County Council. Mr. Wm. Crozier, C.E., Shire Hall, Durham:—

Thos. Walton	£1,450 0	W. C. Atkinson, Grove-terrace, Stockton-on-Tees*	£657 8 2
Thos. Hilton	899 0		

DURHAM.—For alterations and additions to council chamber at 38, Sadler-street, Durham, for the Durham Rural District Council. Mr. Geo. Gregson, Surveyor to the Council. Quantities by the Surveyor:—

G. T. Manners	£187 0	Wm. Pratt	£108 5
J. G. Bradley	130 0	John Shepherd, Durham*	105 0
Thos. Coates	118 19		
C. W. Gibson	117 0		

HALIFAX.—For the completion of two houses, for Mr. T. H. Carter. Mr. F. F. Beaumont, architect, Southgate Chambers, Halifax:—

John Manaley & Sons, Pellon-lane, Halifax	£115
Plumber.—James Ackroyd, 46, Pellon-lane, Halifax	94
Plasterer.—Lumb Bros., King Cross, Halifax	90

JARROW.—For alterations to police-station. Mr. W. Crozier, C.E., County Surveyor, Shire Hall, Durham:—

Stewart Craig, builder and contractor, High-street, Jarrow*	£640

KENDAL.—For the construction of earthenware and cast-iron pipe sewer at Arnside, for the South Westmoreland Rural District Council. Messrs. Hoggarth Bros., engineers, 69, Highgate, Kendal. Quantities by engineers:—

E. Nelson	£500 0 0
W. Carradice	470 1 4
R. Shuttleworth	399 14 11
T. & W. Dirkin, 1, Lound, Kendal*	363 10 2
John Nicholson	355 0 0

LARNE (Ireland).—For making up Fairhill New-road for the Urban District Council. Mr. William Pinkerton, Surveyor:—

R. Apsley	£329 0 0	W. J. Robinson, Broughshane, Ballymena*	£307 19 6
W. McNeill	322 12 0		

LONDON.—For alterations to Nos. 41 and 42, High-street, Bloomsbury, W.C., for the Express Dairy Company, Limited. Messrs. Higgs & Rudkin, architects, 25, John-street, Bedford-row. Quantities by Mr. Joseph Rookwood, 25, Bedford-row, W.C.:—

Patman & Fotheringham	£3,330	Wall & Co.	£3,119
Harris & Wardrop	3,211	Snewin Bros. & Co.	3,088
Roome & Co.	3,172	J. Milroy	3,050
		Macey & Sons*	2,998

[*See also page 475.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Public Offices	Hindley U.D.C.	50*l.*, 25*l.* and 10*l.*	Jan. 18

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Sewerage Works, Sinderland	Bucklow R.D.C.	J. M'Kenzie, Surveyor, 7, Market-street, Altrincham	Nov. 27
Villas, Ashton-under-Lyne		T. George & Son, Old-square, Ashton-under-Lyne	do.
Additions to Museum, Peel Park	Salford Corporation	Borough Engineer, Town Hall, Salford	do.
Sewers, &c.	Swanage U.D.C.	T. Randell, Town Hall, Swanage	do.
Stables, &c., Stockwell Gate	Mansfield Co-op. Industrial Soc.	Vallance & Westwick, Architects, Mansfield	do.
Electric Lighting Works, Whitehall-road	Leeds Corporation	Milnes & France, Architects, 99, Swan-arcade, Bradford	do.
Road, Charminster Estate, Moordown	Bournemouth Land Society, Ltd.	W. S. Evans, 52, Old Christchurch-road, Bournemouth	do.
Street Works, Chapel House-road and other Streets	Nelson (Lancs) Corporation	B. Ball, Civil Engineer, Town Hall, Nelson	do.
Villa, Northallerton	Miss Scaife	W. Perkins, Architect, Bishop Auckland	do.
Unclimbable Railings, &c.	Leamington Corporation	W. de Normanville, Engineer, Town Hall	do.
Villa, Marine Parade, Dovercourt	Mr. H. Gurney	J. W. Start, Architect, Colchester	do.
Tiling Works at Workhouse	Bairothery (Ireland) Guardians	J. A. Scott, Civil Engineer, 16, William-street, Drogheda	Nov. 28
Sewer, &c., Brewery-lane	Felling (Durham) U.D.C.	H. Miller, Civil Engineer, Council Offices, Felling	do.
Granite Paving Setts (500 tons)	Limerick Corporation	City Surveyor, Town Hall	do.
Laundry Buildings at Workhouse	Sheppey Guardians	W. L. Grant, Architect, Sittingbourne	do.
Drainage Works	Cricklade (Wilts) R.D.C.	N. J. Cuss, Engineer, Cricklade	do.
Roof Works, Bank Bottom	Halifax Corporation	T. Holgate, Civil Engineer, Gasworks, Halifax	do.
Underground Convenience, Sandyford-street	Glasgow Corporation	J. Lindsay, City Chambers, Glasgow	Nov. 29
Sewerage Works, Church-lane, &c.	Edinburgh Council	Burgh Engineer, Town House, Edinburgh	do.
Granite Road Metal	Meriden (Coventry) R.D.C.	A. Seymour, 11, Priory-street, Coventry	do.
Road Metal, &c.	Annan (N.B.) District Committee	A. V. Hart, Surveyor, Marchbank, Dumfries	do.
Sewerage Works, Bentinck-street	Sutton-in-Ashfield U.D.C.	McW. Bishop, Town Surveyor, Outram-street, Sutton-in-Ashfield	do.
*Technical School	Watford U.D.C.	W. H. Syme, Architect, 4, High-street, Watford	do.
Drainage Works at Cemetery, Bristol-road	Bridgwater Town Council	Samson & Cottam, Architects, Eastover, Bridgwater	Nov. 30
Sewers, North Staveley	Rotherham R.D.C.	B. Godfrey, Civil Engineer, 29B, High-street, Rotherham	do.
Farmhouse, Foths Birnie, N.B.		C. C. Doig, Architect, Elgin	do.
Roof at Retort House	Tynemouth Gas Company	W. Hardie, Engineer, Gasworks, North Shields	do.
Schools	Owston & Skellow School Board	J. Simmons, Architect, Bank Chambers, Doncaster	do.
Paving, &c., Gladstone-street	Dewsbury Corporation	Borough Surveyor, Town Hall	Dec. 1
Road Works, St. James' Park Estate, Harrogate		S. Stead, Civil Engineer, 33, James-street, Harrogate	do.
Thirty-seven Workmen's Dwellings, Devizes, Wilts	Peterculter (N.B.) School Board	W. H. Read, Architect, Corn Exchange, Swindon	do.
Caretaker's House, Cults School	Mrs. Meade	R. J. Wilson, Architect, 181A, Union-street, Aberdeen	do.
Additions to the Atlantic Hotel, Youghal, Ireland	Moss Side (Lancs) U.D.C.	J. F. McMullen, Architect, 30, South-mall, Cork	do.
Bridge, Urmston	Eggleston (Durham) Parish Council	H. B. Longley, Engineer, Council Offices	do.
Iron Fencing, &c.	Metropolitan Asylums Board	Hill & Stoddart, Council Offices	do.
*Repairs and Painting, &c	Kingston Guardians	Offices, Embankment, E.C.	do.
*Dining Tables	Stone (Staffs) Rural Parish Council	See Advertisement	Dec. 3
Footbridge over River Trent, Burston	Basford (Notts) Guardians	W. J. Farlow, High-street, Stone	do.
Additions to Hospital at Workhouse	Letterkenny (Ireland) U.D.C.	W. V. Betts, Architect, Radford-road, Old Basford	do.
Five Lodging Houses	Illogan (Cornwall) School Board	J. G. Larkin, Council Offices, Letterkenny	do.
School, &c.	Hastings Corporation	F. Hill, Architect, Green-lane, Redruth	do.
Sewers, &c., Fairlight-road	Great Northern Railway	P. H. Palmer, Civil Engineer, Town Hall, Hastings	do.
*Supply of Stores	Handsworth U.D.C.	Stores Superintendent, Doncaster	Dec. 4
Making-up, &c., Hutton-road	Dover Town Council	H. Richardson, Civil Engineer, Council House, Handsworth	do.
Drainage Works, Maison Dieu-road	Chiswick U.D.C.	H. E. Stilgoe, Civil Engineer, Town Hall, Dover	do.
*Paved Footpath	Oldham Corporation	Surveyor, Council's Offices, Sutton Court, Chiswick	Dec. 5
Car Depôt, Wallshaw	Metropolitan Asylums Board	S. A. Pickering, Civil Engineer, Town Hall, Oldham	do.
*Alterations, Painting, &c	East Ham School Board	Offices, Embankment, E.C.	do.
*Window Cleaning	Fulham Borough Council	Clerk, School Board Offices, East Ham, E.	do.
*Making-up Roads	Metropolitan Asylums Board	Surveyor, Town Hall, Walham Green, S.W.	do.
*Enlarging Engineer's Workshop, &c.	H.M. Office of Works	Offices, Embankment, E.C.	Dec. 6
*Post Office at Holyhead	Margate Corporation	Office of Works, Storey's Gate, S.W.	Dec. 7
*Supply of Materials, &c., Waterworks Department	Walker U.D.C	Manager, Waterworks Office, Municipal Buildings, Margate	do.
*Buildings, Flues and Chimney for a Refuse Destructor	Lancs County Council	See Advertisement	Dec. 8
Bridge Works, Winton	Romford School Board	County Bridgemaster, Preston	Dec. 10
*Infant School	Headington R.D.C.	Albert-road School, Romford	do.
*Taking Down and Rebuilding Bridge		See Advertisement	Dec. 13
*Grayswood Church and Vicarage	Right Hon. Earl Carrington	Oliver & Dodgshun, Architects, Carlisle	No date
*New Road, Sewers, &c., at High Wycombe, Bucks	War Department	J. Carter, Jonas & Sons, Surveyors, Market Hill, Cambridge	do.
*New Barracks		Royal Engineer Office, London-road, Pembroke Dock	do.
Two Houses, Selby-street, Wakefield		W. Wrigley, Architect, 6, Westgate, Wakefield	do.
Additions to Candacraig House, Strathdon, N.B.		G. Gordon & Co., Architects, Inverness	do.
Eight Houses, Stocksbridge	Mrs. Hocker	Buxton & Co., Architects, Market Place-chambers, Sheffield	do.
Additions, Westward Ho, Westcliff Parade, Southend	Blaenavon U.D.C.	Greenhalgh & Brockbank, Architects, Bank-chambers, Southend	do.
Extensions of Water Mains, Brynmawr-road		R. S. Widdowson, Surveyor, Blaenavon, Mon.	do.
Cottages, &c.	Lewes Guardians	Clare & Ross, Architects, West-street, Finsbury Circus, E.C.	do.
Reservoir, Chailey Workhouse	Fairfield (Buxton) U.D.C.	H. C. Card, 10, North-street, Lewes	do.
Road, Cliffe-road		C. Flint, Surveyor, Queen's-road, Fairfield	do.
Building Works at Maugerton Manor Farm, Bridport		Rev. T. Johnson, Melplash Vicarage, Bridport	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Application to be in
Clerk of Works	St. Saviour's Union, Surrey	3½ guineas per week	Nov. 27
*Timekeeper and Material Clerk	Battersea Borough Council	35s. per week	Nov. 29
*Architectural Draughtsman	Nottingham Corporation	180*l.* per annum	Dec. 1
*Borough Surveyor	Dartmouth Town Council		Dec. 5

Those marked with an asterisk advertised in this Number. Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xviii. & xxi.

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LONDON.—For the erection of the Belgrave Hospital for children in Clapham-road, Kennington. Mr. H. Percy Adams, architect, 28, Woburn-place, Russell-square, London, W.C. Quantities by Mr. S. G. Thacker :—

Holland & Hannen	£55,730	Bywaters & Sons	£52,868
Colls & Sons	55,317	Higgs & Hill	52,243
Wallis & Sons	53,371	Prestige & Co.	51,543
Kerridge & Shaw	53,337	Gough & Co.*	48,984

LONDON.—For alterations and new saloon bar at the Queen's Head p.h., Little Pultney-street, W. Messrs. Beet & Gray, architects, Albany-chambers, 41, Haymarket. Quantities by the architects :—

Lawford & Co.	£631	W. Antill & Co.	£610
H. Flint	617		

LONDON.—For painting and repairs to the Borough Market, Southwark, S.E., for the Trustees. Mr. W. H. Woodroffe, architect, Town Hall Chambers, 32, High-street, Southwark, S.E. :—

Josolyne & Young	£3,970 0	Dolman & Co.	£1,180 0
MacArthur & Co.	2,750 0	H. Henderson	1,125 0
E. Mills	1,946 0	C. Towner	1,073 0
J. Proctor	1,900 0	Gavin Bros.	896 5
W. Mills	1,753 0	Smith & Sons, Ld.*	885 0
F. & H. F. Higgs	1,630 0	Wontner & Co. Ld.	838 0
A. H. Inns	1,295 0	Whillock & Gratton	410 0

LONDONDERRY.—For the erection of a café, Waterstreet, for the Londonderry Temperance Council. Mr. M. A. Robinson, C.E., Richmond-street, Londonderry :—

Maultsaid & Pollock	£740	Shannon & Rutledge	£624
Robert Colhoun	698	Joseph Shannon, Magazine-street*	600
Thos. A. Colhoun	683		

LYNN (Norfolk).—For the erection of a residence and coal store, George-street, for Mr. W. H. Johnson. Mr. E. E. Colman, architect, 24, King-street, Lynn :—

W. Collins	£445 0	Baines & Co.	£374 10
Warnes	390 0	Hill & Horsley	372 10
W. F. Smith	387 10	M. Bone, Lynn*	352 10

MIDDLETON (Lancs).—For the erection of buildings at the electricity station. Messrs. Stones & Stones, architects, 10, Richmond-terrace, Blackburn :—

Partington & Sons, Middleton, near Manchester £5,950

NETHERFIELD.—For the extension of lithographic works, Netherfield, Nottingham, for Messrs. Stafford & Co. Mr. Richard Whitbread, architect, Carlton, Nottingham :—

Main, Kendall, & Main	£3,968	Browne & Son	£3,480
Lewin	3,743	Short	3,475
Tegerdine	3,648	Cooper & Co., Nottingham*	3,375
Harper	3,590		

PLYMOUTH.—For the erection of school buildings, Salisbury-road, Plymouth, for the Plymouth School Board. Mr. Henry J. Snell, architect, Plymouth :—

Wakeham Bros.	£39,790	Blackell & Son	£36,985
W. Trevena	38,859	T. May	36,658
Lethbridge & Son	38,100	J. P. Berry	35,393
Lapthorn & Co.	37,827	A. Andrews	33,450
A. N. Coles	37,489	Tozer & Son†	32,944

[All of Plymouth.]

SHEPPERTON-ON-THAMES.—For the erection of a pair of semi-detached shops for the freeholders, on the Broadlands Estate, Shepperton-on-Thames. Mr. George F. Sharpe, architect, 57 and 58, Chancery-lane, W.C., and Hampton-hill, Middlesex :—

S. Wright, St. Margaret's* £960

SOUTH SHIELDS.—For the erection of the Cyprus Hotel, Chichester-road, for the executors of the late Mr. J. Turnbull. Messrs. M. Hall & Son, architects, Albany-chambers, King-street, South Shields. Quantities by Mr. J. Eyra Miller, Sunderland :—

R. Brown	£5,200 12 8	S. Sheriff	£4,500 0 0
R. Allison	5,000 0 0	Atkin, Burrell & Co.	4,493 0 0
Thornton & Co.	4,954 8 2	F. B. Dobson	4,436 8 3
J. Young	4,783 16 10	Summerbell & Son, South Shields*	4,350 0 0
C. Henderson	4,654 7 10	P. Sheriff	4,278 1 4
J. C. Nichol	4,635 0 0		
J. Hutchinson	4,604 0 0		
W. Christie	4,561 5 2		

TEDDINGTON.—For making up Lodge-road for the Urban District Council. Mr. M. Hainsworth, surveyor, Elmfield House, Teddington :—

	Tarpaving.	Roadmaking.
Joshua Macklin	—	£459 4 6
E. W. Hollingsworth	£74 4 4	335 0 9
Mowlem & Co.	56 5 0	380 8 11
Nowell & Co.	47 3 0	375 9 3
John Nicholas	55 10 0	337 18 0
Free & Sons	50 4 10	319 0 0
S. Kavanagh	41 11 0	289 2 5
Lawrence & Thacker, 41, Lavender-gardens, Clapham Common*	38 9 6	284 15 10
Wainwright & Co.	36 2 4	—

TWICKENHAM.—For the completion of the unfinished detached houses, Relugas and Covehithe, on the Cole Park Estate, Twickenham. Mr. George F. Sharpe, architect and surveyor, 57 and 58, Chancery-lane, W.C., and Hampton-hill, Middlesex :—

S. Wright, St. Margaret's* £615

TWICKENHAM.—For proposed extension of roads and sewers on the Cole Park Estate, Twickenham (first section). Mr. George F. Sharpe, surveyor, 57 and 58, Chancery-lane, W.C., and Hampton-hill, Middlesex :—

John Kearley, Teddington* £136 4 6

WANSTEAD.—For about 1,227 ft. run of oak park pale fence, to enclose new site on the Wanstead Park Estate, for Wanstead Urban District Council. Mr. John T. Bressey, Surveyor to the Council :—

R. Mulford‡	£786 0 0	A. Turner & Son	£287 6 6
Longley & Son	330 12 0	Bennett, Sharp, & Co.	281 7 6
G. W. Smith	305 0 0	Murray Marshall	279 16 6
J. & S. Agate	298 18 0	Horton & Son	279 0 0
T. Turner, Ltd.	297 0 0	H. Brazell	275 0 0
A. Reed	296 0 0	Rowland Bros.	272 0 0
Stenning & Son, Ltd.	289 0 0	Taylor & Brooker, Dorking*	260 0 0
J. Turner & Co.	288 17 6		

‡ Clerical error, taking yards instead of feet.

WEST BROMWICH.—For alterations, &c., to Boardroom Buildings, Hallam-street, for the Guardians. Mr. Rollason, architect, High-street, West Bromwich :—

John Mallin, Churchfield* £160

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect :—

BRANDLEHOW-ROAD.—Providing and fixing complete low-pressure hot-water apparatus to three halls, seven classrooms on each floor, drawing classroom, cloakrooms, corridors, and lavatories :—

Dargue, Griffiths, & Co., Ltd.	£929	Brightside Foundry and Engineering Co., Ltd.	£587
Cannon & Sons	898	Duffield & Sons	586
J. & F. May	700	Defries & Sons, Ltd.*	555
J. Grundy	660		
Turner & Co.	657		

CALVERT-ROAD.—Providing partitions, &c. :—

E. Proctor	£390 0 0	G. Kemp	£280 0 0
Bruce, Croom, & Co.	368 18 6	Wake & Dean, Ltd.	267 0 0
J. Appleby	362 0 0	H. Groves	235 0 0
General Builders Ltd.	347 0 0	H. Levey*	186 0 0

COBBOLD-ROAD.—Providing and fixing complete low-pressure hot-water apparatus to three halls (B, G, and I), also to six classrooms on ground, first, and second floors, drawing classroom, cloakrooms, corridors, and lavatories :—

Dargue, Griffiths, & Co. Ltd.	£768 15 9	Brightside Foundry and Engineering Co., Ltd.	£577 0 0
Turner & Co.	610 10 0	Duffield & Sons	516 15 0
J. Grundy	605 0 0	Defries & Sons, Ltd.*	490 0 0
Oldroyd & Co., Ltd.	578 0 0		

HACKNEY DIVISIONAL OFFICES AND VISITORS' CENTRE.—Providing eight desks, forty lockers and drawers, &c. :—

J. H. W. Martin	£820 0 0	H. Bouneau	£302 10 0
Atkinson & Co.	409 7 6	London School Furniture Co.	300 0 0
Lascelles & Co.	380 0 0	T. Cruwys*	295 0 0
Hammer & Co., Ltd.	305 0 0		

HAZELBANK-ROAD.—Re-erecting three iron buildings and appurtenances (at present stacked at the Rosendale-road School) on this site :—

T. Cruwys	£1,560	Croggon & Co.	£1,325
Mitson & Co.	1,350	Hawkins & Co.*	1,250

HIGHBURY-GROVE (Truant School).—Relaying the soil drains and portions of surface-water drains and those receiving slop and lavatory wastes, with connexions to existing fittings, and providing separate drainage from the Infirmary :—

Burn Bros.	£2,364 15 7	F. Bull	£1,789 0 0
G. Neal	2,323 0 0	Johnson & Co.	1,781 10 0
Lawrance & Sons	1,993 0 0	R. P. Beattie	1,771 10 5
Williams & Son	1,930 0 0	Stevens Bros.	1,728 0 0
Killingback & Co.	1,836 0 0	L. H. & R. Roberts	1,697 0 0
T. Cruwys	1,828 0 0	McCormick & Sons*	1,687 0 0

HOLDEN-STREET (Improvements).—Providing and fixing complete low-pressure hot-water apparatus to three halls, twelve classrooms, drawing classroom, cloakrooms, lavatories, and corridors, also providing auxiliary heating to nine classrooms :—

G. Davis	£630	Brightside Foundry and Engineering Co., Ltd.	£515
Oldroyd & Co. Ltd.	619	Duffield & Sons	502
Dougill & Co., Ltd.	575	Dawson & Co., Ltd.*	395
J. C. Christie	560		
Williams & Son (Cardiff) Ltd.	540		

LANT-STREET (Improvements).—Providing and fixing complete low-pressure hot-water apparatus for warming twelve classrooms, three halls, cloakrooms, and lavatories and auxiliary warming for six classrooms :—

Tomlinson & Milan, Ltd.	£900 0	Stevens & Sons	£498 0
Cannon & Sons	679 0	Williams & Sons (Cardiff), Ltd.	464 0
Dougill & Co., Ltd.	542 10	Dawson & Co., Ltd.*	380 0
Oldroyd & Co., Ltd.	525 0		

LYHAM-ROAD (Swimming Bath).—Providing and fixing steam boiler, engine, shafting, rotary washer, hydro extractor, wringer, mangle and rinsing troughs, sets of four drying horses; laying on hot water to washing machines and to two spray baths, also providing cold-water main and valve :—

Boaz & Sons	£1,565 0	Wippell Bros. & Row	£1,290 0
Cannon & Sons	1,549 0	Fraser & Son	1,277 0
Oldroyd & Co., Ltd.	1,410 0	Williams & Sons (Cardiff) Ltd.	1,140 0
Brightside Foundry and Engineering Co., Ltd.	1 497 0	J. Esson	1,039 10
		J. & F. May*	1,000 0

MULGRAVE-PLACE (Enlargement).—Extending existing low-pressure hot-water apparatus to nine new classrooms, three new cloakrooms, and three new corridors, and altering apparatus in one classroom :—

G. & E. Bradley	£247	Williams & Sons (Cardiff), Ltd.	£220
J. Esson	237	J. & F. May	199
Morris & Co.	226	Palowkar & Sons*	169
W. Simmons	223		

PLUM-LANE SCHOOL.—Accommodation : Boys, 310 ; girls, 310 ; infants, 346—total, 966. Boys' and girls' school on two stories. Infants' school one story. Halls : Boys', 56 ft. 6 in. by 34 ft. ; girls', 56 ft. 6 in. by 34 ft. ; infants', 70 ft. 6 in. by 30 ft. Classrooms : Boys', 60, 60, 60, 50, 40, 40 ; girls', 60, 60, 60, 50, 40, 40 ; infants', 60, 60, 60, 60, 60, 56, 50. Drawing classroom, 1,202 ft. area. Heating by low-pressure hot-water apparatus and open fires. Area of site, 94,530 square feet. Playgrounds area per child : Boys', about 62 square feet ; girls', about 91 square feet ; infants', about 50 square feet. A house for the schoolkeeper is included in the plans :—

		‡
B. E. Nightingale	£32,998	+ £186
Johnson & Co., Ltd.	32,893	+ 230
Perry & Co.	32,666	+ 217
Kirk & Randall	30,876	+ 198
Antill & Co.	30,264	+ 310
F. & F. J. Wood	29,973	+ 285
Holliday & Greenwood	29,807	+ 298
F. & H. F. Higgs	29,581	+ 295
Lawrance & Sons	29,356	+ 279
Smith & Sons, Ltd.	28,341	+ 280
Wallis & Sons, Maidstone*	27,446	+ 249

‡ If walls of classrooms and halls are plastered *add*.

ST. JOHN'S-ROAD — Wiring, &c., for electric lighting :—

Palmer & Watson	£606 5 0	Drake & Gorham	£580 0 0
Comyn Ching & Co.	599 0 0	Weston & Co.	521 15 0
Hodgson & Co.	592 10 0	Peto & Radford, Ltd.	450 0 0
		J. C. Christie*	445 2 0

WILMOT-STREET.—Repairing furniture :—

T. Cruwys	£305 0	London School Furniture Co.	£275 0
H. Bouneau	297 16	Wake & Dean, Ltd.*	230 0
Hammer & Co., Ltd.	280 0		

Planting trees and shrubs at the following schools :—Boundary-lane, Oliver Goldsmith, Rosendale-road :—

	Boundary-lane.	*Oliver Goldsmith.*	*Rosendale-road.*
Cutbush & Son	£8 9 0	£5 16 0	£13 5 0
A. Durrant	*5 8 0	5 8 0	14 10 0
G. Footer	9 10 0	7 19 0	17 0 0
Goff & Sons	7 4 0	4 16 0	20 0 0
R. Neal	6 12 0	*4 7 0	*9 15 0
Williams & Son	7 10 0	6 11 0	14 10 0

Supply of folding steps, on a running contract :—

J. H. W. Martin	per doz. pairs	£15 6
London School Furniture Co.	,,	13 13
H. Bouneau	,,	13 4
T. Cruwys	,,	13 0
Hammer & Co., Ltd.	,,	12 12
Heathman & Co., Ltd.	,,	9 12
Wrinch & Sons*	,,	8 10

Supply of TIMBER for use in M.T. Centres, on a running Contract :—

Description of Timber.	Cobbetts & Co.	*James Latham, Ltd.	London School Furniture Co.	W. Mallinson & Co.
Yellow Deal (machine planed, in 8 ft. lengths)—	d.	d.	d.	d.
2½ in. by 1½ in. .. per ft. run.	1½	1	1½	—
1½ in. by 9 in. .. ,,	4	4½	4½	—
1½ in. by 9 in. .. ,,	2	2 1/4	2½	—
Yellow Pine—				
1 in. by 11 in. .. ,,	4	3½	4½	4
¾ in. by 11 in. .. ,,	3½	2½	3½	3
½ in. by 11 in. .. ,,	2½	2½	2½	2
Teak (not less than 5 in. wide)—				
¾ in. .. ... per ft. super.	5	3½	4½	4
½ in. .. .. ,,	4	2½	3½	3½
Ash, American (not less than 6 in. wide)—				
¾ in. .. .. per ft. super.	2½	2½	2½	3½
½ in. .. .. ,,	1½	1½	2	2½
Oak (not less than 6 in. wide)—				
1 in. .. .. per ft. super.	3½	3½	6	4
¾ in. .. .. ,,	2½	2½	3	2½
½ in. .. .. ,,	1½	1½	2½	2
Satin Walnut (not less than 8 in. wide)—				
1 in. .. .. per ft. super.	3	2½	3½	
¾ in. .. .. ,,	2½	2½	2½	4
½ in. .. .. ,,	2	2	2½	3½
Bass, or American Whitewood (good green colour)—				
¾ in. .. .. per ft. super.	2½	1½	2½	2
½ in. .. .. ,,	1½	1½	1½	1½
¼ in. .. .. ,,	1	1	1	1

[See also next page.

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The interiors of the following schools will be cleaned between December 15, 1900, and January 5, 1901 :—

ANCONA-ROAD :—

W. Jolly	£292 10 0	E. Proctor*	£220 0 0
G. Kemp	220 0 0		

CANONBURY-ROAD :—

Grover & Son	£216	W. Hornett	£156
McCormick & Sons	197	Stevens Bros.	153
G. Kirby	175	Marchant & Hirst*	144
Silk & Son	164		

CHARING CROSS-ROAD :—

Wall & Co.	£211	M. Pearson	£152
T. Cruwys	208	Staines & Son*	147
C. Gurling	161	F. Chidley	140

CHILDERIC-ROAD :—

E. Proctor	£205 0 0	W. Brown*	£137 12 6
H. Groves	175 0 0	S. Musgrove	129 15 0
J. & C. Bowyer	169 0 0	W. J. Howie	110 0 0

DREADNOUGHT-STREET :—

E. Proctor	£198	C. G. Jones*	£129
Holliday & Greenwood	155	W. J. Howie	114
Hayter & Son	135		

FAUNCE-STREET :—

B. E. Nightingale	£196 0	Lorden & Son	£129 0
J. F. Ford	162 0	Garrett & Son*	117 0
E. Triggs	133 10		

GREAT WILD-STREET :—

Unsigned	£337 17 5	W. Hornett	£156 0 0
B. E. Nightingale	270 0 0	Marchant & Hirst	144 0 0
Stevens Bros.	179 0 0	W. Chappell*	128 0 0

GROVE-STREET :—

E. Proctor	£198 0 0	W. Brown	£126 7 6
W. Banks	164 10 0	Hayter & Son	124 0 0
H. Groves	148 0 0	S. Musgrove*	122 7 0

HALSTOW-ROAD :—

W. Jolly	£258 10	W. Banks	£156 10
Blackheath Sanitary and Decorative Works	186 4	C. G. Jones	143 0
		H. Groves	139 0
		Hayter & Son*	118 0

HEBER-ROAD :—

Lorden & Son	£331	H. Line	£237
Rice & Son	302	Maxwell Bros., Ltd.	227
Baylis & Francis	276	Mitchell & Sons*	212

HIGH-STREET :—

W. Jolly	£294 15	G. Kemp	£225 0
E. Proctor	230 0	Lathey Bros.*	197 0

ILDERTON-ROAD :—

B. E. Nightingale	£432	Holliday & Greenwood	£187
Maxwell Bros., Ltd.	238	H. Line*	165
Rice & Son	230		

IVYDALE-ROAD :—

Maxwell Bros., Ltd.	£218	W. Banks	£212
J. & C. Bowyer	217	Baylis & Francis	186
G. Kemp	215	H. Line*	165

LONDON FIELDS :—

Chessum & Sons	£269	Snewin Bros. & Co.	£205
G. Wales	268	Barrett & Power	203
W. Hornett	242	Silk & Son*	195
C. Willmott	230		

MALMESBURY-ROAD :—

A. W. Derby	£325 0	G. Wales	£215 0
A. E. Symes	250 0	J. Kybett	203 0
Chessum & Sons	230 0	J. F. Holliday*	199 10
Elkington & Sons	229 10	S. H. Corfield	185 0
J. T. Robey	226 10		

MATTHIAS-ROAD :—

Grover & Son	£272	W. Hornett	£246
Barrett & Power	267	Stevens Bros.	230
Silk & Son	261	G. Barker*	225
McCormick & Sons	247		

NUNHEAD-PASSAGE :—

Rice & Son	£335	H. Line	£280
Baylis & Francis	308	Garrett & Son*	263
Maxwell Bros., Ltd.	307		

ST. LEONARD'S-ROAD :—

A. W. Derby	£375 0 0	Gibb & Co.	£265 0 0
T. H. Jackson	231 0 0	J. T. Robey	242 10 0
A. E. Symes	280 0 0	G. Wales*	230 8 0
Elkington & Sons	279 0 0	S. H. Corfield	223 0 0

SMEED-ROAD :—

A. W. Derby	£397 0	Elkington & Sons	£239 10
A. E. Symes	315 0	G. Wales	223 16
Chessum & Sons	284 12	J. T. Robey	220 0
T. H. Jackson	252 10	Gibb & Co.*	219 0

VERE-STREET :—

T. Cruwys	£160 0	C. Gurling	£110 0
Lathey Bros.	144 0	W. Brown	101 12
G. Kemp	118 0	F. Chidley*	94 0

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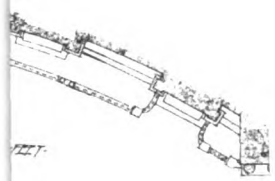

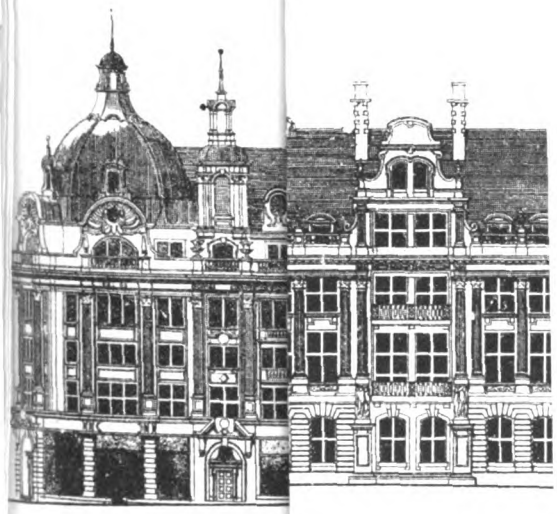

BLOCK PLAN

CIL — DESIGN No. 27.

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The Builder.

VOL. LXXIX., No. 3017. DECEMBER 1, 1900.

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Martin's Bank, Bromley.—Mr. Ernest Newton, Architect ..... *Double Page Ink-Photo.*
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Roads.

ROADS constitute an important element in the development of every new country, and although means of communication have been vastly increased during the last fifty years by the extensions of the railway system, ordinary highways remain as absolute essentials to the welfare and prosperity of countries which have been settled for centuries past. Taking the case of Great Britain, we have only to consider the conditions prevailing in great cities to realise the magnitude of road traffic and to recognise the advantages of good roads, and the disadvantages of bad ones. In many country districts roads still form almost the only means of communication from place to place, whether for pleasure or for business. No doubt the supercession of stage coaches, carriers' wagons, and other conveyances has exercised a very prejudicial effect upon the prosperity of country towns, villages, and wayside inns; but the advent of cycling has done much to restore the balance, and automobilism is destined to contribute very largely to the future traffic of provincial highways. The work of the engineer who makes and maintains roads has lost none of its importance, and we are glad to notice the publication of an excellent treatise on the subject* by Mr. Thomas Aitken, Surveyor to the County Council of Fife, Cupar Division, who is recognised, especially in Scotland, as one entitled to speak with authority. About the making of ordinary roads, it may be thought, there is not much new to be said, but it must be remembered that many treatises on the subject were written at a time when machinery had been very little applied to the quarrying and preparation of the materials, and to the actual construction or repair of roadways. It has also to be borne in mind that the extended powers conferred on the County Councils by the Local Government Acts of 1888 and 1889 have resulted in the inauguration of measures for maintenance upon a much more comprehensive scale than had previously been practised. Road surveyors of the present day are therefore expected to be familiar with the most approved forms of mechanical appliances and with the latest methods of procedure. In urban districts surveyors are required to add a knowledge of the surface construction most suitable for crowded streets, and to be competent to deal with many special problems that do not arise in rural districts. It is evident, therefore, that the present time is most opportune for the publication of a comprehensive work dealing with the various features of modern road-making, and the treatise written and compiled by Mr. Aitken constitutes an eminently painstaking and lucid exposition of the whole subject, which will be of great practical value to municipal and county engineers, and to those who wish to qualify themselves for such positions.

The treatise is nominally divided into two parts, the first relating to "the making and the maintaining of macadamised roads," while the second part deals with "carriageways and footpaths." Outside the first part, however, there is a historical sketch containing much that is intimately related to the chapters following; and at the end of the second part a chapter is usefully devoted to a recapitulation of the teaching generally conveyed in the whole treatise.

In the first page of his historical sketch the author remarks: "The evolution of the modern road can only be adequately understood by reference to the practice of this interesting subject, from the time when the making of the great military roads of the Romans was carried out to the present time, authentic descriptions of which are recorded. It will be necessary, therefore, previous to detailing the different processes from the inception to the completion of roads and streets as now constructed, to review concisely the history of the subject, which extends over a period of 2,200 years." It is generally said—and the remark is repeated by Mr. Aitken—that "there is no trace of Roman influence in the construction of later roads in Britain." This is no doubt true as regards general design, but we rather incline towards the belief that the thoroughly sound and workmanlike methods adopted by the Romans have not been without some useful effect. For instance, Roman engineers were careful to remove loose earth and to replace it where necessary by proper material, consolidated by ramming until a solid foundation was formed, and upon this two or three courses of flat stones were laid by hand. Again, in marshy places, joists or sleepers were laid, over which came a stratum of straw, and then the road materials, generally including a layer of coarse concrete. These forms of construction are clearly suggestive of the principles followed by Telford and others, though the exact mode of application may have been different. Having referred to early British roads, the author proceeds to relate some details concerning the execrable condition of highways during the Dark Ages and up to the advent of Metcalf, Macadam, and Telford. The rival systems of the two latter engineers are described at length, and Telford's general specification for the Highland roads is given in detail. The work in question included some 920 miles of roadways, in connexion with which no less than 1,117 bridges and other works of considerable magnitude were necessitated by the hilly nature of the country traversed. The specification is still interesting, relating as it does to the largest series of contracts for road-making ever undertaken in this country.

Chapter I. is devoted to the discussion of resistance to traction, the forms and dimensions of wheels, and the permissible weights to be carried on wheels. All the points here considered are important to the road engineer, though unfortunately many of them are beyond his immediate control. Under the heading of external forces affecting the

* "Road-making and Maintenance: a Practical Treatise for Engineers, Surveyors, and others." By Thomas Aitken, A.M.Inst.C.E. London: Charles Griffin & Co. 1900.

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motion of vehicles, the author remarks upon the injury done to a road surface by a vehicle surmounting any hard substance, tending by repeated blows to wear holes in the surface, even on roads maintained with the hardest material. This caution might well be taken to heart by some of our Local Authorities, even in the metropolis, who appear to be entirely oblivious of the discomfort experienced by passengers, and of the fact that neglect of proper maintenance is not a real economy. On the subject of tractive force, Mr. Aitken presents an excellent *résumé* of the conclusions arrived at by various authorities, including Morin, Macneil, and others; he also demonstrates very clearly the effects produced on a road by wheels of different widths. It is pointed out that the old-fashioned conical wheels "can only be made to travel in a straight line by a constant twisting action at the surface of the road;" consequently, the wider the tire, the greater is the disintegrating action of the wheel. Ordinary rigid wheels of excessive width are shown to exercise an equally injurious effect, because they cannot possibly touch the convex transverse surface of a road along their full width. Mr. Aitken is of opinion that the wide wheels of waggons and traction engines are powerful agents in destroying the crust of a road, for the reason that excessive bearing pressure is caused by the parts which are in actual contact. As he points out, traction-engine wheels with ordinary rigid tires cannot bear equally on a road unless it be in such a state of disrepair as to be level transversely, "when it cannot be expected to bear even the distributed weight which such conditions make possible." Mr. Aitken continues:—

"In the case of a traction-engine, the wheels of which only touch the road surface for 4½ in. of their width, a very heavy strain is imposed on the material composing the road covering. During dry weather this excessive weight causes a considerable amount of abrasion of the material at the surface of the road. When thaw succeeds frost, and the immediate surface of the road coating is in a somewhat loose state, the passage of traction-engines has the effect of greatly disturbing the materials of the road-crust on roads generally, and is extremely trying even to those which are repaired with the best possible class of macadam, and maintained in the best condition. It often happens, after alternating frost and thaw, that the road coating is affected to a greater or less depth; and at such times the passage of a traction engine over a road causes considerable damage by crushing the stones comprising the coating, and in many instances lifting and displacing patches of the material."

Vehicles with very narrow tires are found to cause much damage under similar conditions, especially where there is little passing traffic to prevent such wheels from forming ruts. The author, therefore, emphasises the necessity of having improved tires for vehicles, or of adopting more stringent measures for the regulation of traffic.

In regard to the laying out of roads, although a work of this kind cannot be expected to include a treatise on surveying, it would have been as well if some notes had been given upon the most approved types of instruments, especially those which are necessary to engineers in India and the colonies. An addition of this kind would probably be welcomed by students who are qualifying for service abroad, and it would at the same time be in harmony with the complete manner in which most other sections of the subject have been discussed and illustrated. In his chapter on earthworks, drainage, retaining walls, culverts, and bridges, the author has not attempted more than a brief enunciation of those points which most directly concern the road-maker. What he has said is a model of concise expression; it is particularly to the point, and is illustrated by a number of sectional and other drawings which cannot fail to be of service to practical men.

The chapter on road materials or metal is not bad, but the author is not quite at home in this part of his subject. In so far as the actual description of the rocks is concerned, the information is for the most part derived from the article "Geology," in the "Encyclopædia Britannica," and may certainly be relied upon. But some of the author's original observations are not quite up to the mark. For instance, we notice that "the igneous and siliceous rocks form the greater bulk of the materials used in road making and repairs." It should have been remembered that many of the igneous rocks used are of a highly siliceous character, though what the author had in view in employing the term "siliceous" was, no doubt, sandstone and the like. The importance of a knowledge of the minerals found in road materials is rightly insisted upon, and the value of geology to the road surveyor is also clearly brought out. The section relating to physical tests of road stone is also well considered, and the author is, in general, up to date. The observations on the absorption test are not, however, everything that could be desired. It is stated that the test "is carried out by weighing the stone carefully after being thoroughly dried, and immersing the sample in water for twenty-four hours." We admit that this is the slip-shod method commonly employed; but if this test means anything, it must be for the purpose of comparison. For the comparison to be of real value, all the samples of stone tested ought to be cut to the same size, and instead of immersing them entirely in water, a flat surface of the sample should always stand up above the surface of the water for about a quarter of an inch. A little table, showing how much water is absorbed by granite, gneiss, &c, is given, but all such generalities are useless unless the locality whence the stone came in each case is mentioned, or, at least, the stones which gave the maximum and minimum absorption, from which the table was compiled. This table is taken from Rankine's "Civil Engineering," however. The author evidently knows very little about the "weathering test," for we have the old method of using Glauber's salt (sulphate of soda) mentioned, though everybody familiar with the subject is aware that that method is of no practical use, and has been discarded in nearly every testing establishment on the Continent for many years. Again, we are told that freezing tests on the weathering of stone can "only be effected during the prevalence of frost, and are consequently not always easy of application"; whereas, as a matter of fact, the experimenter does not, commonly, wait for the weather, but employs artificial means of freezing. The notes on the durability of road stone are excellent, and we quite agree that the average basalt, diorite, and syenite are amongst the most durable materials that can be employed on roads. One point in this connexion is a little striking. The author employs many rock names which one never sees in surveyors' tenders for road metal, and which not one surveyor in 100 understands. These terms (which are explained) are not by any means new, but that they should be employed in a practical book of this kind is very gratifying, as indicating a greater appreciation of a scientific knowledge of road stones than has hitherto been shown by practical men. We have on many occasions insisted that unless the surveyor is able to distinguish the difference between stones that are apparently the same at a casual glance, he does not always get the best result when advertising for tenders. Occasionally, however, the author makes a slip even on this point. On p. 110 we notice that he calls the Mountsorrel stone "syenite," the Bardon Hill (erroneously stated to be in the North of England) "basalt," and the Ceirog *(sic)* stone "granite." But, whilst we indicate these little inaccuracies, we must add that we do not know of any other work which deals better with the subject, and this chapter is certain to be of some general use to the surveyor.

It would be impossible to refer at length to the chapter on quarrying, which covers more than sixty-five pages, and constitutes a fairly complete exposition of the subject. Two types of rock drills are selected for special description, their construction and mode of action being illustrated by sectional drawings. With the remarks as to the superiority of drills with steam-thrown valves over those with tappet-valves we agree in the main, although under some circumstances a tappet drill may be preferable. Intending purchasers will always act wisely in furnishing full particulars of requirements to the maker selected, so that tools may be obtained exactly suited to the character of the work to be performed. Several useful plans and sections of road-stone quarries are given, together with practical hints as to boring shot-holes, the use of explosives, and drawings of a storehouse for explosives. As an instance of the advantageous results to be obtained from the employment of machinery, the author states that a quantity of from 1,000 to 1,400 tons of stone can be quarried in one week, whereas in order to produce by hand a like quantity of quarried material the employment of twenty-four men would be required each day for a similar period, or a boring squad of three men would be engaged forty days in performing a like amount of work. Mr. Aitken demonstrates that "there is a saving of nearly 49 per cent., and when the hand-quarried material is stored, of over 59 per cent." by the adoption of mechanical quarrying and blasting.

A good many points of interest to the surveyor who may be called upon to select and to superintend the use of a steam-roller will also be found in the book. As illustrating the extent to which this method of road-rolling is now practised, it is stated that "the firm of Aveling & Porter alone have made and sold over 3,000 steam road-rollers, the majority weighing from 10 to 15 tons." In London, more than 100 rollers are in daily use on an area of 400,000,000 square yards, representing about 2,000 miles of roadway 30 ft. wide. Although scarifying machines have only lately come into extensive operation, and in fact have not been produced in a practical form until within comparatively

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recent years, the idea was patented by Clay in the early part of the century. His apparatus, as Mr. Aitken records, was designated "a harrow which is intended to scarify the uneven part of any road." The author might also have mentioned the steam-driven "Teaser" invented at an even earlier date by Trevithick. One of the benefits to be obtained by the use of a scarifying machine is that roads which have become of bad form, are otherwise but very little worn, may be broken up and re-formed at comparatively trifling cost, and in many instances without the addition of new metalling.

When all the technical problems attending the design of a road have been happily settled, the actual work of construction requires no abstruse knowledge, and the whole process is described by Mr. Aitken in less than two pages of letterpress. Briefly described, the making of a modern road is as follows:—The bed is first prepared, and the "bottoming" material, consisting of a layer of stones, varying in size from 3 in. to 4 in. cubes, is spread to a depth of from 6 to 12 in., according to circumstances; over the bottoming comes a cushion of sand from 1½ to 2 in. thick, and, finally, the metalling is laid to a depth of from 4 to 6 in. Two sectional drawings in this chapter, one of a country road and the other of a suburban road, will be found useful, as also will the author's hints as to the work of construction.

With Chapter IX. commences the second part of the treatise, which is specially addressed to the requirements of municipal engineers or borough surveyors. The reader will find, however, that he must refer to Part I. for some of the information necessary for complete elucidation of the subject of carriage-ways and footpaths. In the course of some preliminary remarks, the author states the essential features which should be possessed by a good pavement for carriage-ways, adding the caution that the physical, climatic, and other features of cities and towns must always receive attention when a selection is under consideration. A roadway paved with granite or other "setts," properly laid upon a good concrete foundation, is undoubtedly durable and economical. It affords a good foothold for horses, and may be cleansed with comparatively little trouble; but, on the other hand, it is very apt to become greasy under certain conditions, and is then particularly trying to horses. Perhaps the greatest objection to the use of such pavement is the excessive noise produced by wheeled traffic.

Pitched pavements are a great deal used in manufacturing towns, for which they are not entirely unsuitable, but some less noisy form of paving is essential for residential and mercantile districts. Those of our readers who are acquainted with the north of England know that "setts" are very extensively adopted, even in the outlying suburbs of large cities and towns, and their use is still common in the south. The operation of wood paving is tolerably familiar to Londoners, many of whom have reason to regret the frequent opportunities afforded for its study. Most of the earlier attempts to construct satisfactory pavements of this class resulted in failure, owing to the selection of unsuitable material and to the absence of proper foundations. The statistics quoted by Mr. Aitken as to the relative wear and tear of soft and hard wood blocks will be found highly interesting. Generally, the conclusion is to be drawn that the average life of soft wood pavement in the busiest thoroughfares of London is about 6½ years, and that Australian hard woods may be expected to last at least ten years. The cost of paving, assuming the existing foundations to be sufficient, is 8s. for deal and 11s. for Australian hard woods per square yard. As is well known, asphalt forms an impervious roadway; it affords no opportunity for the collection of foreign matters, and as the road retains its convexity, the surface drainage is always effective. From a hygienic point of view asphalt is preferable to wood, but those interested in vehicular traffic do not appreciate its slipperiness in damp weather. The table following, reproduced from the volume under review, is contained in a report by Mr. Haywood on accidents to horses on carriage-ways in the City of London.

City of London: Comparative Slipperiness of Carriage-way Pavements.

Pavement.	Distance Travelled before a Horse Fell—in Miles.			
	Dry.	Damp.	Wet.	Average of 50 days.
Granite	78	168	537	132
Asphalt (Val de Travers)	223	125	192	191
Wood (Improved Wood and Ligno Mineral)	646	193	432	330

The remarks upon this table by Mr. Haywood are particularly interesting, and so also is a table comparing different classes of pavements, reprinted from "Carriage-ways and Footpaths," by Mr. H. Percy Boulnois.

The recapitulation chapter includes a description of the Viagraph, the instrument lately devised for taking an autographic record of road and carriage-way surfaces. The viagraph is described as being "in principle a straight-edge about 12 ft. long and 9 in. wide, applied continuously to the road surface, along which it is drawn. The main frame contains an apparatus for recording on paper a profile of the road surface tested, and the sum of unevenness is indicated by a numerical index." Reliable data can only be obtained by the aid of the viagraph when the instrument is used in an intelligent manner. Thus it is necessary that several diagrams should be traced along parallel courses on any given roadway, so that a fair average may be obtained. As the viagraph records facts and not opinions, it ought to be the means of reducing litigation to a very considerable degree, and also of enabling road surveyors to protect themselves against complaints based on erroneous impressions. Some interesting viagraph diagrams are given by the author, including one taken on the Victoria Embankment, which is probably one of the worst-kept roads in existence. As compared with the Leatherhead and Guildford-road, showing an unevenness of from 12 ft. to 14 ft. per mile, the Embankment "viagram"—if we may coin the term—indicates an irregularity of no less than 102 ft. in the same length. Repairs are now in progress on this splendidly situated thoroughfare, and it may be hoped that similar operations will some day be contemplated in regard to others, notably the road separating Hyde Park from Kensington Gardens, and one or two of the roadways in the park itself. In the first page of Mr. Aitken's admirable work we find it stated that the good condition in which roads are maintained affords "a fair indication of the progress or prosperity of any age or people." This sentiment might well be taken to heart by the authorities responsible for the habitual neglect of the thoroughfares mentioned, and it deserves to be kept constantly in view by surveyors in every part of the kingdom.

NOTES.

St. Martin-in-the-Fields.

IT is satisfactory to find that the London County Council have determined not to be a party to meddling with the steps of the portico of St. Martin-in-the-Fields, and we hope it will now be recognised that the attempt to spoil Gibbs's church might as well be abandoned. It is also satisfactory to learn that this course was adopted in consequence of the Report of the Institute of Architects on the subject. It has been too much the custom of the London County Council to go through the form of asking the opinion of the Institute on architectural points and then refusing to pay any attention to it. We hope a new precedent may have been set by this case.

Discoveries at Bosco Reale.

BOSCO REALE, near Pompeii, which some years back enriched the Louvre with a magnificent set of silver caps, is now the scene of new discoveries of equal importance. In a vineyard not far from the place, a building containing twenty-four rooms, presumably a country house, has come to light. The remarkable thing is that in all these rooms not a single object of any description has been discovered, but each and all are decorated with beautiful frescoes, which for freshness of colour and generally fine preservation are equal to anything discovered at Pompeii. It really looks as if the house had been built on speculation and remained "unlet." Of the seventy frescoes, most represent flowers and fruit, but there are three notable figure pieces. One represents a lute player, double life-size, whereas at Pompeii no fresco figure exceeds natural stature. Another represents an old gladiator performing to a woman; the third, a woman in the attitude of a listener. The house presumably belonged to the last days of the Roman Republic. All the frescoes have been carefully detached, and are stored at Bosco Reale.

The Corporation of London.

DURING the next session of Parliament the Corporation will promote Bills for the following purposes:—They propose to remove the present London (City) Freemen's Orphan School to new buildings to be erected upon a site of 14½ acres at Walton-on-the-Hill, near Reigate, of which they have lately become the owners. The school was established at Brixton in pursuance of an Act passed in 13 and 14 of the current reign. They intend to purchase or acquire, by compulsion or agreement, the Spitalfields Market with the object of carrying on and improving the market traffic, and with powers to sell subsequently or lease the undertaking

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to the Council of the Borough of Stepney; and have prepared a Bill which shall confirm and give effect to the agreement, dated in July last, between them and the London Riverside Fish Market Company for the purchase by the Corporation of the fish market at Shadwell, and in virtue of their charter of 1 Edward III. for continuing the traffic there in various commodities, in addition to the sale of fish authorised under the initial Act of 1882. Two other Bills relate to grants by the Corporation as Governors of building and improving leases in respect of the Bridewell and (old) Bethlehem Hospitals property, with exemption from the control and jurisdiction of the Charity Commissioners; and by another Bill they seek for powers to dispose of the site of Christ's Hospital, which they, on the other hand, as Governors of St. Bartholomew's Hospital, desire to purchase.

The National Gallery and Trafalgar-square.

THE recent fire in some premises adjoining the National Gallery is not without good results in one direction. The Commissioners of Works and Public Buildings will apply next Session for an Act authorising the Government to acquire some property, upon the west side of the Gallery, which is now bounded on the west by No. 11, Pall Mall East, with Nos. 5 and 9, Monmouth-court; on the south by Pall Mall East, and on the north by some stables belonging to, and occupied by, the Earl of Lonsdale, We hear that the London County Council propose to carry out some improvements of the fountains and the open space in Trafalgar-square. The fountains and their basins, executed in Peterhead granite by McDonald & Leslie, of Aberdeen, were, together with the angle lamp standards, designed by Sir Charles Barry, R.A., who also prepared the plans for laying out the square, which was (*vide* the *Gentleman's Magazine*, 1837) begun on August 14, 1837, with the laying of the broad foot pavement in front of the National Gallery. The area had been cleared by the removal of the Royal Mews, the (old) Golden Cross Inn, and some courts and alleys, including the Bermudas, at the lower end of St. Martin's-lane. The National Gallery was begun in 1832, and W. Wilkins's part of the design was completed in 1838, the Corinthian columns (but not the entablature) of the portico being from Carlton House, and much of the stone from the King's Mews. The College of Physicians and the Union Club-house were designed by Sir Robert Smirke, 1822-5; to the latter Decimus Burton made some alterations and additions. The buildings on the east side of the square, comprising "Morley's" Hotel, were designed and built upon his own property by George Ledwall Taylor, who died at a very advanced age in April, 1873.

Tapestry as a Fixture.

THE law in regard to fixtures contains many subtle distinctions, but it is necessary both for architects and builders to have some general idea of it for the protection of clients and employers. We fear that the recent decision on this point, arising out of the difference as to the right to the possession of the late Mme. de Falbe's tapestries at Luton Hoo, will have a tendency to puzzle those who are interested in this matter. Mr. Justice Byrne decided that the tapestry in the drawing-room belonged to the estate, and therefore passed with it; that the tapestry in the hall belonged to the executors and not to the estate, because these pieces were not attached to the wall or fabric of the house in such a way as to constitute permanent additions to the mansion house. Without going into details it may be said that the tapestries in the hall were framed—they were, in fact, very similar to large pictures screwed to the wall. On the other hand, the walls in the drawing-room were prepared for the tapestry by having some thing in the nature of an ordinary canvas and frame fixed to the wall; to these the tapestries were attached. We confess that the fixing of the tapestries in the hall and in the drawing-room appears to the non-legal mind to have been about the same in character. But the Judge, by means of photographs, also came to the conclusion that the tapestries in the drawing-room formed the leading and most characteristic feature of the wall decoration, and one which would be entirely destroyed by their permanent removal. But the drawing-room had once been without tapestries, and we imagine could again be effectively adorned with pictures, so that it appears doubtful if Mr. Justice Byrne's decision as to the tapestries in the drawing-room can be upheld. With all due respect to the learned Judge as a lawyer, his opinion on what is or is not a permanent characteristic of a room is not of as much weight as that of a competent architect or painter.

Landlords and Sanitary Defects.

WE have often had occasion to point out that the law in regard to sanitary matters both in town and country is fairly effective if it be employed, and that the chief point to be insisted on is not reform of the law, but its active application by the Local Authorities. On the other hand, it must be said in justice to sanitary inspectors that their difficulties are greatly increased by the negligence or inertness of house-owners, who, from their position, should take the lead in these matters. Thus, in the Report in the *Watford Observer* of November 24 of the last meeting of the Watford Rural District Council, we find the inspector reporting that a dwelling-house owned by Lord Ebury had among other sanitary defects no intercepting trap between the house and cesspool, no supply of water to the inside water-closet, and the tank waste-pipe required disconnecting from the drain. The Report further adds that after a warning, "nothing has been done to remedy the defects," and that a formal notice must therefore be served. But how can districts be placed in a proper sanitary condition when landlords thus neglect their duty, and by so doing encourage smaller proprietors to fail in keeping their premises in even an elementary state of sanitary fitness? All we can hope is that Lord Ebury is an exception, and that there are few in his position who are so neglectful of their duty as owners of house property.

Electric Oscillations.

LAST Monday evening, Dr. Fleming gave the first of a course of four Cantor Lectures at the Society of Arts on "Electric Oscillations and Electric Waves." He began by defining an electric oscillation as an alternating current of very high frequency. The frequency of ordinary commercial alternating currents is from fifty to a hundred per second, but the frequency of the alternating currents with which the lecturer dealt was sometimes nearly a million per second. It would be quite impossible to produce these currents by coils of wire rotating in a magnetic field. Practically the only way of producing them is by allowing a condenser to discharge itself through an inductive coil. It is highly probable that Professor Joseph Henry, as far back as 1842, recognised that the discharge of a condenser might in certain cases be oscillatory. Lord Kelvin, in 1853, proved analytically that the discharge was sometimes oscillatory, and gave the correct criteria which determine whether it will oscillate or not. Feddersen and many others verified experimentally his conclusions, and the lecturer showed photographs on the screen of the successive sparks that take place when a Leyden jar is discharged. He showed some very striking experiments illustrating what is known as electrodeless discharge. A large vacuous bulb introduced into the centre of a coil of wire carrying a high frequency current instantly became luminous, a bright circular ring of light which appeared to revolve being generated inside the bulb. He showed by a thin sheet of silver foil how easy it was to screen off the bulb from these electric oscillations. In one of his experiments he proved conclusively that iron had a greater choking effect on these high frequency currents than copper, and thus proved that the conclusions of Hertz and Lodge need modification. He gave an interesting experiment on "wireless electric lighting," and, placing himself between the lamp and the source, so that the electric oscillations must pass through his body, showed that they had absolutely no effect on it. The lecture was most successful, and the course promises to be not only of great popular interest, but also epoch-making from a scientific point of view.

Advances in Telegraphy and Telephony.

MR. GAVEY, the electrician to the Post Office, read a paper last week to the Institution of Electrical Engineers on "Telegraphs and Telephones at the Paris Exhibition." He first discussed the improvements in multiplex telegraphy, and showed how, by means of automatic transmission, the carrying capacity of our telegraph lines had been increased by 1,000 per cent. during the last twenty years. A wire which only carried thirty words per minute when the instruments were worked by hand could easily carry 300 words per minute with an automatic Wheatstone. He praised highly the improved telegraph instruments exhibited by Messrs. Virag & Pollak, which produce messages in ordinary writing at the receiving station, thus saving the necessity of having a staff of clerks to interpret the signals. He thought that both in this country and in America we were within a measurable distance of introducing and using a printing and typing telegraph, so that the Morse system would soon be a thing of the past. The advance in telephony has been much more rapid than in telegraphy. He mentioned specially the abolition of the earth return, the use of a central battery, visual signalling and automatic exchanges. The central battery telephone switch of the Western Electric Company is being adopted all over America, and has been adopted by the Post Office and the National Telephone Company. Amongst curious developments

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he mentioned the "Telephone Hirmondo" at Buda-Pesth. Items of news are spoken into the main transmitting telephones at the central station every quarter of an hour, and they are repeated until fresh news arrives. Selections of music are also occasionally given. It is a substitute in fact for an evening paper and a theatrophone, and is very successful commercially. Another novelty in telephone working is illustrated in the capital of Mexico, where they have "free trade" in telephones. Any one is at liberty to open a telephone exchange, provided he undertakes to have intercommunication with the others. There are at present eight separate companies at work. The most interesting and the most promising of the inventions in this section shown at the Exhibition was the Poulsen telegraphone. A steel ribbon is made to pass rapidly before the diaphragm of the telephone, and this records the message. On passing this ribbon in front of the diaphragm at any subsequent time the message is repeated perfectly distinctly. In the opinion of the lecturer, Sir William Preece, Dr. Silvanus Thompson, and many others who spoke in the discussion, the Poulsen telegraphone was far superior to the phonograph, and many important possible applications of it were pointed out.

Christ's and St. Bartholomew's Hospitals.

THE Corporation of London, as Governors of St. Bartholomew's Hospital of the foundation of King Henry the Eighth, will promote a Bill in the ensuing session of Parliament to empower them to purchase by either compulsion or agreement the site and buildings of the Blue Coat School, with a view to the extension and improvement of their own hospital and its grounds. The site they propose to acquire abuts upon the hospital's south side, is bounded by Giltspur-street, Newgate-street, and Little Britain, and is situated in the parishes of St. Sepulchre, Christ Church, St. Bartholomew-the Less, and St. Botolph, Aldersgate. It is not commonly known that there formerly existed a foot thoroughfare from Newgate-street to a gate in the City wall, at the north-west corner of the Grey Friars great cloister, and so by "The Walke" to St. Bartholomew's Hospital. The walk and the gate in the City wall are plotted in one of some plans surveyed in and about 1540. The plans also mark a burial ground of Grey Friars as lying to the south-west of the Walk, and just outside the City ditch, with another graveyard for the "Poor of the Hospital" (of St. Bartholomew) within the precincts of the latter. The Walk was closed in 1818, and the gate in the City wall is now represented by a doorway (opening into the remoter hospital) in the north-west angle of "Great Cloister," Christ's Hospital.

Churches in Leeds.

A PARLIAMENTARY Bill is promoted for the constitution of a body of trustees with authority to pull down and dispose of the three churches of St. Paul, St. Philip, and St. Stephen, Burmantofts, together with their several graveyards, vaults, &c., schools and vicarages, also the St. Luke's, St. Thomas's, and St. Barnabas's Schools and St. Edmund's Vicarage, and to apply the proceeds towards the formation and endowment of certain new ecclesiastical districts, with churches, mission rooms, schools, and houses of residence for the incumbents or ministers of the new districts. The church of St. Philip, in Wellington-street, was built in 1846-7, under the Act 6 and 7 Vic. c. 37, at a cost of 5,000*l.*, after the plans and designs of Mr. R. D. Chantrell, of Leeds. The church of St. Stephen, designed by Mr. J. Dobson, of Leeds, was erected in Accommodation-road, 1853-4, and cost about 3,000*l.*; whilst St. Paul's stands upon a site in Park-square given by Dr. Wilson, Bishop of the then diocese of Bristol; it was built of stone at a cost of 10,000*l.* after the classical style with an Ionic portico and pediment and was renovated eighteen years ago.

Society of Painters in Water-colours.

THE thirty-ninth exhibition of the Society of Painters in Water-colours contains an unusually large proportion of interesting works, though several of the leading artists are not quite at their best; Mr. Tom Lloyd, for instance, whose "Sea Pinks, Alderney" (54), is a beautiful and delicately-treated coast scene, but one or two others of his are less interesting than usual. Mrs. Allingham is of course always good, but her contributions this year do not reach her highest standard. The landscape, "Downs near Westerham" (199), is noticeable for the unusual fact that it contains no figures. On the other hand, Mr. Thorne Waite's large drawing "The Lock" (59), in the centre place at the top of the room, is one of the finest things he has done; the only contributor, perhaps, of whom this could be said. Mr. Chas. Gregory's highly-finished but not very powerful style in landscape is well illustrated in "A Primrose Path" (10), a tangle of delicately-coloured foliage; the same effect is repeated in "A Surrey Town" (18). Mr. R. W. Allan contributes several of his broad bright effects of colour and sunlight, of which perhaps the best is "Montrose" (45); in the otherwise powerful drawing of "Honfleur" (26) the architectural detail is too much sacrificed to the total effect, considering what a prominent feature the church front is in the composition. Mr. Matthew Hales's "Sunset and Sunrise, North Cape" (20) is a brave attempt at a most difficult subject, an expanse of sea catching a red glow from the sky. Mr. Pilsbury's beautiful finish in landscape is best shown in "The Fall of the Leaf" (22), a most delicate and painstaking piece of work, except perhaps in regard to the water, which seems rather neglected, at all events not wrought up to the finish of the rest. In contrast with his work we have the finer and more poetic treatment of Nature by Mr. Eyre Walker; among his drawings may be especially noticed "The South Downs, from Ashdown Forest" (134), for truth of light, colour, and distance, and a true broad water-colour style. Miss Rose Barton exhibits two pictures of an old garden with masses of clipped hedges, fine in general effect, but there is a want of texture in the clipped hedges, which might be almost any material. Mr. Cuthbert Rigby, who may be classed with Mr. Eyre Walker as a landscape painter, contributes seven works, of which "Rainsborrow Crag" (185) is the most striking. Architectural subjects enter pretty largely into the collection; Mr. Albert Goodwin has a view from the roof of Milan Cathedral, a splendid subject, which wants a more forcible treatment of foreground detail to make it fully effective; Mr. Rooke, besides some small drawings in which buildings predominate, sends a large and really fine architectural picture of "Senlis Cathedral" (191). Mr. Walter Crane's small landscape sketches are interesting, especially "Dunwich" (72), which gives a remarkably true impression of the place; but why did he send in such a thing as "An English Rose" (57)? and why, if he sent it, was it hung? Among other works which should not be passed over are Mr. Herbert Marshall's "A Grey Morning, Whitby" (111); Mr. Hemy's "Study from Nature for the Boat in the 'St. Mawes'" (95); "A Study in Colour" (178) by Mr. Thorne Waite—flowers in a green vase; and "Goldsmith awaiting Dr. Johnson" (218), by Mr. Smallfield. The introduction of a cartoon for stained glass (179), by Mr. Louis Davis, although the work itself is very good, seems rather out of place in an exhibition of this kind.

Mr. Moffat Lindner's Exhibition.

AT Mr. Dunthorne's Gallery in Vigo-street is a small collection of water-colour sketches by Mr. Moffat Lindner of "The Harbours of Bergen and the Rivers of Dordrecht." These are rapid impressions of the light and colour of scenes in most of which shipping craft of various kinds form the prominent features; they are very interesting as suggestions or records of effect, except that the water is almost entirely neglected—apparently regarded as a white surface on which to plant ships. No. 4, for instance, is called "A Good Breeze," but where is the effect of the breeze on the water? It is left to the imagination: and in a breeze the general effect of water is usually dark rather than light.

Camberwell School of Arts and Crafts.

THIS school has just held its first annual exhibition of students' work from November 20 to 26. The school was opened in January 1898, in a building erected in memory of Lord Leighton by the Vestry of Camberwell, in order to provide instruction in those branches of design and manipulation which directly bear on the more artistic trades. The exhibition was supplemented by cases of the more finished productions of the Central School of Arts and Crafts in Regent-street, which added to the interest of the exhibition, and should have been very instructive to the students of Camberwell. The school is divided into sections under "art classes" and "technical classes." On both sides there is evidence of a good beginning having been made. The art classes are confined to figure drawing and design, the best results of which seem to be in pen and ink studies, those by Mr. R. Richardson and Miss M. Ballard being among the list. On the technical side there is a fair show of work done. In the embroidery exhibits there is an evident lack of study of the design and colour of old work; there is a certain rawness even in the best work done in this class. Of the other classes there is no remarkable exhibit, unless it is in the practical cabinet-making class, where Mr. H. Martin has made an overmantel, very fair in design and apparently of sound workmanship; there is some good inlay in this class by Mr. G. W. Cole.

Hindley Public Offices Competition.

THE instructions issued to architects for this competition form a more curious example than usual of the ignorance with which such

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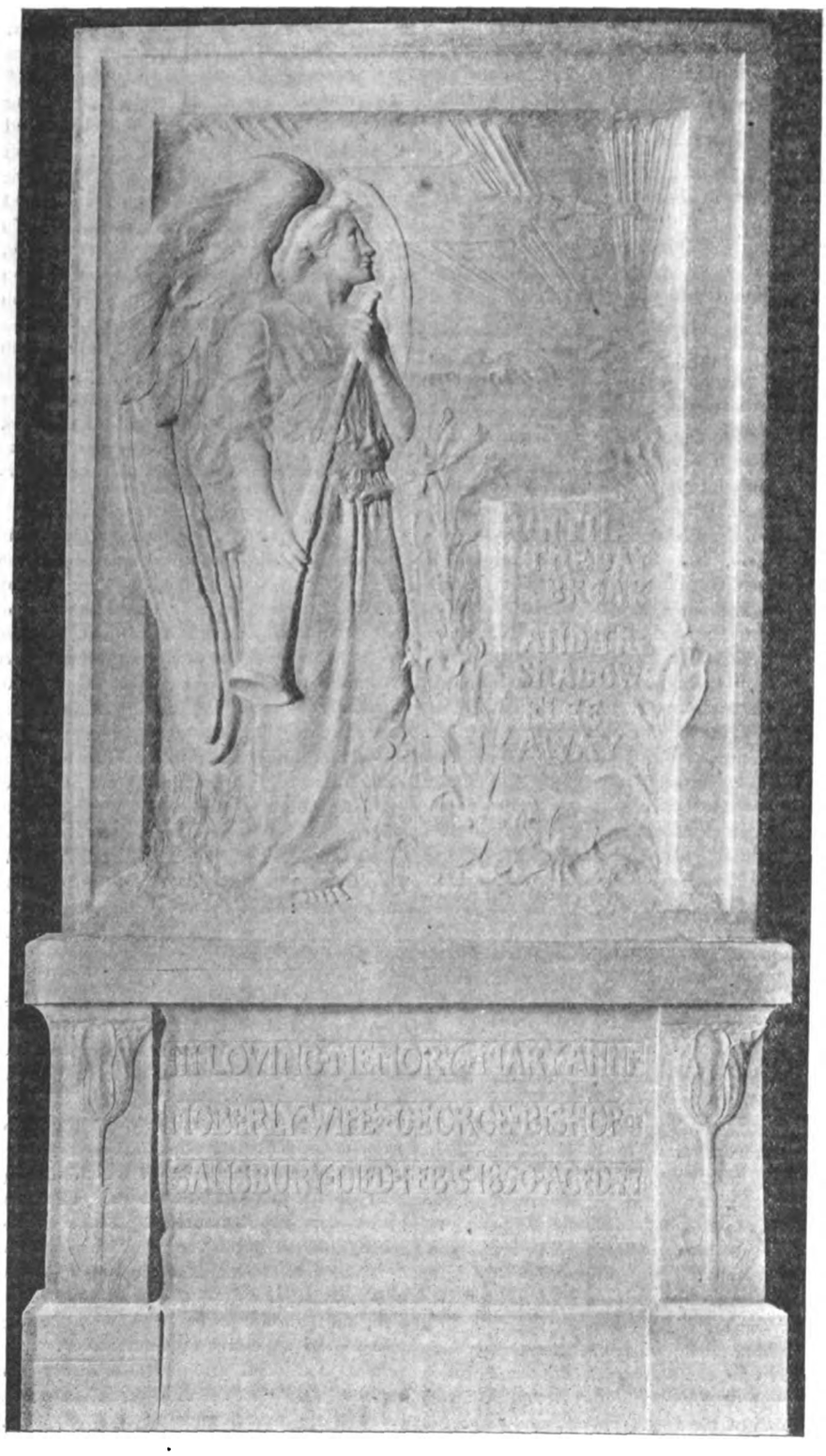

Memorial Tablet, Salisbury Cathedral. Miss E. M. Rope, Sculptor.

documents are drawn up by small public bodies who seek no advice beyond that of their own surveyor. To begin with, the sum named, 5,000*l.*, is utterly inadequate for the building required. The Council will make their own selection of what they think the three best designs, and give premiums of 50*l.* 25*l.* and 10*l*, for which sums all these three sets of drawings "are to become the property of the Urban District Council of Hindley, who are not to be bound in any manner by anything done under, or in connection with, the competition, beyond paying the premium." Finally, and as a crowning insult to the profession, it is added, "Each competitor must state the terms upon which he would be prepared to superintend the carrying-out of his plans." What architect of any standing or respectability do the Council expect will compete on those terms?

MONUMENTAL TABLET IN SALISBURY CATHEDRAL.

THE tablet with inscription, illustrated here, has just been put up in Salisbury Cathedral to the memory of Mrs. Moberly, widow of the late bishop of the diocese. It is of white marble, measuring 5 ft. in height and 2 ft. 7 in. in width, and is placed upon the plinth against the south wall of the south-east transept, adjoining the monument to Bishop Burgess. The sculpture represents a figure of an angel standing watching for the dawn of the Resurrection morning. In the right corner is a stone bearing the inscription, "Until the day break and the shadows flee away." The dedicatory inscription occupies the plinth of the monument.

The work was designed and modelled by Miss E. M. Rope.

MORTARS FROM SILCHESTER.

IN continuation of his researches respecting the chemical composition of ancient mortar as existing in our old abbeys, castles, and Roman ruins (see *Builder*, June 18, 1892, and February 11, 1893), the writer has much pleasure in sending the following analysis of a specimen of mortar taken from the old Roman camp at Silchester, together with a photo-micrograph of the sand magnified twenty-five diameters, which was taken by the writer's chief assistant, Mr. Albert Ashe, whose name was associated with the previous illustrations:—

Analysis of Mortar from Roman Camp at Silchester.

Water (lost at 212° Fahr.)	1·46
Combined Water	2·88
Lime	22·70
Magnesia	·23
Potash	·36
Soda	·15
Oxides of Iron	1·95
Alumina	·30
Sulphuric Acid	·08
*Carbonic Acid	15·46
Gelatinous Silica soluble in Alkali	12·10
Insoluble Matters (Sand), &c., &c.	42·33
	100·00

On comparing the above results with those published in the *Builder* of the dates referred to, also with the analysis of mortar from Peterborough Cathedral published in the issue of February 20, 1897, it will be seen that this mortar is of exceptionally good quality, for not only is the lime present in high proportion to the sand, namely, as 1 to 1·86, but the figures for gelatinous silica soluble in a 10 per cent. solution of caustic soda are also exceptionally high—namely, 12·10 per cent.

In commenting upon the mortar from Peterborough Cathedral, attention was drawn to the fact that a high percentage of lime was not necessarily an indication of the superior quality of mortar, for though there was as much as 28·25 per cent. of lime present in the Peterborough specimen, the mortar was of very inferior quality, much of the lime being due to the calcareous nature of the small stones and gravel, consisting largely of cretaceous chalk, associated with the original mortar.

The figures for gelatinous silica in the Peterborough mortar only amounted to 3·55 per cent., or about one-fourth of the quantity found in this mortar.

It is really the proportion of gelatinous silica associated with the lime that constitutes, in the writer's opinion, the best test of the quality of mortar; and it would be of practical interest to ascertain the particular locality from whence the lime used in the preparation of the Silchester mortar was obtained, because the gelatinous silica is usually associated with the lime rather than with the sand employed.

Chalk lime contains only 1 to 2 per cent. of soluble silica, greystone contains 9 to 10, Aberthaw 15, while the best Portland cement contains as much as 20 to 22 per cent.

As regards the sand employed in this mortar, the illustration shows that it is of good quality,

Specimen of Sand used in the Mortar, Magnified 25 Diameters.

being fairly uniform in size, with irregular rough edges, and very different from the smooth rounded shape and water-worn appearance so graphically illustrated in respect

* Equal to carbonate of lime, 35·13.

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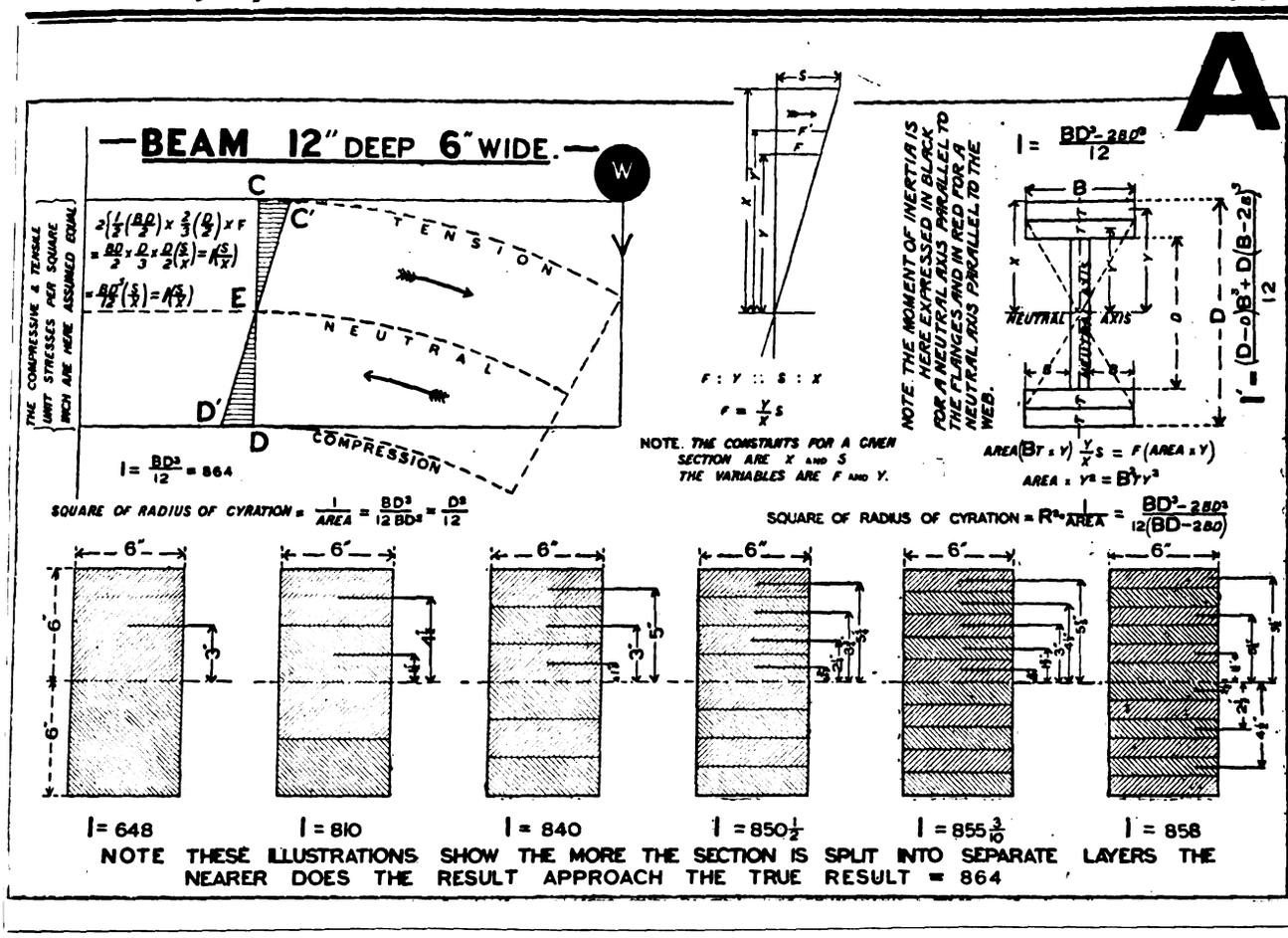

of the sand in the mortar of Rochester Castle (*Builder*, June 18, 1892).

Of minor importance, but for the sake of comparison, it is interesting to notice that the figures for magnesia, oxides of iron, alumina, and sulphuric acid are all low in this Silchester specimen of mortar.

JOHN HUGHES, F.I.C.,
District Agricultural Analyst for Herefordshire.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary fortnightly meeting of this Association was held on Friday last week in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, W., the President, Mr. W. H. Seth-Smith, in the chair. On the invitation of the Committee of the Association, a large number of members of the Institution of Junior Engineers were present, and the meeting room was more than usually crowded.

The minutes of the last meeting having been read and confirmed,

Mr. G. B. Carvill, hon. secretary, announced some donations to the library.

The following gentlemen were then elected members of the Association: Messrs. R. P. Jones, J. F. McIlwraith, P. W. Mulready, J. M. Pilkington, and S. N. Simmons.

The Use of Rolled Joists in Construction.

The Chairman, in calling on Mr. A. T. Walmisley to read a paper on "The Use of Rolled Joists in Construction," said that Mr. Walmisley had been very unwell lately, and it had been a special effort for him to prepare his paper for the occasion; consequently they would feel the more indebted to him for the trouble he had taken in the matter.

Mr. A. T. Walmisley, before reading his paper, described some diagrams which he had had prepared for the occasion, and which are reproduced in this issue of the *Builder*, after which he read the following paper:—

"It is necessary, in the first place, to understand the influence of the moment of inertia when considering the moment of resistance of a section.

Referring to diagram A, fig. 1, maximum stress (tensile), CC'. Maximum stress (compressive) DD'.

If in fig. 2, S = safe stress per sq. inch in the outside fibre CC' or DD' and x = its distance from the neutral axis and b (see fig. 3) = breadth and t = thickness of layers in section, then bt = area = a, and if y or y' = distance of centres of area from the neutral axis, moment of resistance of outside plate or layer = $(a \times y)\frac{y}{x}S = f(a \times y)$, because the strain being zero at E and a maximum at a distance x from E, it will at a distance y from E have a unit value of $\frac{y}{x}S$, which, multiplied by the area, gives the total strain in the layer acting at a distance y from the neutral axis.

$(a \times y)\frac{y}{x}S$. Now x and S in this equation being constant for every area in the section, they can be eliminated and applied after summation. The formula then gives what is called the moment of inertia = $I = Ay^2$ and $\frac{I \times S}{x}$ = moment of resistance.

Typical Section, 12 in. × 6 in.—Calculated by the formula $\frac{bd^3}{12}$ we find

$$I = \frac{6 \times 1728}{12} = 864$$

and referring to the dividing up of the above section as shown in the diagram,

$$I = 36 \times 3^2 = 324 \times 2 = 648$$
$$I = 18(4{\cdot}5^2 + 1{\cdot}5^2) = 405 \times 2 = 810$$
$$I = 12\,(5^2 + 3^2 + 1^2) = 420 \times 2 = 840$$
$$I = 9(5{\cdot}25^2 + 3{\cdot}75^2 + 2{\cdot}25^2 + {\cdot}75^2) = 425{\cdot}25 \times 2 = 850{\cdot}5.$$
$$I = 7{\cdot}2(5{\cdot}4^2 + 4{\cdot}2^2 + 3{\cdot}0^2 + 1{\cdot}8^2 + {\cdot}6^2) = 427{\cdot}68 \times 2 = 855{\cdot}36.$$
$$I = 6(5{\cdot}5^2 + 4{\cdot}5^2 + 3{\cdot}5^2 + 2{\cdot}5^2 + 1{\cdot}5^2 + {\cdot}5^2) = 429 \times 2 = 858.$$

The above trials show that in proportion to the number of horizontal sections taken, the nearer to the truth will be the result.

The late Sir William Siemens, addressing the Iron and Steel Institute in 1877, stated that the use of steel for structural purposes could only be said to date from the year of the Great Exhibition of 1851. Its manufacture is now well understood. It is found to be a complex structure, and not the homogeneous mass it is often supposed to be. Addressing the Iron and Steel Institute this year (1900) Sir William Roberts Austen stated that "in 1,000 parts of steel, 997 parts, more or less, may be iron and the rest carbon," but that the result of the union is a metal that is more widely used and has more varied attributes than any other material.

The interdependence of small percentages of matter on the larger masses in which such minute contributions are hidden is one of the chief studies of metallurgists of the present day, and the chemistry of steel shows the effects produced by the existence of phosphorus, silicon, manganese, and sulphur in the material, rendering some kinds of steel comparatively soft, while others were extremely hard. The mode adopted for either rapid or slow cooling was seen to have an influence. The committee appointed by the Board of Trade to inquire into the loss of strength in steel rails through use on railways, consequent on the St. Neots accident of December 10, 1895, after four years' labour in their report issued this year state that, as regards chemical composition, they do not think it desirable to insist upon too high a proportion of carbon, manganese, or silicon in the steel, having regard to the ordinary contingencies of manufacture and the greater susceptibility of high carbon steel to thermal influences, but beyond giving tabular results of investigation of individual specimens, the committee, while establishing the conclusion that the evidence is not sufficient to justify a decisive verdict respecting percentages, nevertheless insist on the importance of securing as low a proportion as possible of phosphorus, sulphur, and silicon in steel which is to be manufactured into rails, and these precautions would apply in a similar way to rolled joists.

The St. Neots rail was a Bessemer steel (80 lbs. per yard) bull-headed rail, laid in 1873 on the Great Northern Railway up line, and transferred to the down line after thirteen years' service on the up line during repairs at some date not recorded. Its failure may have been due to local stresses unavoidable at the joints, and independent of the chemical composition of the steel, but which joints need constant periodical inspection.

Although iron does not combine with carbon at ordinary temperatures, yet the union may be effected when brought into contact at a red heat. Mild steel containing a proper percentage of carbon is produced by the Bessemer as well as by the open hearth processes both with either acid or with basic lining to the convertor or hearth. The open hearth process is more under control, and gives more time to adjust the composition than the Bessemer converter, and hence is generally preferred. In the Bessemer or pneumatic process, molten pig-iron is blown through, the carbon and other elements burned out, and then the desired proportions of carbon and man-

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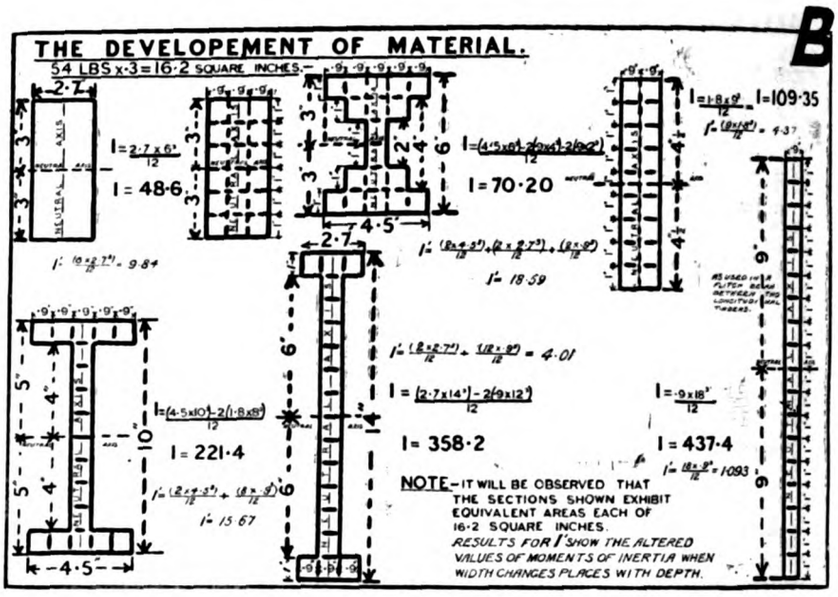
ganese are added, and the whole process is over in, say, twenty minutes. Hematite pig-ron is used in connexion with acid linings. With silicious linings such as ordinary firebrick, basic slag would would combine with it and eat it away. Calcined magnesian limestone is generally used for a basic lining, and hence the process is called basic. We have the treatment of pig-iron with certain classes of iron ores without the addition of scrap, according to the direct open-hearth process of the late Sir Wm. Siemens, and the fusion of a mixture of pig and scrap iron or scrap steel in the open-hearth process of Messrs. Siemens-Martin, in which the steel is dead melted and the process allows time to draw samples for testing and time to doctor up the mixture as required. Pig irons containing but little carbon or silicon are preferable for the open-hearth process. Phosphorus aids cold shortness, *i.c.*, breakage cold and unexpectedly, while sulphur aids red shortness. A deficiency of silicon results in inferior metal. Only the purer kinds of pig-iron can be operated upon in silicious or acid-lined furnaces, while with basic linings, more impure phosphoric pig-irons can be used, and the slag of the basic process contains from 10 to 18 per cent. of phosphoric acid, which is ground up for use as a fertiliser. The higher the carbon the higher the tensile strain. This can be regulated in the open-hearth process without expense. For thin material the carbon is kept low, and for thick material it is kept high. The operation of rolling hardens it. The sulphur and phosphorus should be below ·06 per cent. The lower the steel is in phosphorus, the less susceptible is it to crystallisation when punched. Some experiments upon bars 2 in. by $\frac{5}{8}$ in., punched with a $\frac{3}{4}$ in. diameter hole, leaving $\frac{1}{16}$ in. clearance, were made upon acid and upon basic open-hearth steel. The acid system gave bars with ·08 per cent. phosphorus, and the basic system gave bars with ·03 per cent. phosphorus. The acid bars were broken by the process, and were found to have crystallised from the punch-hole to the edge of the bar. The basic bars showed no effect of the punching. Both the acid and basic steel experimented upon was ordinary structural steel running from ·2 to ·3 per cent. of carbon. Experience shows that the lower the phosphorus, other elements being the same, the less is the steel affected by cold working. The connexions in all steel work is preferably made in holes carefully drilled.

Messrs. Dorman, Long, & Co. (Middlesbrough) adopt a proportion of between 0·16 and 0·25 per cent. carbon in their steel by the Siemens-Martin process. Owing to the supplies of the best hematite ores becoming scarce, the quality of this kind of ore is inferior to what it was a few years ago, and it is very difficult to keep the sulphur and phosphorus below expedient limits. This is one of the reasons which has led Messrs. Dorman, Long, & Co. to adopt the manufacture of steel from Cleveland iron, the phosphorus being eliminated by lime and the sulphur by calcium chloride. They find that they are able to obtain better results than they could with the old hematite iron, and by keeping records of frequent analysis, and having meanwhile the furnace under control, they supply the sections which give satisfaction.

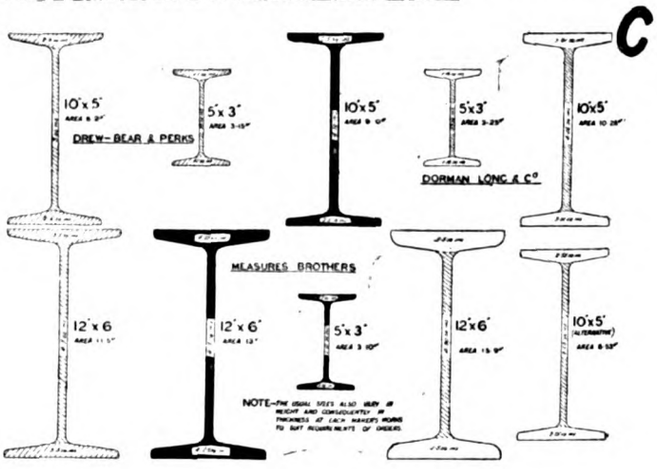
At the Earl of Dudley's Round Oak Iron and Steel Works, Brierley Hill, they adopt the basic open hearth process, and can produce anything from ·1 to ·3 carbon that punches cleanly and works satisfactorily. The Shelton Iron and Steel Company also adopt the basic open hearth process.

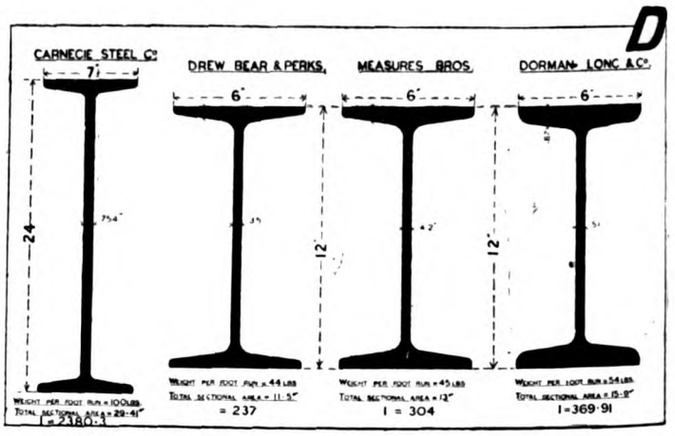
A large number of joists used in construction are too shallow. The proportionate depth to the span should be $\frac{1}{12}$, but should never be less than $\frac{1}{20}$ of the span. The advantage of depth over width is shown in diagrams E and F. To the former we shall allude presently, but in the common form of placing one stock section over another it will be seen upon reference to diagram F that the flanges which are united in the centre do not materially assist the moment of inertia of the section. Hence the tendency to deflection obviated by the use of two joists employed as shown in diagram F could be better provided for by the adoption of a made-up girder with angle-irons and plates in which the metal of the double centre could be transferred to the top and bottom flanges. When girders have to carry a floor to which a plastered ceiling is to be suspended, comparative stiffness is indispensable to prevent sagging, and the consequent cracking of the plaster, and should be designed under such circumstances so that the deflection does not exceed $\frac{1}{360}$ in. per foot of span, but this ratio might even be reduced with advantage.

Makers' catalogues show the sizes and weight of joists kept in stock, and in some cases add the safe distributed loads over various spans for each joist, but do not state the breaking strain assumed, or if they do give this, they do not add the factor of safety taken to arrive at the amount of stress per square inch. Hence it is not generally fair to say that because one list gives higher loads than another list that the joists are superior. In each case the designer must determine the safe working load for himself, and see that both the flanges and the web are each capable of sustaining their due proportion of strain. The joists sometimes come in from the mills not as true as one could wish, the flanges not being parallel. This is more noticeable in the wider sections, the 8 in. by 6 in. especially. Such wide sections, also 9 in. by 7 in., are more suitable for stanchions than girders.



DIAGRAMS ILLUSTRATINC VARIATIONS IN AREAS OF FLANCES & WEB BY DIFFERENT MAKERS OF STOCK SIZES





When a wide dimension is needed for girder work, for the support of a wall or other purposes, two rolled joists are introduced as shown in diagram E, which illustrates the effect of adding top and bottom flange plates to form the connexion, and shows the theoretical corresponding thickness of web that would be equivalent to the work of ordinary flange plates. As a rule, in single joists the width of the flange should be sufficient to resist flexure in a horizontal, plane, or lateral bending. When the boom is of insufficient width the girder will fail by the lateral deflection of the top bay or boom rather than vertical buckling.

Professor Rankine has deduced the following formulæ for the ultimate strength of the top booms of small girders as regards resistance to lateral flexure :—

$$t = \frac{f}{1 + a\,r^2}$$

where t=the ultimate average thrust per square inch upon the flange area.

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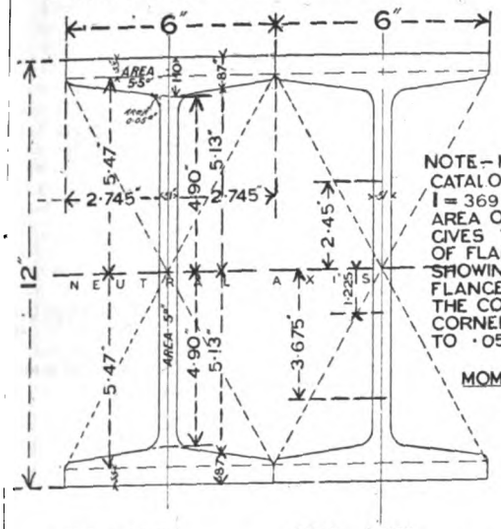
2 JOISTS 12"x 6"

SECTIONAL AREA = 16"x2 = 32"
WEIGHT PER FOOT RUN = 54 LBS x 2 = 108 LBS.



NOTE—MESSRS DORMAN LONG'S CATALOGUE STATES THAT I = 369·91 FOR A SECTIONAL AREA OF 15·9 SQ. INCHES AND GIVES THE MEAN THICKNESS OF FLANCE AS ·87 INCH SHOWING THAT THE STATED FLANCE THICKNESS INCLUDES THE CONSIDERATION OF THE CORNER AREAS EACH EQUAL TO ·05 SQ. INS.

MOMENT OF RESISTANCE

$$R = \frac{I \times S}{\frac{1}{2}D}$$

AREAS	DEPTH		
5·5" x	5·47² =	164·564	
2(·05)" x	4·90² =	2·401	
2·5" x	2·45² =	15·006	
		181·971	

$I = \frac{363·942}{2}$

AREAS	DEPTH		
5·5" x	5·47²	164·564	
2(·05)" x	4·90²	2·401	
(1·25" x	3·675²	16·882	
1·25" x	1·225²	1·875	
		185·722	

$I = \frac{371·444}{2}$

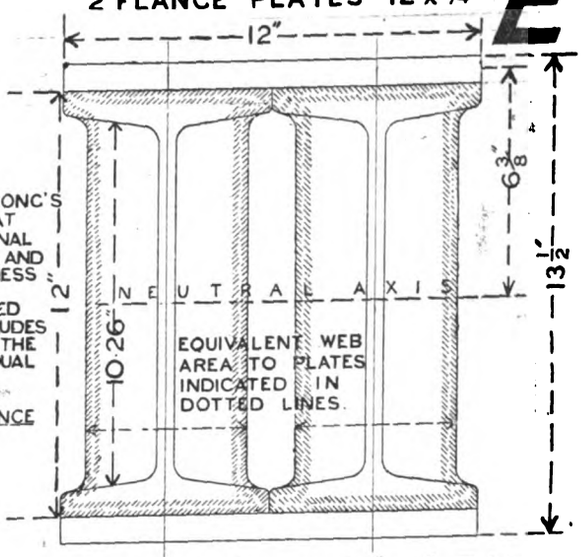
$I = \frac{(6 \times 12^3) - 2(2·745 \times 10·26^3)}{12} + 4(·05 \times 4·9^2)$ $I = 374·68$

$I = 369·88 + 4·80 = 374·68$

$I = 749·36$

E

2 JOISTS 12"x 6"
2 FLANCE PLATES 12"x ¾"



I FOR 2 R.S. JOISTS 12"x 6" = 749·36

I' FOR 2 FLANCE PLATES 12"x ¾" =

$= 2\left\{12 \times \frac{3}{4} \times \left(6\frac{3}{8}\right)^2\right\}$, OR $\frac{(12 \times 13\frac{1}{2}^3)}{12} - \frac{(12 \times 12^3)}{12} = 732·37$

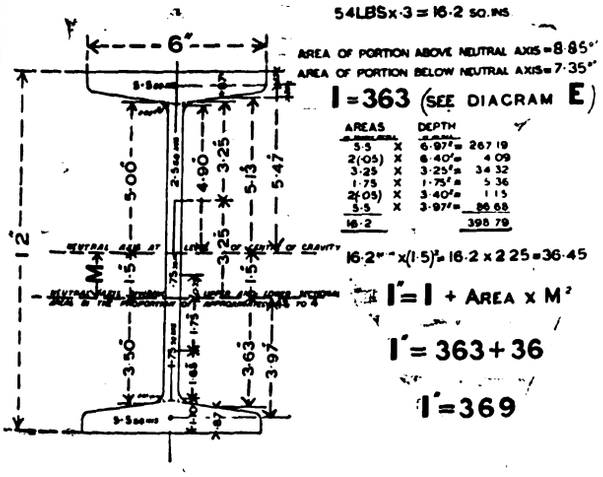
THEN $I + I' = 749·36 + 732·37$

$= 1481·73$

EXAMPLE OF MOMENT OF INERTIA CONSIDERED WITH REFERENCE TO NEUTRAL AXIS NOT COINCIDENT WITH CENTRE OF GRAVITY OF THE SECTION.

JOIST 12"x 6" WEIGHING 54 LBS PER FOOT RUN

54 LBS x ·3 = 16·2 SQ. INS



AREA OF PORTION ABOVE NEUTRAL AXIS = 8·85"
AREA OF PORTION BELOW NEUTRAL AXIS = 7·35"

I = 363 (SEE DIAGRAM E)

AREAS	DEPTH	
5·5 x	6·97² =	267·19
2(·05) x	6·40² =	4·09
3·25 x	3·25² =	34·32
1·75 x	1·75² =	5·36
2(·05) x	3·40² =	1·15
5·5 x	3·97² =	86·68
16·2		398·79

$16·2" \times (1·5)^2 = 16·2 \times 2·25 = 36·45$

$I' = I + \text{AREA} \times M^2$

$I' = 363 + 36$

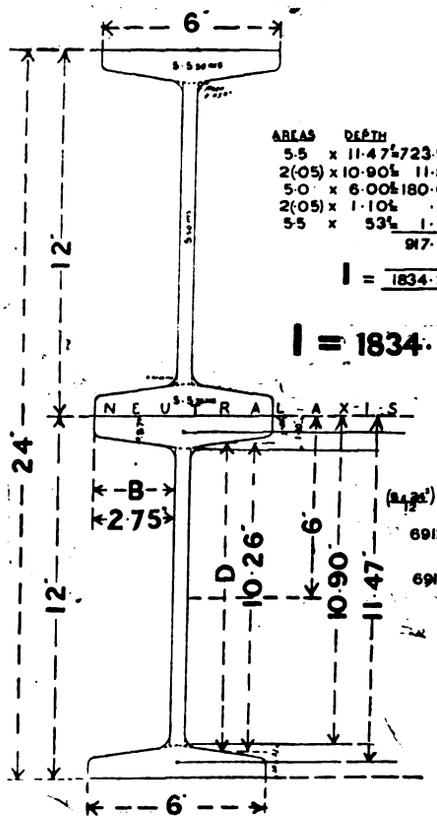
$I' = 369$

HENCE THE MOMENT OF INERTIA CONSIDERED WITH REFERENCE TO A NEUTRAL AXIS SITUATED AT A VERTICAL DISTANCE M FROM THE CENTRE OF GRAVITY EQUALS THE MOMENT OF INERTIA CONSIDERED WITH RECARD TO THE CENTRE OF GRAVITY PLUS THE AREA OF THE SECTION MULTIPLIED BY THE SQUARE OF M

F

2 JOISTS 12"x 6"

SECTIONAL AREA = 16"x 2 = 32"
WEIGHT PER FOOT RUN = 54 LBS x 2 = 108 LBS.



AREAS	DEPTH	
5·5 x	11·47²	723·584
2(·05) x	10·90²	11·881
5·0 x	6·00²	180·000
2(·05) x	1·10²	·121
5·5 x	5⅜²	1·544
		917·130

$I = \frac{1834·260}{2}$

$I = 1834·260$

$\left(\frac{B+t}{12}\right)^3 = 2\left(\frac{2·75}{12}\right)\left\{2\left(10·26 \cdot \frac{·87}{2}\right)^2 + 2\left(5·5 \cdot \frac{·87}{2}\right)^2\right\}$

$6912 = \frac{11}{24}(22·26)^2 + 3·08$

$6912 = 5056 + 3 = 1859$

$I = 1859$

r = the ratio of length of flange to width.
f = 16 tons per square inch or such other value to suit the material in use.
a = a constant which equals $\frac{1}{6000}$ for a flat boom.

When more than a single girder is employed, if the circumstances are such as to admit of the flanges being braced horizontally together like a horizontal lattice girder, not only material may be saved, but the advantage of the inside surfaces of the girders that are so connected is secured for inspection and for facility of forming the connexions.

Generally speaking, the width of the upper flange of a girder, when not stiffened laterally

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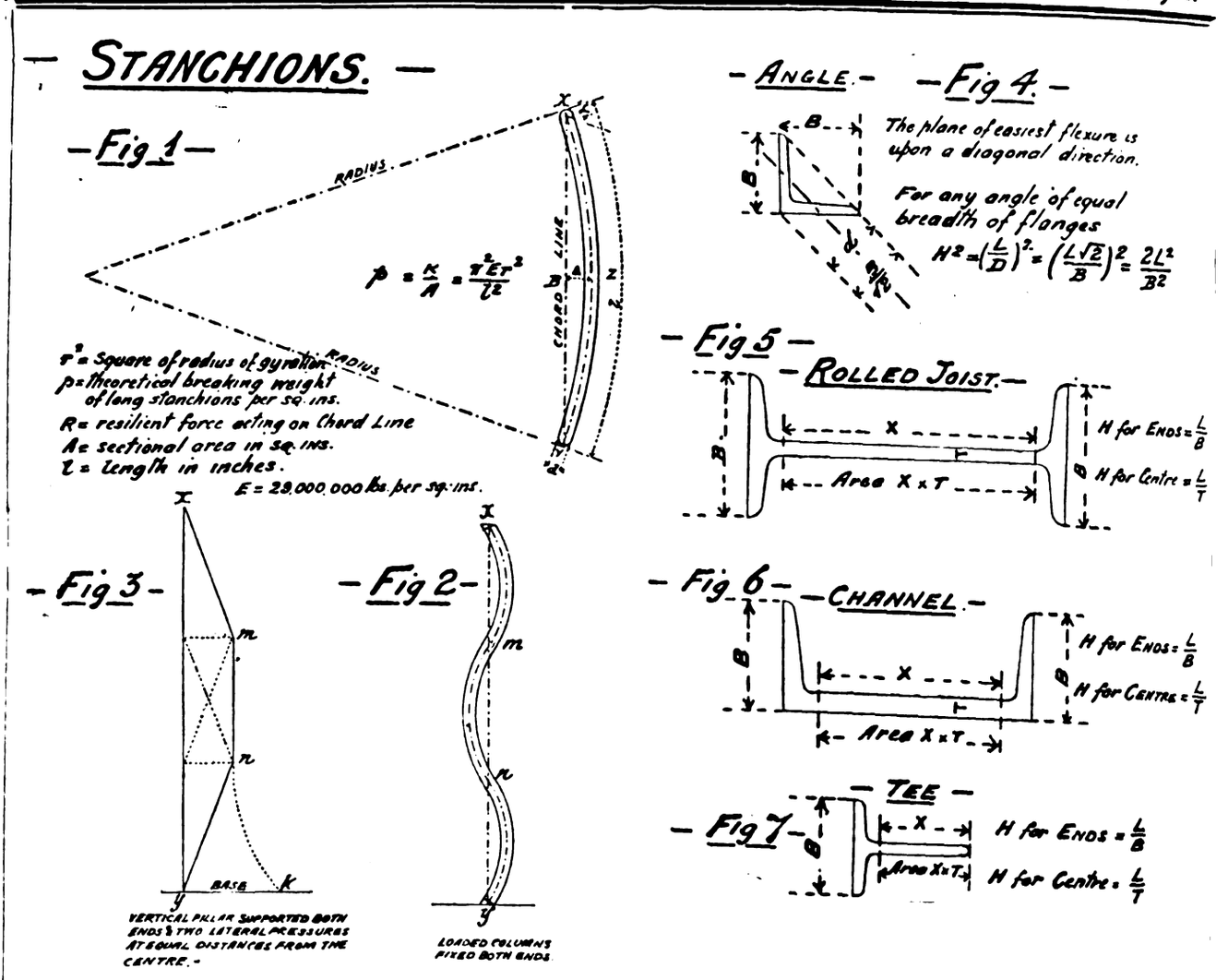

by additional connexions, should be $\frac{1}{30}$ to $\frac{1}{40}$ of the span, so that if the depth is assumed as $\frac{1}{12}$ of the span the width would be $\frac{2}{5}$ of the span, showing that if the usual stock sizes be taken of 10 in. by 5 in., or 12 in. by 6 in., the proportion of half the depth for the width of flange is ample. The width of the lower flange needs to be such as will give a proper bearing on the piers, or if the beam is suspended from the top flange, a sectional area to resist the tension produced by the loads. It is useful to remember that in long girders the web of a joist is more likely to fail near the points of support than in the centre, not only on account of the action of shearing strain, but on account of the conditions of rolling. Hence at the works it is found well to crop off the ends after rolling long lengths so as to obtain a more uniform strength of section throughout.

In connecting rolled joists at right angles to one another, when one is "machine special notched," a good distributing bearing for the transverse joist upon the lower flange of the longitudinal joist is secured at the connexion. This is illustrated on the diagrams G and H hung on the wall; in the former the web only is cut, in the latter the flange to secure the desired bearing.

In considering bearings, girders should rest on a wall, and not merely upon a pier attached to a wall. The writer has seen girders resting upon what appeared like a pier in plan, but which had simply been brickwork corbelled out.

The higher the wall the less the pressure from the girder upon the ground.

Where joists rests on timber, masonry, or brickwork, bearing plates are invariably introduced to distribute the weight, and such plates should be thick enough to countersink the rivets of attachment to the joists on the under side of the bearing plates. When such plates are set back from the front edge of the wall or stone on which they are placed they exercise the same effect as chamfering the edge of the template.

In the Paris Exhibition of 1867 a rolled beam was exhibited measuring 1 metre (39⅜ in.) in depth, 10 metres (33 ft.) in length, and weighed 2½ tons. This beam, instead of being rolled in the usual way, was subjected to the pressure of four rollers, by which process the quality of the iron in the flanges was preserved as well as that of the web.

The Carnegie Steel Company roll a beam 24 in. by 7 in. to 80 lbs. per foot and moment of inertia = 2,087. Their joists generally present a good finish free from surface imperfections and straight. The American joists hitherto seem to contain a slightly larger amount of phosphorus in their composition than the British manufacture. They give, for example, a test of 0·08. Ours is about 0·06. The Americans have, however, practically discontinued manufacturing acid open hearth steel, and now make only basic steel, which they assert to be purer chemically. The American joists are at present cheaper than the English, but this, of course, is only peculiar to the moment.

French joists to a reasonable specification are fairly satisfactory, but are not much cheaper than our own when the cost of carriage is added. They adopt the Siemens-Martin basic system. There is nothing fixed for the percentage of carbon, phosphorus, silicon, manganese, or sulphur. Tests are applied by the engineer during use to test hardness and other requirements. They specify 32 kilogrammes per square millimetre, with an elongation 8 per cent. for iron and 42 kilogrammes per square millimetre (26·6 tons per square inch) for steel.

The first national work in this country in which foreign iron was employed was the Natural History Museum, South Kensington, about the year 1869. The term "Belgian joist" is a generic term, as joists are made in France and Germany as well as in Belgium, and sold as foreign joists.

Results of 1,200 Tests of Foreign Steel Joists.

Limit of elasticity	Maximum	69·0 %
	Average	64·1 %
	Minimum	60·0 %
Ultimate stress in tons per square inch	Maximum	29·1 tons.
	Average	28·08 "
	Minimum	27·2 "
Elongation per cent. in 8 in.	Maximum	28·0 %
	Average	24·39 %
	Minimum	20·5 %
Reduction of area per cent.	Maximum	60·2 %
	Average	50·53 %
	Minimum	42·4 %

The above were German manufactur

Observe how even are the results recorded, due probably to the fact that the Germans are good chemists.

As to British, German, Belgian, and American make, all these countries have manufacturers whose output is thoroughly good and reliable. There is no difficulty in obtaining foreign material that will stand the required tests, and the result of foreign competition has been that many of the British rolling mills who roll joists are now better equipped than formerly. At the same time, the foreign ordinary commercial joist delivered into this country, from Belgium in particular, is not a good joist, and frequently in some foreign joists the web is thickened to obtain the weight at the expense of a minimum flange. It must be remembered that wrought-iron does not flow like cast-iron, and it is difficult to get the material pushed up in rolls where the flanges are wide compared with the depth of joists. Iron joists are generally of greater sectional area than steel. They are the same depth and width, but weigh more per foot run on account of sectional area. Thus iron joists weighing respectively 50, 35, and 13 lbs. for 12 in. by 6 in., 10 in. by 5 in., 5 in. by 3 in. weigh in steel 44·30 and 11 lbs. per foot run.

Railway companies, for patriotic reasons, and more particularly for the benefit of their traders, usually insert a clause in their contracts that all materials provided by a contractor are to be obtained from traders who give their traffic to the company, and conveyed over the railways and canals (if any) belonging to the company. The manufacture depends mainly on the specification, and therefore both British and foreign steel may or may not be good, as the material known as mild steel may have almost any strength between that of hard steel and that of wrought iron.

The committee on the use of steel in railway structures appointed by the Board of Trade to consider the practicability of assigning a safe co-efficient, reported in 1877 that the steel employed should be cast steel, or steel made by some process of fusion, subsequently rolled or hammered, and that it should be of a quality possessing considerable toughness and ductility, and that a certificate to the effect that the steel is of this description and quality should be

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forwarded to the Board of Trade by the engineer responsible for the structure. Also that the greatest load which can be brought upon the bridge or structure, added to the weight of the superstructure, should not produce a greater strain in any part than 6½ tons per square inch.

As in the use of mild steel, the extension per ton per square inch is practically equal to the compression, it follows that the neutral axis of a section of steel strained transversely will be in the centre of gravity of its section; but as in wrought and in cast-iron sections the unit stresses, particularly in the latter, vary in the case of tension and compression, diagram F illustrates how the moment of inertia may be calculated from a neutral axis not coincident with the centre of gravity.

The qualities required in a steel or iron structure being chiefly of a mechanical nature, it is reasonable that the test should be mechanical, and, provided these tests are satisfied, the designer does not trouble himself about the chemical constituents. Tests are provided to detect brittleness and to secure toughness, combined with ductility, malleability, and the result of experiments show that the tensile resistance and limit of elasticity are the main objects of inquiry.

Tensile strength 27 tons to 31 tons per square inch ultimate with elongation of 20 per cent. in 8 in. lengthways and crossways of the same.

Some excellent results of tests for malleability are shown in the diagrams, figs. 8, 9, 10, and 11, which were made on steel supplied by Messrs. Drew-Bear, Perks, & Co.

Specification for mild steel plates and sheets as adopted by the Great Western Railway Company:—

1. All plates to be of British manufacfure.

2. All plates and sheets to be of the exact dimensions ordered, and to be uniformly throughout of the thickness specified.

3. All plates and sheets to be flat and free from blisters, scale, laminations, buckles, and all other defects.

4. All plates and sheets to be of such quality as to weld perfectly.

Strips cut lengthwise and crosswise to be capable of standing the following tests:—

Tensile Test.—Ultimate tensile strength to be not less than 24 tons nor more than 28 tons per square inch, with an elongation of at least 22 per cent. when the thickness of the sample is more than ⅞ of an inch, and with an elongation of at least 20 per cent. when the thickness is ⅞ or less; elongation in each case to be measured over a length of 10 in.

Temper Bending Test.—Strips 1½ in. wide, heated uniformly to a low cherry red and cooled in water of a temperature of about 80 deg. Fahrenheit, to stand bending in a press to a curve the inner radius of which is equal to the thickness of the plate.

Cold Bending Test.—Strips 1½ in. wide to stand bending cold in a press to a curve the inner radius of which is equal to the thickness of the plate.

Punching Test.—The material to be tested for ductility by punching cold a group of holes ⅝ in. to ¾ in. diameter, the edges of which shall not be more than $\frac{3}{16}$ in. apart.

All mild steel rivet, channel, angle, T, and other bars to be of such quality as to weld perfectly, and to have an ultimate tensile strength of not less than twenty-four tons, nor more than twenty-eight tons per square inch, with an elongation of at least 25 per cent.. measured over a length of 10 in.

All rivet bars to be rolled exactly round to gauges to be supplied by the railway company.

The material to be tested for ductility by being bent cold under a steam hammer; also by punching cold a group of holes ⅝ in. to ¾ in. diameter, the edges of which shall not be more than ½ in. apart.

Rivet bars, in addition to the tensile tests, must stand bending double, both hot and cold. The head heated to redness must stand flattening until its diameter is three times the diameter of the bar without cracking at the edge.

All wrought-iron plates, sheets, and bars to be of British manufacture, tough, fibrous, and of the highest smithing quality.

All plates, sheets, and bars to be of the exact dimensions ordered, and to be uniformly throughout of the thickness or section specified.

All plates, sheets, and bars to be free from blisters, scales, laminations, buckles, twists, and all other defects. All plates and sheets to be flat.

All plates, sheets, and bars to be of such quality as to have an ultimate tensile strength of:—

	Tons per sq. in.	Elongation.
Round and square bars and flat bars less than 6 in. wide	23	with 20 p.c. in 10 in.
Angle, tee, channel, and H bars, and flat bars over 6 in. wide	22	with 12 p.c. in 10 in.
Plates with the fibre	22	with 10 p.c. in 10 in.
Do. across the fibre	18	with 3 p.c. in 10 in.

and to admit of bending round a radius equal to the thickness when hot through an angle of 125 deg. with the grain, and 100 deg. across the grain, and when cold as follows:—

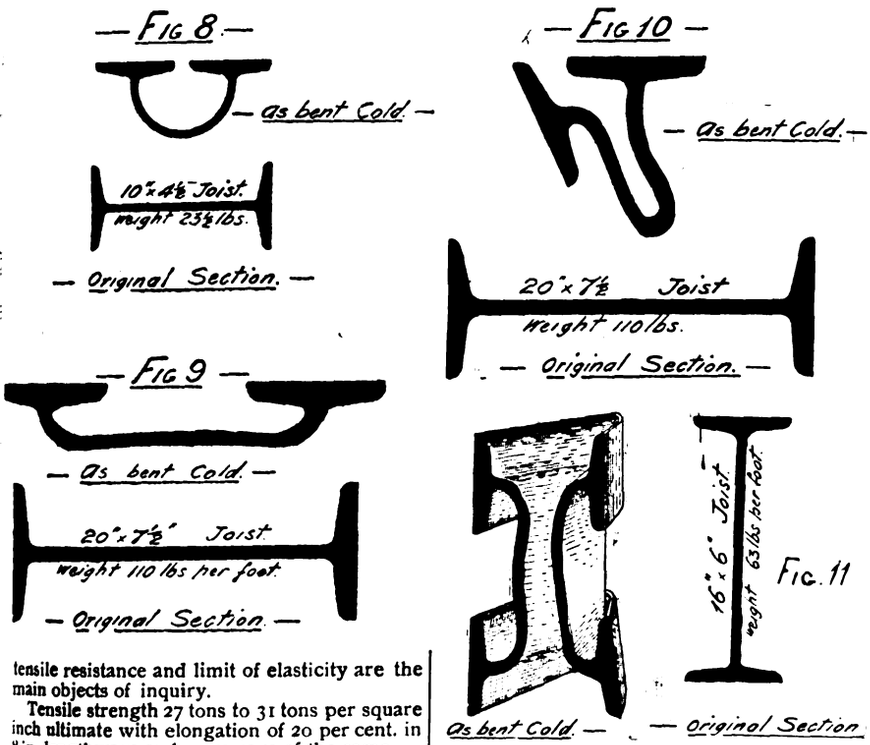
Bending test, 180 deg. to a diameter equal to thickness of piece tested without fracture on outside of bent portion. The elongation shall be measured on an original length of 8 in., except when the thickness of the finished material is $\frac{15}{16}$ in. or less, in which case the elongation shall be measured in a length equal to sixteen times the thickness; and except in rounds of ⅝-in. or less diameter, in which case the elongation shall be measured in a length equal to eight times the diameter of section tested.

The London and North-Western Railway Company specify that all steel shall be of British manufacture, produced by the Siemens-Martin open-hearth process, and of such quality as to withstand the following tests:—

Ultimate tensile strain not less than 28 tons per square inch, contraction of area at fracture for same not less than 40 per cent., extension in a length of 10 in. not less than 20 per cent.

Some authorities prefer to take the elastic limit rather than the ultimate strength of the material, but as they then employ a proportionately smaller factor of safety, the result is practically the same.

Thickness of plates ..... in.	1 and ⅛	⅞ and ¾	⅝	½	⅜	⅜	⅜	⅜	⅜	⅜	½	½	½	½	½
With the grain, through an angle of .. deg.	15	20	22½	25	27½	30	35	42½	50	60	70	75	85	95	
Across the grain, through an angle of .. deg.	5	7½	10	10	12½	12½	15	17½	20	25	30	30	40	50	



STANCHIONS.

It requires no long description to prove that a long and slender column always gives way by bending, but the reasons are not clear until we consider the question in a negative form and inquire why it should not bend? Referring to the diagram, a slender rod with rounded or hinged ends will bend like a bow, and the lateral resistances opposed to such bending will be similar to the vertical resistances offered by a rod supported at both ends over a free span when laid as a beam and loaded. In the latter case we know that the deflection is proportional to the amount and disposition of the load, so that to produce a great deflection we have to introduce a proportionally great load, the elastic resistance of the beam bearing a definite ratio to its deflection. In a solid block, viewed as a short column free from flexure, the element of compressive stress only prevails, and in a long column fixed at the ends, the reasoning is again modified by the points of contra-flexure that have to be considered. In every material the strength diminishes rapidly as we advance from short to long columns, but the reduction is more conspicuous in the cast-iron and the strong steel than in the softer metals. An inspection of the stress diagrams M N shows that in the case of free ends cast-iron is only economical up to 3½ diameters and for ends fixed up to 7 diameters, while for heights exceeding this ratio mild steel is preferable to the use of either cast or wrought-iron. This diagram is based upon calculations given in the formulæ tabulated below. In further considering the question of flexure in an upright column, there being no apparent transverse force to produce the bending, the result can only be caused by the ends tending to approach one another, and the condition of things resembles the action of a bow in which the ends are united by a member in tension, so that if we can determine the tension produced in the member uniting the ends, we shall have found the resistance that the bent column opposes to the load on its head. This evidently must depend more upon the elastic stiffness of the material and the dimensions of the columns than upon the crushing strength of the material. The form of the section is important, and a rolled joist section is preferable to the channel ⊏ or ⊏⊐ section sometimes employed with its web or back placed against a wall, because the compressive stress is more equally distributed over its section. An open or ⊏⊐ section also has this advantage for use as a stanchion compared, with a round, hollow column, that the whole surface can be seen and its thickness checked without the need of drilled holes to prove that the thickness is uniform.

A slender column is naturally a very weak one, and in order to obtain a satisfactory adoption of its introduction in a structure we must provide against the action of flexure, which is the source of its weakness. This may be

The whole of the iron to be inspected and tested before leaving the manufacturers' works.

The Carnegie Steel Company, of America, specify for structural steel an ultimate strength of 60,000 to 70,000 lbs. (26·78 to 31·24 tons) per square inch.

Elastic limit, not less than one-half the ultimate strength. Elongation, 22 per cent.

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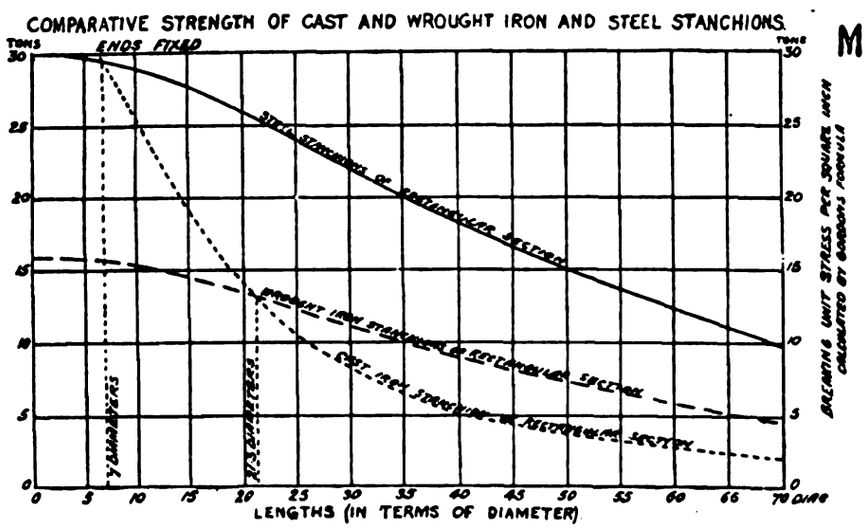

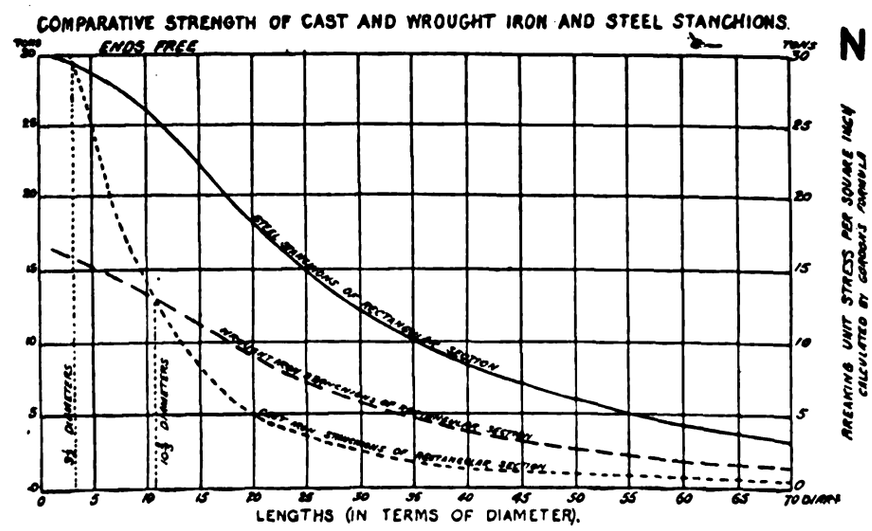

effected by the same means as in a girder, namely, by removing the metal from the centre and placing it as far away from the axis of the stanchion as possible. An inspection of diagram B shows at once the value of the development of material in a girder, and the same argument avails in a stanchion, so that by the adoption of four separate legs braced together like a lattice-girder we may so develop the material in a filamentary form as to considerably increase its efficiency. In a stanchion of any section the resilient force R is proportional to the modulus of elasticity, but is independent of the ultimate strength of the material. Thus a long stanchion of the strongest steel would vary little from a similar stanchion of wrought iron, because the modulus of elasticity is nearly the same in both these materials. However great the ultimate resistance of the steel may be, the crushing stress will inevitably be reached at some period of the increasing bending strain if only the load is sufficient to overcome the resilient force of the bow and to set up the ever-increasing deflection. When this deflection begins to act, the stanchion may be considered as having failed for all practical purposes, no matter what may afterwards happen to it during the course of the buckling process. A steel stanchion would theoretically take a greater ultimate deflection than the wrought-iron stanchion before it became actually crushed or crippled on the concave side, but the breaking weight would be nearly the same for both materials. When struts of different sections are ranged together according to the radius of gyration, the results of experiments agree together as closely as could be expected; but if struts of equal diameter and of different patterns of cross section are ranged together, their strengths vary. In short stanchions the superior strength of the steel will come into play, and in a stanchion of unequal elasticity it will come into play to some extent at all ratios of length to diameter.

Professor T. Claxton Fidler, in his treatise on "Bridge Construction," states that there can be no doubt that amongst the different sections of rolled iron bars or *built struts* the radius of gyration should be taken rather than the outside diameter as the true measure of stiffness.

In the author's diagram shown to represent the breaking weight of stanchions of different proportions, the *verticals* give the breaking weight in tons per square inch of sectional area, while the *horizontals* represent the ratio of length to diameter.

I = moment of inertia = sectional area of beam or stanchion × the square of the radius of gyration $(r)^2$.

Therefore, dividing the force R by the sectional area in square inches, we have the resilient force in pounds per square inch of the section of the strut expressed by—

$$f = \frac{R}{A} = \pi^2 E \frac{r^2}{l^2},$$

and this denotes the theoretical breaking weight of long stanchions in pounds per square inch, or the load which is sufficient to overcome the resilience (or the act of springing back, popularly known as "rebounding") of the bow, and to produce indefinite deflection.

Stanchions.	Ends Fixed.	Ends Free.
Cast-iron (solid) rectangular	$P = \frac{35}{1 + (\cdot 0037)\,H^2}$	$P = \frac{35}{1 + (\cdot 0148)\,H^2}$
Wrought-iron (solid) rectangular	$P = \frac{16}{1 + (\cdot 0005)\,H^2}$	$P = \frac{16}{1 + (\cdot 002)\,H^2}$
Wrought-iron (solid) angle	$P = \frac{19}{1 + (\cdot 0011)\,H^2}$	$P = \frac{19}{1 + (\cdot 0044)\,H^2}$
Mild steel (solid) round	$P = \frac{30}{1 + \left(\frac{1}{1400}\right)H^2}$	$P = \frac{30}{1 + \left(\frac{1}{350}\right)H^2}$
Mild steel (solid) rectangular	$P = \frac{30}{1 + \frac{1}{2480}H^2}$	$P = \frac{30}{1 + \left(\frac{1}{620}\right)H^2}$

NOTE:—P = Crippling stress per square inch in tons. $H = \frac{L}{D}$ = ratio of length to width in direction of plane of flexure. P × area = breaking stress of given section.

The Chairman said they had listened to Mr. Walmisley's paper with the greatest interest. Two years ago Mr. Walmisley read a most valuable paper before them on "Foundations,"* and the paper he had just read was equally valuable and scientific. As they had a large number of their engineering friends present that evening, he hoped they would have a good discussion on the paper.

Professor Hy. Adams said he had much pleasure in proposing a vote of thanks to Mr. Walmisley for his interesting and valuable paper. He felt they would agree with him in saying that a paper or lecture from Mr. Walmisley was sure to be sound, reliable, and complete. The subject was one of considerable interest to constructional engineers and architects. The diagrams which the lecturer exhibited were also of great assistance and he hoped that they would be illustrated when the lecture was printed. Many interesting points had been dealt with, but perhaps the most important was that of the safe loads given in the makers' lists. He had just had occasion to refer to some of those lists, and he was surprised to find so many extreme statements. For instance, three different lists gave joists 12 × 5 × 36—39 lbs. as being suitable for spans of from 30-32 ft., and capable of carrying loads of 7 to 9·4 tons. Mr. Walmisley suggested that the span should be twelve times the depth, but that would hardly be suitable for architects, and, as a matter of fact, they made a span in feet equal to twice the depth in inches, though even that did not satisfy some designers, for in a fireproof floor made of iron and concrete there was a still greater ratio of span to depth. The 12 × 5 × 39 lbs. was in one list limited to a 20-ft. span, and a safe load was given as 15, 11, and 9 tons, according to the factor of safety adopted. He had had the curiosity to work out what the result would be of loading the 12 × 5 joists with the suggested load of 9·4 tons on a 30-ft. span. It would give a deflection of 2 in., the ordinary deflection being $\frac{1}{10}$ per foot of span, and the load that would produce that would be 3 tons. and with the great span of 30 ft., and a shallow depth of 1 ft., the engineer in the ordinary way would think that sufficient load to put on it.

Mr. Percival Marshall, President of the Institution of Junior Engineers, seconded the vote of thanks, and on behalf of his society expressed the thanks of the Institution to the Architectural Association for the courtesy which had enabled so many members of the Institution to hear such an excellent paper. The subject was equally interesting to both engineers and architects, and it seemed a very desirable thing that members of both professions should have

* See our issue for May 28, 1898.

Example—Steel Stanchion.—Joist 12 in. by 6 in., weighing 62·5 lbs. per foot.

Length in feet.	Weight per foot run. lbs.	Ratio L/B	Calculated Breaking Limit. Stress in tons.	Area for Flanges. Square in.	Breaking Weight (ends free).	Ratio L/T	Calculated Breaking Limit. Stress in tons.	Area for Web.	Breaking Weight (ends free).	Total Breaking Weight in tons.
14	62·5	28	13·30 See formula.	12·48	165·98	247	·30 See formula.	6·12	1·83	167·81

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an opportunity of discussing that and similar subjects together. There were certain matters which might very well be discussed by the two professions, such, for instance, as the standardisation of sections, for he thought that if makers would fall into a uniform practice in producing their sections it would facilitate the work of architects in designing structures.

Mr. B. Blount (Messrs. Stanger & Blount, of Westminster) said he had listened with considerable interest to the paper—not only to the mechanical side of it, which appealed particularly to members of both professions, but also to the chemical side, which appealed to him very closely. There was ample scope for debate in the chemical side of the subject. They had heard of the influence of the various non-metals which were present in mild steel on its tensile strength, and ultimately on its strength when put into a structure. This influence was enormous, and had been recognised for some time by engineers, in structures which had to carry dynamic loads, such as rails. The subject of rails had come into prominence lately, owing to certain disastrous failures and the concensus of opinion drawn from experiments based on these failures was that caution should be exercised in increasing the tensile strength of our mild steel. Naturally he agreed with that, and yet he felt that safety could be secured at too great a cost; one should proceed cautiously, but should at all events make progress. In connexion with that he might refer to a point touched upon by Mr. Walmisley, viz., the American practice of increasing certain non-metals in steel. That was thoroughly to be condemned. Mr. Walmisley had stated with accuracy that a high proportion of phosphorus was to be found in steel which American firms were offering to English consumers. The percentage given was, however, somewhat lower than the average, which was more like 0·10 per cent. than 0·08 per cent. The English steel maker, although protected by certain railway companies as mentioned by Mr. Walmisley, was nevertheless handicapped by competition of that kind. The American product was not, as a rule, as good as the English. As to the ultimate composition of steel which influenced its quality, one might have two steels which were chemically identical but differed in their micro-structure. Already in his own practice he had found much advantage from the microscopical examination of steels, especially in those cases where fracture was caused by influences which seemed to be obscure. Architects and engineers who were, as all members of those professions must be, at times troubled by failures not readily explicable should remember that a mere specification of the mechanical properties of steel and even its chemical composition, was not everything; they must also take note of the microscopical character of the metal.

Mr. R. J. Gifford Read said that not only was the paper very valuable, but the diagrams and formulæ also. Very many of the tables prepared by Mr. Walmisley were worthy of study, since they would afford a ready means of obtaining the necessary strength and values of the various sections when one was engaged in designing a structure. The use of rolled joists in construction was a very important matter in the erection of buildings. Nowadays buildings in towns were required to give far more accommodation than formerly, and sites for buildings were, as far as his experience went, very often curtailed, and seldom was a constructor left free to erect the best form of building possible. In these circumstances the advent of rolled joists had been a great boon to the architect and constructor, because joists gave an opportunity of carrying over spaces, walls, floors, and suchlike, larger, more numerous, and heavier than was possible in the days of wooden beams, while the modern iron joists occupied far less space. But while there were good reasons why rolled joists had become essential in modern buildings, he had never heard an architect say that he liked them—though for that matter architects did not appear to care for engineering work at all. Still, rolled joists were absolutely necessary nowadays, and if properly used they did excellent service. The value of a rolled joist was greatest when it could be placed directly across a span from wall to wall, but if rolled joists had to be used in a complex way, as they often were—one trimming into another, or two or three trimming into each other, and having bends and awkward connexions—it was very difficult to make thoroughly good joints, and that was one of the most essential points with regard to rolled joist work. The joists were not so pliable and easily handled as the angle iron and plate work such as Mr. Walmisley had referred to in the roof of the Olympia, and in regard to that roof, he looked upon it as one of the finest roofs, if not the finest, in England. The connexions were a very important matter, and he would especially draw their attention to the connexions shown in diagram H. That, of course, showed the right way of making connexions, but he was afraid they were never done like that, for generally the joists were wanted as soon as they were ordered, and they had to be fitted as quickly as possible, and the common way of treating them was to notch down the flange and trim it in with an angle iron to the other joist. Of course, it should be rounded off in the careful way shown in the diagram, but generally that was a practical impossibility. There were many points connected with joists that theoretically should be done, but which practically it was difficult to get done. In diagram E Mr. Walmisley very properly showed the advantage of having two joists side by side, with plates to carry a wall. The diagram showed a very good section, but if the joists were further separated and the flange plates made twice the width, but half the thickness, they would not get as good a girder. A necessary point to consider was the proper proportions of the widths of the joists to their depths, and the thickness of the plate so as to get a girder which would do the work and have the greatest strength for the amount of iron used. With regard to the varying strength of joists, whether rectangular or of other section, the moment of inertia could be determined mathematically, having reference to the area only; but another matter had to be considered, viz., the quality of the material, and it was found that the breaking strength of the thick sections worked out greater than the strength given by a formula deduced from the moment of inertia. In fact, he believed it had been found that the breaking strength was 70 per cent. greater than the theoretical strength for a rectangular section.

Mr. P. J. Waldram said he felt that any one who had not dealt in mathematical formulæ might think that the paper was too scientific to grasp, but really the subject was not so complicated as some might think. There was one little practical point he might venture to warn architects as to—viz., that in specifying for rivetted-up work they should be careful to ascertain the market price. It was sometimes more expensive to put less material in the joists than more of a certain character, and it was well in extensive work to get a proper estimate before deciding on rivetted-up work. As to rivetted-up work, in order to develop the full strength of the plates the rivets should be designed and not guessed at. He would like to give expression to a warning as to piers. Piers should be piers in the true sense of the word, and their height must be taken into consideration. A terrible illustration as to that was, he believed, afforded in the Abbey Mansions disaster. Piers were not piers when they started at the base and went up to the top 18 in. wide. In going into the question of strength or otherwise it was easy to forget, in looking at a pier 2 ft. square on any floor, that it went down to the basement.

Messrs. H. Lovegrove, W. H. Shephard, and H. Satchell having briefly spoken,

Mr. H. Young, junior, said of course the steel joist was not a very pretty thing to look at, but it was a most effective section, and it was the outcome of years of thought by theoretical and practical men. From theoretical and empirical formulæ had been produced the most efficient section it was possible to have, and all that remained was for the manufacturer to make a steel which would be homogeneous and of better quality. Steel joists had grown from cast iron to wrought iron and then to steel. Could Mr. Walmisley tell them anything about the Talbot process of making steel? It did not do to accept manufacturers' figures without investigation. In selecting a joist from a merchant's list, the first thing to know was what it was to do; if to support a brick wall, a little settlement of that wall did not much matter; but if it had to support a cast-iron tank, with caulked joints, any deflection of the joist would be a serious matter. It was true that the designer could not always get what he wanted, owing to the inundation of work at the mills; but the best way out of that difficulty was, if it could be arranged, to order the joists some considerable time before they were wanted. As to the question of steel stanchions *v.* cast stanchions, if they wanted a stanchion to carry from 50 to 500 tons, the best thing, he thought, was to have the cheapest, and up to a certain point the cast-iron stanchion was by far the cheaper. At the Paris Exhibition he had expected to see a great many steel joists, but he did not see any. He did not know whether that was because the French liked something more graceful and æsthetic than the joist, but at all events they used extensively a small lattice girder coloured in light blue with the rivets picked out in gold. Whatever the French touched looked well. The Alexandre III. bridge across the Seine was an example of a cast-steel joist: it was one arch thrown across in the section of a joist made of cast steel, and he thought they would all agree that it was one of the finest bridges thrown across the river of one of the finest cities in the world.

The Chairman said he would like to reciprocate on behalf of the Association what the President of the Junior Engineers had said. As an Association they were glad to welcome their engineering friends, and he felt that they had gained largely by the liberal way the engineers had entered into the discussion, and he hoped it would be possible to arrange similar meetings in the future. Architects who listened to such a highly scientific paper felt that it was impossible to compete with engineers in applied science, and in discussions such as they had heard that evening the members of the Association could not fail to profit. He felt that every year, perhaps, the two professions got a little wider apart, as science and investigation became more elaborate, and engineers, for instance, went ahead in matters scientific and architects devoted their time and power more and more to what they considered their proper province, viz., the art side of their work. He thought that must be the tendency of specialism, which in itself was inevitable as information became more extended. The last speaker made allusion to the beautifying of those more scientific constructions, and, for his part, he had often felt how true was the praise of another gentleman as to the roof of Olympia. That roof had often given him pleasure to look at, and he thought it was another illustration of the fact that where science was rightly applied there was no reason why it should not be beautiful. Most of them knew how beautiful the French could make their engineering and other structures, and many illustrations could be drawn from the Continent of simple, beautiful structures in iron and steel. England was far behind in applying art to scientific construction, and he felt that members of the architectural profession should bear that in mind.

The vote of thanks was then put to the meeting and very heartily agreed to.

Mr. A. T. Walmisley in reply said it never did to have a cast-iron beam fixed at both ends, because it was not made to take tension and compression in the same flange. Engineers, although they recognised some advantage in a stanchion or girder fixed at both ends, preferred, where possible, to have a girder or stanchion free at both ends because the stresses were then more definite. As to the roof of Olympia, he ought to say that although he had a great deal to do with that building, for certain reasons—partly on account of the extent of the work, and partly because of the way the money was found—another engineer was associated with him. In that roof the whole structure was so developed that the only continuous plates were cover plates.

The meeting then terminated.

The next meeting will be held on December 7, when Mr. Wallace Rimington will read a paper on "Colour in Architecture seen through an Artist's Glasses."

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.—At a special general meeting of this Institution held at the offices on the 27th ult., there was an election for two pensioners. There were three candidates, and Mrs. Redfern and Mrs. A. M. Smith were elected to the widow's pension of 24*l.* per annum. This is the second election held since Midsummer last. In the unavoidable absence of the President Mr. O. Newling was voted to the chair.

RESTORATION OF BLACKMORE CHURCH, ESSEX.—Part of the north wall of this church is being rebuilt, and the steeple, of wood, is being restored. Mr. Chancellor is the architect, and Messrs. Brown & Son, of Braintree, are the contractors.

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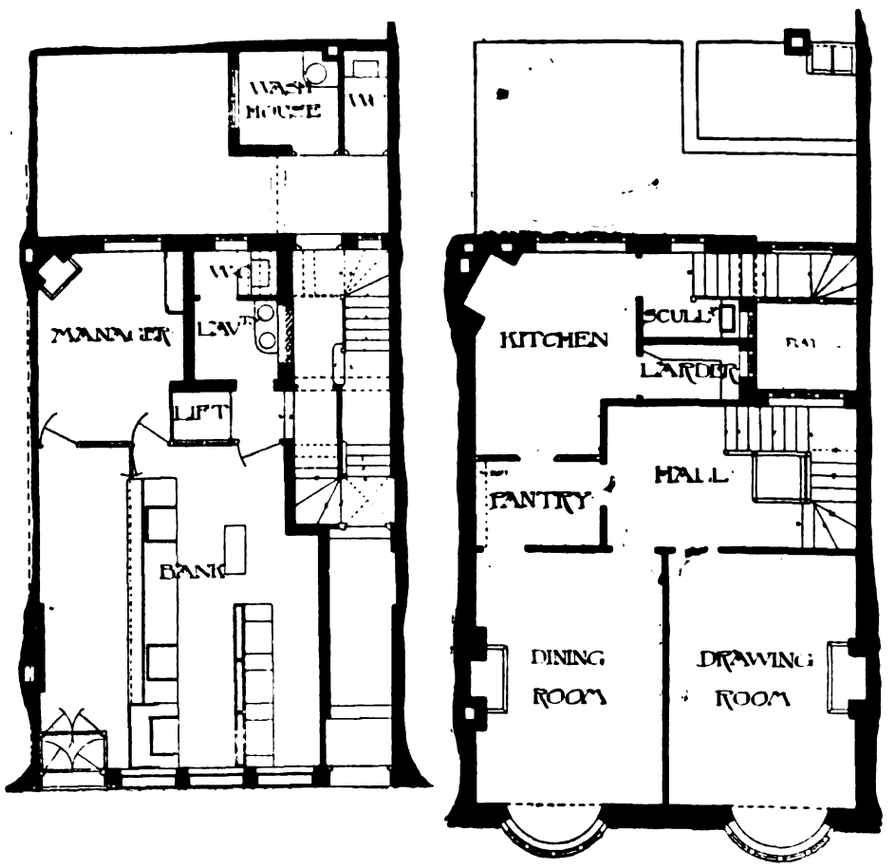

Ground Plan. First Floor Plan.

Martin's Bank, Bromley. Plans.

Illustrations.

A FRIEZE OF THE ATTIC MONTHS.

IN this, the attempt has been made to seize the more prominent and simple suggestions offered by the names of the Athenian months, and, as far as might be, to present a central typical subject for each, round which the imagination may group the manifold accessories and conjectures which belong to them, and which cannot be expressed here.

The composition commences at the left hand of the upper length shown in the illustration, and is continued from left to right on the lower length.

The first month, Hecatombæon, has a bull dedicated to sacrifice, the typical offering of the great sacrifices, whence the name of the month.

The second, Metageitnion ; the changing of neighbours by change of domicile. This is a group of a man and his wife, with their child and household god, migrating from one suburb of Athens to another.

The third, Boedromion. Apollo runs to scare the horse of the Amazon queen in response to the prayer and sacrifice of Theseus, to whom victory is thus granted.

The fourth, Pyanepsion. A household which has prepared the dish of beans or of peeled barley in honour of Apollo is greeted by the youth, the elder son, as he advances bearing a branch of olive. This he will carry in procession and place as he is bid, before the threshold of the dwelling, or perhaps near the shrine of the god himself.

The fifth, Maimacterion. The month of Zeus, the boisterous, who half starts from his throne to speed the Genius of blast and torrent on his course.

The sixth, Poseideon. Here Venus, whom Poseidon, ruler of the ocean, accosts, partly disrobes, to plunge into the waves.

The seventh, Gamelion. The month, favoured for weddings, is represented by a group where a bridegroom leads home his bride, attended by his friend, or best man. At the threshold stands the mother with a pine torch to welcome them to the nuptial abode.

The eighth, Anthesterion. The month of the flower feast is expressed by the four figures next grouped, who together suggest some of the characteristics of the three days of the great Festival of Dionysius now held. The opening of the wine cask, or jar, whence one youth has filled a cup for the second youth, who holds it ready to give to a third. This third lad is just ceasing his dance or hop upon the greasy goat's skin. Beyond them a maiden stands with basket and wreath of flowers, and beside her is placed an earthen dish of meats for consumption at the holiday feast.

The ninth, Elaphebolion, the hunting and slaying of the deer by Artemis.

The tenth, Munychion. To three sea-farers, Artemis, as "the Lady Munychia, watching over harbours," appears propitious.

The eleventh, Thargelion. A festival in honour of Apollo and Artemis was held in this month ; and the sacred embassy to Delos, some time in the ancient vessel of Theseus himself, took place. In allusion more especially to the latter celebration, Apollo here manifests himself with certain of the accessories of his Delian aspect—the bow, the group of the Charites or Graces, &c.—but devoid of the archaic severity of his conventional sculptured image, to three devout youths, musicians, who have hymned his praises.

The twelfth, Scirophorion, is expressed by the sciron or white parasol borne by the priestesses in the procession of the festival of Athena Sciras. J. S. B.

MARTIN'S BANK, BROMLEY, KENT.

THIS bank and the adjoining premises were built in 1898 by Mr. Duthoit, of Westmoreland-road, Bromley.

The lower part is of unpolished granite, the upper part of red brick; the space between the bays is covered with enriched and partly painted and gilded cast lead ; the gutters are also of cast lead, the work of Messrs. Wenham & Waters, of Croydon. The bank windows are made of gun metal, the doors, &c., of unpolished teak.

The internal fittings were made by Messrs. Sage & Co., the heating is by Messrs. Longden, and the strongroom work by Messrs. Chubb.

Mr. Ernest Newton is the architect. The drawing was exhibited at the last Royal Academy.

WAREHOUSES, BERLIN.

THIS represents a block of warehouses erected in Berlin from the designs of Herr Otto March, architect. They form an example of modern German street architecture of this class.

The architect, it will be seen, in spite of having to provide for a great deal of window space, has contrived to preserve solid and substantial piers to the building.

THE SURVEYORS' INSTITUTION:

ROOFS OF FARM BUILDINGS.

AN ordinary fortnightly meeting of this Institution was held on Monday evening at No. 12, Great George-street, Westminster, Mr. John Shaw, President, in the chair.

The minutes of last meeting having been read and confirmed, Mr. J. W. Penfold, hon. secretary, announced that Mr. John Farrer, of Oulton, near Leeds, had been elected as a member of Council. He also announced that Mr. John Wright Kirk, of Westminster, had been transferred from the class of Professional Associate to that of Fellow.

Some donations to the library and library fund having been announced, and a vote of thanks accorded to the donors,

A paper by Mr. A. T. Walmisley, on "Roofs of Farm Buildings," was read by Mr. Julian C. Rogers, secretary, at the request of the author, who was not feeling sufficiently well to read it himself, although he was present. The paper (which is unavoidably held over), together with the author's diagrams, and some notes of the discussion which followed, will be given in our next issue.

The next meeting of the Institution will be held on December 10, when Mr. R. E. Middleton will read a paper on "London Water Supply."

COMPETITIONS.

PUBLIC BATHS, KIDDERMINSTER.—In the limited competition for designs for public baths, Kidderminster, the first premium has been awarded by the Town Council to Messrs. Gething & Son, and the second to Messrs. Meredith & Pritchard.

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—An ordinary meeting of this Association was held in the Grosvenor Hotel, on Tuesday, the 20th ult., the President, Mr. F. Batchelor, in the chair. Mr. T. E. Hudman read a paper on "Georgian Architecture in Dublin," dealing chiefly with the period between 1714 and 1830. During the reign of the Georges the population of Dublin increased from 8,000 to 169,500, and thereby expanded from what was little better than a small mediæval town with narrow streets and a congested population into a metropolis with wide streets and many noble buildings, mainly due to the efforts of "The Wide Street Commission" appointed by Act of Parliament in 1757. Many of the oldest houses, now rapidly disappearing, were undoubtedly of Dutch origin, but the buildings of the later period, both public and private, such as the Custom House, Trinity College, the Bank of Ireland, the Four Courts, the City Hall, &c., designed by such master hands as Sir William Chambers, Gandon, and other eminent architects, were still in existence. The striking feature of Dublin was its wide line of streets and squares, and the effect of its public buildings, so judiciously placed—the line from College-green to Rutland-square would be hard to beat, not to mention Merrion-square, Fitzwilliam-square, and St. Stephen's-green, and the surrounding network of streets. The paper was illustrated by lantern slides, chiefly from photos taken by Mr. Hudman and Mr. Black.—The first of the series of technical demonstrations, mentioned in our "Note" last week, was held at the works of Messrs. H. & J. Martin, Grand Canal-street, Dublin, on the 23rd ult. There was a large attendance of members, numbering over forty. The lecturer, Mr. J. Martin, dealt first with various forms of damp courses, and then passed on to bricks, their qualities and durability. He showed many samples of stock bricks, coloured and glazed facing bricks, and fire bricks, most of which were of Irish manufacture. He next proceeded to show varieties of sand, fine and coarse, used in the quay walls by Dr. Stoney. After dealing with piling according to the method prevalent in Belfast and with other foundations, Mr. Martin explained the briquette test for cement, and many more ready tests. The demonstration lasted considerably over an hour, and that the scheme is appreciated in

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Dublin is evinced by the fact that many new members are joining the Association in order to avail themselves of its benefits.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The second meeting of the session was held on November 21, Mr. C. H. Compton, V.P., in the chair. The Hon. Editorial Secretary, Rev. H. J. D. Astley, read an interesting *résumé* of the proceedings of the recent Congress at Leicester, which will be published in the *Journal* in due course. Mr. Astley also read "Notes on the Mound Dwellings of Auchingaich," by Mr. W. A. Donnelly. The locality of these mounds is in the north-west corner of Dumbartonshire, in that picturesque and mountainous belt which runs between Loch Lomond and the Gareloch on the Auchingaich, one of the highest tributaries of the Fruin Water. The mounds first attract attention from their colour, as well as from their configuration, the turf on their hillock surfaces being generally of a deeper green and their outlines suggesting a more monotonous repetition of contour than is found in any natural configuration of landscape. They are grouped together in clusters of three and four or half a dozen, almost touching one another—as a matter of fact, many do touch each other—they form a border to a quadrangular space about 100 yards square, and number over forty. The mounds are all more or less circular in shape, standing about 5 ft. high at the highest, but more often not more than 3 ft. 6 in. above the level of the natural hillside, and present a remarkable similarity to the homes of the beaver. Further off, on the right bank of the Auchingaich, Mr. Donnelly discovered another group about 100 yards up the mountain-side of some seventeen or twenty more similar mounds. Excavations were made in some of them which disclosed the existence of boulder-built walls, rude and strong, each mound having a narrow doorway with the jambs invariably in their original position, but the lintels displaced, and in two instances lying on the doorstep. The general characteristics of these mounds suggest the idea of their having been the homes of an early pigmy race. In the discussion following the paper, the Chairman, Mr. Rayson, Mr. Folkard, the Rev. H. J. D. Astley, and others took part. Various opinions were expressed as to the probable value of the discovery, but all were agreed in attributing the construction of the mounds to human hands, but by whom, for what purpose, and at what period they were constructed it is impossible to say with the data at present furnished. Further exploration, which will be undertaken in due course, may enable archæologists to arrive at a definite conclusion.

BUILDERS' BENEVOLENT INSTITUTION:

ANNUAL DINNER AND PRESENTATION.

THE fifty-third annual dinner of the Builders' Benevolent Institution was held on Thursday, November 22, in the hall of the Carpenters' Company, London Wall. Mr. John Greenwood, C.C. (President), occupied the chair, supported by Messrs. J. Howard Colls (Hon. Treasurer), T. F. Rider, E. B. Nightingale, A. Lucas, A. E. Parker, H. H. Bartlett, A. Ritchie (J.P.), W. Higgs, Professor Roger Smith (Master of the Carpenters' Company), C. Bussell, Thomas Stirling, J. T. Bolding, and others, the company numbering altogether about 140.

The toasts of "The Queen" and "The Prince and Princess of Wales and the rest of the Royal Family" having been received with enthusiasm,

Mr. Arthur Lucas gave "The Army, Navy, and Auxiliary Forces," which was responded to by Major R. A. Brutton (Secretary) and Major W. J. Brown.

The President then proposed the toast of the evening, "Prosperity to the Builders' Benevolent Institution." He said that previous to the late municipal election a certain noble lord made some unsatisfactory remarks in reference to builders. In doing so, the noble lord could hardly have realised what an important trade the building trade was, and what an immense number were engaged in it. It was a most difficult business to carry on, for many a man had done his very best, working early and late, and yet from circumstances entirely beyond his control things had not turned out so well as he had anticipated. Such a man perhaps lost all he had, his health failed through worry and anxiety, and at last he found himself stranded. This Institution then came to his aid, after looking carefully into the circumstances of the case. The charity, he might add, was founded in 1847, since which time there had been 289 pensioners elected, the present number being forty-six. Of these the men received 39*l.* and the women 27*l.* a year. New annual subscribers were urgently needed to take the place of those who had been removed by death. The Institution depended entirely on the liberality of the members of the building trade, who might be sure that whatever they subscribed would be thankfully received and faithfully applied.

The toast was heartily received.

Mr. J. Howard Colls, who responded, said that for some time, it might be said, the building trade in London had been passing through fairly good times, but there were already indications that it was not going to be so good. It was, therefore, particularly advisable that builders should subscribe while they had good times. He had watched this Institution for many years, and he did not believe that any committee could give more attention to the claims that came before them.

Mr. A. E. Parker gave the toast of "The Worshipful Company of Carpenters," and referred to the great interest taken by them in all matters connected with the building trade.

Professor Roger Smith (the Master) replied, and expressed the pleasure of the Company in doing anything they could to assist this charity and the building trade.

Major Brutton (Secretary) then read the list of donations, which showed a grand total of 720*l.* Of this amount the President's list represented 574*l.*, his own subscription being 105*l.*

Mr. T. F. Rider gave the toast of "The President," which was cordially received.

Mr. A. Lucas next presented a testimonial to Major Brutton. This consisted of a cheque for 160*l.*, and the following testimonial:—"This testimonial was presented to Major R. A. Brutton, together with a cheque for 160*l.*, by upwards of 200 subscribers, in recognition of twenty-five years' faithful service as Secretary of the Builders' Benevolent Institution, and with many wishes for his future health and prosperity." Major Brutton, he added, had spent a quarter of a century of hard work in furthering the efforts of the charity. The Major was a kindly gentleman and an honourable man, who was ready and able to give advice because of his devotion to the cause he loved. Indeed, the success which has attended the Institution was due in no small measure to the devotion of their able Secretary.

Major Brutton replied, and returned thanks for the presentation. Though the cheque was most acceptable, there was something he valued far more, and that was that he had gained the esteem of so many gentlemen connected with the Institution, and that esteem would live for ever in his memory. He thanked the members of his Committee for many acts of kindness and he desired specially to mention the names of Mr. T. Stirling, Mr. J. T. Bolding, and Mr. C. Russell who had given him so much assistance.

Mr. H. H. Bartlett proposed "The Architects and Surveyors," to which Professor Roger Smith and Mr. H. Northcroft replied.

Mr. Alex. Ritchie, J.P., gave the last toast "The Vice-Presidents, Committee, and Stewards," for whom Mr. L. J. Maton and Mr. J. T. Bolding responded.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Alderman W. H. Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend the Shoreditch Borough Council 7,100*l.* for the erection of model dwellings; the Greenwich Guardians 150,000*l.* for the erection of a workhouse; the St. George's Union 22,900*l.* for the extension of the infirmary; the St. Giles-in-the-Fields and St. George, Bloomsbury, Guardians 12,910*l.* for the erection of receiving-house and nurses' home; and the St. Saviour's Union Guardians 20,500*l.* for the erection of additional buildings at Newington workhouse.

The Front of St. Martin's Church.—The Improvements Committee brought up the following report in regard to the front of St. Martin's Church:—

"We brought up to the Council on October 23, 1900, a report upon a letter which we had received from the Vestry of St. Martin-in-the-Fields submitting a proposal for the widening of St. Martin's-place by the alteration of the steps in front of St. Martin's Church, and asking the Council to contribute part of the cost of the work. We recommended the Council to contribute one-third of the net cost of the work, such contribution not to exceed the sum of 270*l.* The Council, however, after debate, referred the recommendation back to us with instructions to take expert opinion as to the architectural effect of the proposed alteration, and to request the Vestry of St. Martin-in-the-Fields meanwhile to take no further action for carrying out the work.

In compliance with these instructions we have taken the opinion of the Royal Institute of British Architects upon the proposal, and we requested the Vestry meanwhile to take no further action for carrying out the work. The Vestry informed us that they had already entered into a contract for the work, that a considerable quantity of stone had been obtained, that the work had been put in hand, and that experts were of opinion that the general architectural effect of the church would not be prejudicially affected by the proposed alteration. As soon as the Council of the City of Westminster superseded the Vestry, we asked them to arrange that no further action should be taken in the matter until we were in a position to come to a definite decision as to contributing towards the cost of the suggested work, with the result that the Westminster Council have agreed that the work shall not be proceeded with for another fortnight.

It will now be well if we give the details of the application made by the Local Authority. The steps of the church have undoubtedly been in a dilapidated condition for some time, and owing to their condition and position are the cause of frequent accidents to pedestrians. The Vestry in 1896 asked the Council to undertake as a county improvement the reconstruction of the steps in such a way as to secure a widening of St. Martin's-place. The Council on April 13, 1897, upon our recommendation, informed the Vestry that it was not prepared to carry out the work as a county improvement. We have given careful consideration to the proposals now put forward. At the present time a flight of steps leads from the portico of the church to a terrace or landing. This landing is about 9 ft. wide on the south side of the portico, and connects with the footway of Duncannon-street by another flight of steps. The landing on the west side of the portico is about 4 ft. 6 in. wide, and connects with the footway of St. Martin's-place by a flight of steps which gradually tapers away as the footway rises to the level of the landing at its northern end. The footway between the lower flight of steps and the carriage-way is in some places less than 6 ft. wide; and at this part the carriageway of St. Martin's-place is only about 37 ft. wide. The Local Authority have agreed with the church authorities for the reconstruction of the steps in such a way as to remove the landing on the west side of the portico and to lessen the width of the landing on the south side. A continuous flight of steps will lead from the western front of the portico to the footway of St. Martin's-place, and the effect of the abolition of the landing will be to widen the footway to about 9 ft. In consideration of the Local Authority undertaking the work, the church authorities will surrender without money-payment the land to be added to the public way. We regret that it is not possible at the present moment to increase the width of the carriageway; but, in our opinion, any increase in the width of the thoroughfare at this part, whether carriageway or footway, must be of great advantage to traffic generally. The vehicular and pedestrian traffic at this spot is enormous, and consists, not of local traffic, but of that going to and from all parts of London. Before approving the plan submitted by the Local Authority we considered alternative schemes with a view to the Council concurring in the adoption of the most suitable scheme to widen St. Martin's-place without interfering in an undesirable way with such a prominent and well-known building. One suggestion made to us was that to widen the thoroughfare the steps should be set back to a position within the line of the columns fronting the church; another was to substitute for the steps a vertical wall on the west side of the columns; whilst a third alternative method would involve the setting back of the church about 30 ft. further to the east, necessitating the rebuilding of portions of the edifice. To all these alternative suggestions, however, there are objections, and after full consideration we have come to the conclusion that the proposal made by the Local Authority is the most suitable, and likely to detract least from the architectural effect of the present arrangement of the steps. From contemporary prints it would appear that the lower flight of steps formed no part of the original design, but was added later when the gradients of St. Martin's-lane and Duncannon-street were readjusted.

The Royal Institute of British Architects, who readily agreed to give the Council the benefit of

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their views, have sent us a reply in which they express their opinion as follows :—

'The Council of the Royal Institute are strongly of opinion that the suggested removal of the landing, which now divides the flight of steps leading up to the portico, would be very detrimental to the appearance of the west front of this fine church. Owing to the fall in the ground from north to south, the lower steps are of necessity broken off where they merge in the ground line. An unsymmetrical base of this kind to a symmetrical portico would have a distinctly bad architectural effect, but by the ingenious device of dividing the flight of steps in the middle, a perfectly symmetrical base of seven unbroken steps is provided for the colonnade, while the lower steps, which must terminate unsymmetrically, are separated from the design of the building and do not form part of it. My Council feel therefore that nothing short of actual necessity could justify the removal of the landing or platform, while from the personal observation of its members and reliable information received, they are fully assured that no such necessity exists.

In the event of the widening of the public footpath ever becoming necessary, they have no doubt that the suggested setting back of the western steps is the least objectionable means of effecting the purpose. But even if on account of such necessity the landing be omitted from the steps in front of the portico, they strongly recommend that it should still be retained on the south side, where it would be useful in helping to preserve somewhat of a symmetrical appearance to the base of the portico.

While considering the question of the appearance of this portico, my council beg leave to suggest whether it would not be possible to remove the cast iron railings now fixed at the top of the steps and between the columns, as they constitute a serious disfigurement to the building.'

We understand that the above-mentioned statements represent the unanimous opinion of the past Presidents and the President and Council of the Institute.

After a full and careful review of all the facts, and having regard to the opinion expressed by the Royal Institute of British Architects, we have decided to advise the Council to contribute towards the cost of the work proposed to be undertaken by the Local Authority, subject to the Council of the City of Westminster agreeing to retain the platform in the steps on the southern side of the church. We are impressed by the fact that the great extent of the traffic along St. Martin's-place necessitates the widening of the thoroughfare, and we consider that the least objectionable method of providing for this is by adopting the proposal made by the Local Authority, subject, however, to the qualification in regard to the retention of the platform on the south side of the church. We are not prepared, however, to advise the Council to arrange for the removal of the cast-iron railings from the top of the steps, as suggested by the Royal Institute, because we consider such a course most undesirable, although we admit that architecturally they detract somewhat from the appearance of the building.

When the Local Authority made application to us in July, 1900, they stated that the cost of the proposed work was estimated at 608*l.* They have since informed us, however, that as accidents frequently occur they felt compelled to undertake the work at once to secure its completion before the winter sets in, and they therefore entered into a contract amounting to 811*l.* 10s. 2d. We quite agree with the Local Authority as to the urgency of the work. We consider that the Council may reasonably contribute one-third, not exceeding 270*l.*, of the net cost of the scheme now suggested. We have caused to be hung in the Council-chamber a cartoon plan showing by black lines the present position of the steps and by red lines the proposed alteration. We recommend :—

That the estimate of 270*l.* submitted by the Finance Committee be approved, and that, subject to the Council of the City of Westminster agreeing to retain the platform in the steps on the southern side of St. Martin's Church, the London County Council do contribute, on the usual conditions, one-third of the net cost of the reconstruction of the steps in front of St. Martin's Church in such a way as to increase the width of the footway on the eastern side of St. Martin's-place to about 9 ft., as proposed by the Local Authority, such contribution not to exceed the sum of 270*l.*"

Colonel Probyn moved the adoption of the Report, as the Chairman of the Committee (Dr. Longstaff) refused to do so. The ecclesiastical authorities had consented to give up the steps to be dealt with for the public benefit, and the Local Authority fully recognised the importance of the improvement. What was proposed was to do away with the "tableland" and to add 2 ft. to the public footway—a loss to the church of very slight account, but a considerable gain to the public.

Mr. Shaw Lefevre pointed out that the architects reported that the alteration would seriously affect the architectural effect of the church, and that nothing short of actual necessity could justify the removal of the landing or platform. They also stated that, should the widening of the footway ever become necessary, they had no doubt that the suggested setting back of the western steps was the least objectionable means of effecting the purpose, but they strongly recommended that the landing on the south side should be retained. That was the scheme adopted by the Committee, but in his opinion it was still objectionable and would interfere with the architectural features of the church. He thought that, as there was a strong professional feeling against the alteration, it would be better for the Council to take no part in it, and moved as an amendment that, in view of the report of the Royal Institute of British Architects, the Council was not prepared to take the responsibility of sanctioning the alteration by contributing any part of the cost.

Sir H. B. Poland, Q.C., seconded the amendment, and said that had the St. Martin's Vestry had before them the Report of the Royal Institute, they would never have sanctioned the alteration or entered into a contract for carrying it out. He felt that the iron railings at the top of the steps were an eyesore, and he could not think why, according to the Committee, their removal would be undesirable.

Mr. Parker supported the amendment, though not for the reasons already given. This was not an improvement from the public point of view, and the proposal, if carried out, would not do much to widen the road. What was needed was a thorough widening; the proposal before the Council was so trifling that the Council ought not to contribute to its cost. The Committee seemed to be troubling themselves a great deal about architecture, but it was not the business of the Committee to become a Committee of architectural experts.

The Hon. W. Peel, M.P., said he would be no party to the mutilation of this beautiful church. It was wholly unnecessary for the Council to assist in damaging the church for the sake of merely adding 2 ft. 6 in. to the footway. When they asked the opinion of a body like the Royal Institute they should be led by its Report. It would be little short of an insult, having asked the Institute for its opinion, to set it aside in the manner proposed.

Colonel Rotton said he hoped that the amendment would be carried. For anything the Council could do the alteration would be carried out, as the sum asked for was only 270*l.*

Mr. Beachcroft said he should have thought the matter would have been treated on the basis of an ancient monument, especially as the Council had spent 20,000*l.* on preserving a fifth-rate barber's shop in Fleet-street. No one who had seen the church could fail to see that a good deal depended on the maintenance of the steps as they are, though if it had been proposed to round the corner of Duncannon-street, he should have sacrificed his æsthetic views for utilitarian purposes and vote in favour of an improvement at this point.

Mr. Burns, M.P., was not prepared to help make the Council a zareba behind which the Westminster Council could shelter itself from the artistic and æsthetic views which London architects would undoubtedly bring to bear upon it for tampering with this church. No one could deny that there was congestion of traffic just by the church, and he was convinced that a widening was necessary. He suggested that one of the wealthy parishioners, such as Mr. Astor, should give the vicar of St. Martin's 10,000*l.* with which to engage a competent architect, under whose guidance they could underpin the whole church, including the portico, put it on a sliding gantry, remove it 40 ft. back, and give it an alignment with Duncannon-street. In that way alone could the widening of St. Martin's-place be carried out without injuring the church. He asked the Council to preserve itself from a suggested act of vandalism.

Colonel Probyn said it was absurd to use the word "vandalism," for the church would not be touched at all. Moreover, in the original drawings of the church there was no "tableland" at all between the steps. The "tableland" was put in so as to adjust matters when the level of St. Martin's-lane was disturbed at a later date.

Dr. Longstaff said that if this street required widening the easiest way would be to take down a portion of the National Gallery—that portion which was architecturally the least important. That could easily be done.

The amendment was then put and carried by a large majority.

Underground Electric Railways.—Replying to Mr. Leon, Mr. Benn (Chairman of the Highways Committee) said the Council had little control over underground electric railways, but they could oppose Bills before Parliament on the ground that in the interest of London some general system should be settled before the Bills were passed. He would bring the matter before the Highways Committee.

The Highways Committee proposed the adoption of an underground conduit system of electrical traction devised by Dr. A. B. W. Kennedy for use on the Council's tramways in South London. The traffic receipts on the Council's tramways for the past year were 302,360*l.*, as compared with 392,151*l.* in the previous year.

In reply to Mr. Boulnois, M.P., Mr. Benn said the estimated cost of the conduit system was 15,000*l.* per mile single and 30,000*l.* per mile double line.

Sanitary Inspectors' Examination Board.—The Public Health Committee reported as follows :—

"On October 9 the Council resolved to address a letter to the Local Government Board, asking that it might be authorised under clause (c) of the memorandum of association of the Sanitary Inspectors' Examination Board, to appoint five representatives to serve on that Board, and stating that the Council would be glad if the President of the Board would receive a deputation from the Council on the subject. The Board now state in reply that they have received applications from a number of bodies for representation on the Examination Board, but that, as that Board was only formed last year, it is considered inexpedient to make any alteration in its constitution until further experience has been had of its working; further, that a note shall be made of the Council's application, so that it may be considered whenever any alteration is made in the bodies represented, and that in these circumstances it does not seem necessary to trouble a deputation from the Council to attend."

Government Buildings.—Mr. Burns asked the Chairman of the Building Act Committee whether it was a fact that the new Land Registry Office was proposed to be built 80 ft. high, with two stories in the roof, and projecting 12 ft. in advance of the other buildings and the existing line of frontage, and whether steps had been taken to bring such a violation of the Building Act before the notice of the proper Government Department.

Mr. Goddard Clarke replied that a communication had been received from the First Commissioner of Works stating that he shared to a great extent the views of the Council in this matter, and the question was still under consideration.

Sir A. Arnold thought a deputation should emphasise the nature of the encroachment.

Tender.—On the recommendation of the Highways Committee, the tender was accepted of the Gilbert Arc-Lamp Company, Limited, for the supply, for the sum of 2,200*l.* 18s. 0d., of the arc-lamps required in connexion with the electric-light installation for the Victoria Embankment and Westminster Bridge.

Housing of the Working Classes.—Mr. Waterlow (Chairman of the Housing Committee) moved the reception of the Report of that Committee, which stated that the detailed accounts of the Council's workmen's dwellings had been sent to each member. He pointed out that the accounts showed a deficiency on the year's working of 1,157*l.*, which was 1,235*l.* less than the deficiency of the previous year. The deficiencies occurred on sites where the Council were forced to build. Had the central laundry on the Boundary-street area turned out successful, the loss would have been very slight. The Council had schemes in hand only awaiting the approval of Government, estimated to cost 863,000*l.*, and to give accommodation to 14,858 persons.

Mr. Bond, M.P., said that if they compared the Council with private dwellings' companies, it would be seen that nothing was provided in the Council's accounts for directors, and yet there was no profit for the ratepayers.

Mr. Waterlow said that if they crowded families into one room, no doubt they could pay 5 or 6 per cent., but he did not think the Council would agree to do anything of the kind.

The Site for a County Hall.—The Special Committee on New Offices recommended :—"That, in the opinion of the Council, it is not expedient that a site on the crescent island to be formed in connexion with the Holborn to the Strand Improvement should be reserved for the erection of new offices for the Council."

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Mr. Corbett (Chairman of the Committee) declined to move the recommendation.

Mr. Shaw Lefevre, in moving the Report, said that the value attached by the valuer to the suggested site was 2,400,000*l.*, which was so enormous that the Committee felt that the Council could not go into it. Comparing the cost with other suggested sites, he might say they might get a site in Westminster for one-fifth or one-sixth the figure, and with a site in Spring Gardens there would be a saving of 50 per cent. There were other objections to the site. It was somewhat further removed from the public offices; it was a noisy position; and it was also in a district abounding with theatres and saloons, and he did not think it was a desirable position to which to take their very large staff.

Mr. Goulding, M.P., expressed the opinion that it was time party politics were put aside, and that they should decide upon a County Hall which would be worthy of the work the Council had to do. He moved to add the following words to the recommendation, viz.:—"But that the Committee bring up a Report without delay as to what site they do recommend for the erection of a County Hall and offices."

Mr. Horniman seconded the amendment, and it was carried.

The recommendation as amended was then agreed to.

The Council adjourned shortly before seven o'clock.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

AT the meeting of the London County Council on Tuesday the following applications under the 1894 Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

Line of Frontage.

Woolwich.—A one-story shop on part of the forecourt of No. 31, Plumstead-road, Plumstead (Mr. P. Chinnery).—Consent.

Width of Way and Line of Frontage.

Newington, West.—A two-story warehouse on the south side of Peacock-street, Newington, between Nos. 12 and 18 (Mr. A. W. Reed for Messrs. J. H. & J. W. Kent).—Consent.

Projecting Iron Structure.

Rotherhithe.—A steel grain-shoot across the public way of Church-passage, Rotherhithe, for the purpose of conveying grain between the warehouses in the occupation of Messrs. Dudin & Sons, on opposite sides of that street (Messrs. W. A. Crips & Son for Messrs. Dudin & Sons).—Refused.

BOOKS RECEIVED.

INWOOD'S TABLES FOR THE PURCHASING OF ESTATES. Twenty-sixth Edition. Revised and Extended by W. Schooling, F.R.A.S. (Crosby Lockwood & Co.)

WATERWORKS DISTRIBUTION: A PRACTICAL GUIDE TO LAYING OUT SYSTEMS OR MAINS. By J. A. M'Pherson, A.M.Inst.C.E. (B. T. Batsford.)

THE CATHEDRAL CHURCH AND MONASTERY OF ST. ANDREW AT ROCHESTER. By W. H. St. John Hope. (Mitchell & Hughes.)

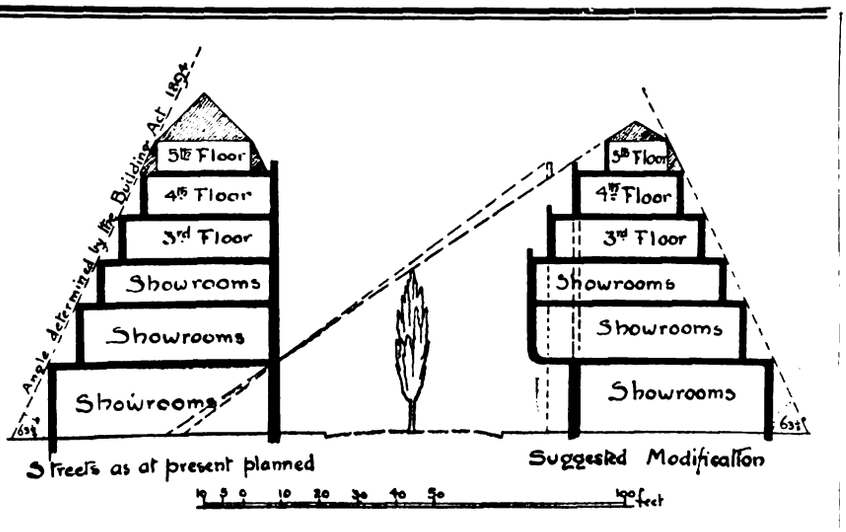
OLD COTTAGES AND FARMHOUSES IN KENT AND SUSSEX. By W. G. Davie and E. Guy Dawber. (B. T. Batsford.)

Correspondence.

***To the Editor of* THE BUILDER.**

STREET BUILDING FOR CITIES.

SIR,—The main object in our town streets is to secure the maximum of light and air, and the tendency of modern requirements is to curtail our quantum. In our business streets, each new shop, in self-defence, makes its ground floor taller than the last, in order to get light to the back of the showroom, and the showrooms, of course, are the justification of the building. The importance of the wind sweeping down our streets and purifying them is most felt, of course, during foggy weather, when there is little air stirring and the fog lingers, baffled and imprisoned, between the high walls. The bridges across the streets suggested by Sir Frederick Bramwell would



be a serious evil, as checking the circulation of air. The suggestion I would make is, that we should construct the façades of our streets somewhat as shown by the diagram—that is to say, in a series of vertical fire-proof compartments, relying on the party walls for this purpose; and bridging across from party-wall to party-wall, supplemented where needed by steel concrete-cased columns, to form the façades. Consequently, if fire broke out, it might be possible to confine the damage to that particular compartment whence it originated. The ground-floor walls to be set back to enable the shop gazers to view the goods from the outside, sheltered by the projecting first floor which stands out beyond the frontage line a bow-window's width. The third floor resumes the frontage line and the flat set back is used as skylight to increase the lighting of the top showroom. Above come residential quarters, each floor with a wide terrace, which would add, I think, to their attractiveness; and so compensate for the loss of area in the two top floors. By this section it is clear that the air in the streets can be more easily changed and more briskly swept along, whilst the light would penetrate further into the ground-floor showrooms. It is also important that when trees are planted along a street they should be of a shape proportioned to the sectional area of the street, and planted in the centre of the roadway, where they may have a chance to prosper, instead of on the sidewalks, where they must prove serious obstructions, by their presence, to the aims and objects of the shops.

HALSEY RICARDO.

NORWICH LIFE INSURANCE OFFICES' COMPETITION.

SIR,—We lately received an invitation to take part in a limited competition for the above, but the conditions we considered were unfair, and as we could not get them altered we declined to compete.

We make this communication in order to assist those who are endeavouring to secure that competitions shall be conducted according to the regulations laid down by the Royal Institute of British Architects, and to maintain the best traditions of the profession.

We subjoin a copy of the letter which we addressed to the directors.

E. BOARDMAN & SON.

Norwich, November 27.

Copy of Letter Referred to.

"To the Chairman.

November 17.

New Insurance Office Premises.

DEAR SIR,—The directors having honoured us with an invitation to take part in a competition for the proposed New Office Buildings, we regret that we must decline to do so if the conditions are adhered to. We respectfully ask you as Chairman to bring the matter before the Board.

The Royal Institute of British Architects have issued a carefully-considered 'Form' for the conduct of competitions, but your conditions are at variance with this in some most important points. No premiums are offered. No provision is made to recompense the competing architects if the buildings are not erected. The assessors appointed are apparently servants of the Board, and the firm practise as surveyors and not architects.

The President of the Royal Institute of British Architects only last week made the question of competitions a foremost one in his inaugural address, and we appeal to the professional gentlemen on the board to say whether or no it is proper and fitting for practising architects who are members of the Institute to undertake work under conditions which are contrary to the best interests of the profession.

We are sending a copy of the Institute conditions and the Presidential address to all the members of the board.

Regretting we have to trouble you in the matter, we remain, dear Sir, yours faithfully,

EDW. BOARDMAN & SON."

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

20. ELECTRIC WELDING—THOMSON PROCESS—BENARDOS PROCESS—COPPER REFINING—OZONE—ALUMINIUM—CALCIUM CARBIDE—CORBORUNDUM.

WHEN iron or steel is heated in a fire until it is at a white heat it assumes a pasty condition, and two pieces can be firmly united together by hammering. This process is caused welding, and to do it properly requires considerable skill, as the heat must be nicely regulated and the ends have to be clean. Some twenty years ago Professor Elihu Thomson, when experimenting by passing discharges from a Leyden jar through a fine wire coil, found in one of his experiments that the ends of a thick wire coil surrounding the thin wire coil were welded together. This led to further experiments, and finally he evolved the process of electric welding which bears his name.

In the Thomson process an alternating current transformer is used which has many turns of fine wire in the primary coil, and only one turn with its ends fitted with heavy clamps in the secondary. The two pieces of metal rod to be welded together are fixed in these clamps and pressed together. The secondary now forms a complete circuit, and if we maintain a steady pressure of 300 volts at the terminals of the primary circuit, then a very large current at a very low pressure is induced in the secondary. Now most of the resistance of the secondary circuit is at the joint, hence since the heat developed in a portion of a circuit is proportional to the resistance of that portion, nearly all the energy of the current is expended at the joint which is raised in a few seconds to the required temperature. It is found that the surfaces in contact are all at nearly the same temperature, because if one portion is cooler than another it will have less resistance, and hence a larger fraction of the current will flow by that path and so heat it. The method is also a very clean one, and the operator can inspect the weld during the whole process. An electric weld can be made much more quickly than by the smith's process, and it is in every way more satisfactory. Nearly every metal can be welded by the electric process, whilst only a very few can be welded by the other process. The ends of a solid ring can also be welded, for although some current goes round by the longer path, yet owing to the choking effect produced by the back E.M.F. of self-induction, this branch current is con-

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siderably smaller than the current passing through the ends to be welded. The following table gives the time required and the power consumed in making welds of iron or steel rods or pipes :—

Round Iron or Steel.			Iron or Steel Pipe.		
Diameter in inches.	Watts.	Time in Seconds.	Inside Diameter in inches.	Watts.	Time in Seconds.
¼	1500	10	½	6700	33
⅜	2500	15	¾	7800	40
½	4800	20	1	12250	47
⅝	6700	25	2	31350	84
¾	10000	30	3	72000	106

Thus to weld two pieces of steel pipe each ¾ in. in diameter together we require 10 kilowatts, or 13·4 horse-power, to be applied for half a minute. Nearly all this energy is being expended at the weld, yet as the whole operation is over in half a minute, the metal is quite cool at a distance of two or three inches on either side.

In the Benardos process of welding use is made of the electric arc. The workman holds a carbon which is joined by a flexible cable to the negative pole of a battery of accumulators, and the metal to be welded is joined to the positive pole. If he now touch the joint that is to be welded with the carbon and lift it about an inch from the metal, a brilliant arc is started which rapidly raises the metal to the welding temperature. Owing to the glare, it is necessary to wear dark glasses during the process. Some very difficult welds, such as welding steel sheets into seamless barrels, mending broken teeth in cast-steel gear wheels, and even cutting out portions of boilers and welding in new pieces with the boilers in their working position, have been successfully effected by this process. Very large currents are required, usually from 300 to 500 amperes, and the pressure required needs to be at least 80 volts, as steadying resistances have to be placed in series.

Perhaps the most important application of electrolysis at the present time is to copper refining. About one-half of all the refined copper used in the world is produced electrolytically, and the great improvement in the purity of the copper is shown by the fact that the specific resistance of the copper in the cables used for electric lighting is less than one-half the specific resistance of the copper used in the first Atlantic cable. If we put two copper plates in a solution of copper sulphate and pass a direct current from one to the other, then copper is deposited on the plate the current leaves by, and the plate by which the current enters loses in weight. Copper refining is simply an elaboration of this simple experiment. The impure copper is made the positive plate, that is, the plate connected to the positive pole of the dynamo, and the plate on which the copper is to be deposited is connected to the negative pole. A current of one ampere deposits only 1·1739 grammes of copper per hour, and remembering that there are 453·6 grammes in a pound, it will be seen that very large currents are necessary. If the currents employed are too large for the size of the plates, then the deposit is flaky. If a rapid circulation of the electrolytic solution be kept up over the plate on which the deposit is taking place, much larger currents can be used, the deposit still remaining tough and smooth. As the yearly output of electrolytic copper is now about 200,000 tons per annum, the great importance of this industry will be apparent.

It has been known for many years that the peculiar odour produced when a frictional electric machine was worked was due to ozone. Just as diamond is an allotropic form of carbon, so ozone is an allotropic form of oxygen. It has not yet been obtained in a perfectly pure state. If we allow sparks to take place in oxygen, its bulk is reduced and a certain proportion of ozone is formed. The molecule of ozone is in an unstable condition. It consists of three atoms, whilst the molecule of oxygen contains only two. Ozone is a very powerful oxidising agent, and hence it is very efficient as a germicide.

Of the many forms of apparatus invented to produce ozone on a commercial scale, Mr. Andreoli's ozoniser is, perhaps, the simplest and most efficient. It consists of two combs of aluminium separated from one another by a sheet of glass, each comb being connected to the terminals of a high tension transformer. As each comb has thousands of points, ozone is manufactured rapidly by the electrostatic discharge taking place at the points. Large quantities of ozone can thus easily be manufactured at small expense. Many of the secondary chemical effects produced by ozone are of great value. It is sometimes used for bleaching beeswax, tallow, grease, &c. It is necessary for the manufacture of some artificial perfumes like vanillin and heliotropine. It is also largely used for thickening and bleaching oils and varnishes. Messrs. Siemens & Halske have two factories in Germany where bleaching is done by ozone. Cloth, linen, and yarns are bleached in one of them, and in the other starch is bleached and refined.

The most valuable applications of ozone at present are in medicine and sanitary science. In all diseases where organisms are present it has been used with advantage, and in the treatment of unhealthy wounds it greatly alleviates the pain and takes away the offensive smell. It is very efficient for sterilising water, as all impurities are oxidised and the microbes destroyed. From experiments made on Thames water, Mr. Andreoli calculates that a cubic yard could be completely sterilised by an expenditure of a tenth of a Board of Trade unit in his apparatus.

Dr. Fröhlich, of the firm of Siemens & Halske, states that an ounce of ozone will bleach 110 lbs. of linen as well as it could be bleached on grass in three days. It will also bleach and refine 100 lbs. of potato starch, taking away all the bad taste and smell, and leaving the colour perfectly white. He also states that an ounce of ozone in a room whose capacity is 8,000 cubic yards makes the air almost unbearable for healthy persons.

The manufacture of aluminium in 1885 was on a very limited scale, the world's production for that year being under four tons. It was made by a chemical method—namely, the sodium reduction process, and the selling price was 2*l.* 10*s.* per lb. In this year Mr. C. M. Hall, a young American, while still at college, experimented on the electrolysis of fused aluminium salts. He attempted to find a substance which would form an electrolyte for alumina at high temperatures so that the aluminium might be separated from it. After many unsuccessful attempts he managed to deposit aluminium by means of an electric current by using melted cryolite as the electrolyte. Cryolite is a combination of sodium and aluminium fluorides, and has a low melting point (900 deg. C.). In 1888 the well-known Pittsburg Reduction Company was formed to make aluminium by Hall's process, and at the end of the year it was selling aluminium at 20*s.* the pound.

About the same time as Hall, M. Héroult patented a process in France for obtaining aluminium from a bath of fused cryolite and alumina by means of electric currents. The development of the manufacture of aluminium in Europe was, however, much slower than in America. The largest company in Britain is the British Aluminium Company, which works on the Héroult system. They obtain the raw material from their mines at Glenravel, in Ireland. It is then conveyed some twenty miles to their alumina factory at Larne Harbour, where it is chemically treated, and the alumina is obtained in the form of a very fine powder. It is found that five tons of the raw bauxite produce about two tons of alumina, and this in turn produces about one ton of metal. The alumina after being dried is packed in steel casks and conveyed to Foyers, in Scotland, by steamer.

At the Falls of Foyers a channel has been constructed to lead away part of the water from above the upper fall to the factory, a distance of about three-quarters of a mile. The turbines are of the vertical type and are each capable of transmitting 700 h.-p. to the dynamo which it drives. The dynamos produce 8,000 amperes at a pressure of 60 volts. The current leaves the dynamo by means of large bare copper cables, which convey it to the furnaces in which the alumina is decomposed. The pure aluminium is then sent to the company's rolling mills in Staffordshire.

Aluminium wire is now quoted at 224*l.* per ton, or 2*s.* per lb., and sheet aluminium is about 15 per cent. cheaper. Although the cost has been so lowered there has been a notable improvement in the quality of the commercial metal. M. Minet has analysed specimens made in 1890, 1893, and 1897, with the following results, the numbers being percentages :—

Composition of the Metal.	In 1890	In 1893	In 1897
Silicon	0·90	0·25	0·02
Iron	0·40	0·40	0·12
Aluminium	98·70	99·35	99·86

For reasons we have previously stated aluminium is being extensively used for long distance power transmission schemes, and it is also used for reducing refractory oxides. It is used extensively in the iron and steel foundry where a small quantity is added to the metal immediately before casting. It is also used to make cooking utensils. For shipbuilding it has not hitherto proved a success. Part of the sheathing of the yacht *Defender* was corroded, although the metal used in its construction was exceptionally pure. It is extensively used in warships as a substitute for inflammable wood, and it is also sometimes used instead of lithographic stones.

One of the most important electro-chemical industries is the manufacture of carbide of calcium. The discovery of the method of manufacture was made accidentally by Mr. Willson, of the Willson Aluminium Company, in 1893. As originally produced it was a by-product of the electric furnaces used for reducing refractory materials. The materials used in its manufacture are finely-ground lime and coke. These are put into the electric furnace and subjected to a very high temperature. The furnace is a brick-built chamber containing two large carbon electrodes, which gradually burn away under the intense heat, but their distance apart can be regulated by means of screw rods to which they are attached. In order to get 1 ton of carbide 300 h.-p. has to be given to the furnace for twelve hours. It is therefore obvious that cheap power is necessary for its manufacture. The present wholesale price of carbide of calcium is about 20*l.* a ton.

For operating electric furnaces polyphase currents offer many advantages over direct currents. With direct currents it is impossible to maintain several arcs in parallel owing to the difficulties of regulation, but with polyphase currents we can use as many carbons as there are phases. For example, with three-phase currents we can have three carbons inclined to one another at 120 deg., the molten mass forming the neutral point. In electric furnaces temperatures as high as 3,500 deg. C. have been obtained, and carbon has been vapourised.

A pound of calcium carbide will, when mixed with water, produce five cubic feet of acetylene. This gas in an ordinary burner burns with a very smoky flame, but in burners specially constructed to prevent the formation of smoke it burns with great brilliancy, the light it gives being between ten or twenty times that given by coal gas. It has, moreover, several advantages over coal gas. It can be generated in a very simple and ready manner from the carbide, and hence can be used for illuminating purposes in country houses without the expense of an outside gasworks. It gives out less heat and consumes less oxygen for a given amount of light than coal gas. The disadvantages are possible dangers in connexion with explosions and the difficulty of storing it in bulk. Considerable progress has recently been made in this direction, and there is an ever increasing demand for calcium carbide.

A recent industry that has greatly interested scientists is the Villon process of manufacturing alcohol from calcium carbide. The carbide is decomposed into acetylene in the usual manner, and the acetylene is converted into ethylene gas by passing it through a solution of chromium and ammonium sulphates. The ethylene gas is absorbed by sulphuric acid and the product is distilled after water has been added. This distillate is ethyl-alcohol and is used as a fuel in motor vehicles. With carbide at 20*l.* a ton it could be made at a little over 1*s.* per gallon.

Silicium carbide or carborundum is now much used for boring, grinding, shaping, &c., and is displacing emery and corundum. The raw materials required for its manufacture are coke, sawdust, salt, and sand. These are put into the furnace, which at Niagara is in the form of an oblong box 12 ft. in length, 3 ft. in width, and 3 ft. in depth. In the centre of either end are the electrodes, consisting of six-

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teen carbon rods, each of which is 3 in. in diameter. When the circuit is closed no apparent change takes place for about half an hour, although about 1,000 h.-p. is being expended on the furnace. Then a slight odour is perceived owing to the formation of carbon monoxide. After three or four hours the whole furnace is enveloped in blue flames, caused by the combustion of the escaping gases. Cracks also appear along the surface of the bricks, through which appear yellow sodium flames. The current is kept on for twenty-four hours and then the furnace is allowed to cool. The side walls are then taken down and the upper crust is cut through with large steel bars and raked off. The inner crust is then removed with a spade and the crystalline silicium carbide exposed.

The crystals are of all colours and sizes. They are ground down to powder and after being washed with dilute sulphuric acid the commercial product is obtained. This is made up into hones, files, rubstones, and cloth by being mixed with a binding material and then moulded under hydraulic pressure and vitrified in kilns. Carborundum is much superior to emery, and there has sprung up a great demand for it. It has been successfully employed in polishing diamonds. Great additions have recently been made to the plant of the Carborundum Company at Niagara Falls.

Amongst other electro-chemical industries we may mention the manufacture of alkalies and bleach which is done electrolytically in about thirty factories. The tanning of hides, the seasoning of timber, the making of potassium chlorate, and the manufacture of sodium hypochloride are a few of the minor electrical industries which may in the future rapidly develop.

OBITUARY.

MR. HENRY CURREY.—We regret to announce the death, on Friday, November 23, at his residence, The Chesnuts, Lawrie Park, Sydenham, of Mr. Henry Currey, of No. 37, Norfolk-street, Strand, W.C., aged eighty years. Mr. Currey, who was an Associate of the Institution of Civil Engineers and a Fellow of the Surveyors' Institution, was elected Associate of the Royal Institute of British Architects in 1848, and Fellow in 1856, and a Vice-President for 1874-7 and 1889-93. He was during a long period architect and surveyor to the Governors of St. Thomas's Hospital, and in that capacity planned and designed for them his most important work—the hospital buildings on the Albert Embankment, of which the long range of pavilions, connected by corridors and arcades, constitutes a prominent feature of the riverside view as seen from Westminster Bridge, and forms a striking contrast to the opposite Houses of Parliament. The Governors purchased the site—about 8½ acres, whereof half had been reclaimed from the foreshore at Stangate—from the late Metropolitan Board of Works for 90,000*l.*, at the time of the construction of the Embankment—begun in July, 1866, and completed (but since widened at Vauxhall) in November, 1869: on August 8, 1865,* we published a view, with plans, of the buildings, and on June 24, 1871,* another view, with plan, of the two middle pavilions. The Queen opened the new hospital on June 21, 1871, having laid the first stone on May 13, 1868. The new medical schools were opened in June, 1894. The governing body adopted the detached pavilion system—extended in this instance through the exigencies of a narrow site—after a committee had visited many hospitals on the Continent. A description of the plans will be found in a paper read by Mr. Currey at a meeting of the Royal Institute, and reported by us on January 28, 1871. With a total frontage of 900 ft. the blocks stand 125 ft. apart; the central space being 200 ft in length. They were designed for 600 beds in wards measuring 28 ft. by 120 ft. and 15 ft. high, for twenty-eight beds apiece, allowing each patient a space of 1,800 cubic feet. At the south end are the schools and a museum, 85 ft. by 30 ft. and 34 ft. high, with two galleries, the southernmost wing being for special cases and smaller wards; at the bridge-foot are offices and separate residences for the treasurer and four resident officers.

In giving evidence before the Hospital Commission, February, 1891, Mr. Brass, receiver of the hospital estates, is reported to have stated that the new buildings cost 969*l.* per bed, the out-patients' side included.

In 1861-2, Mr. Currey built the hotel at the London Bridge railway terminus, which was illustrated in our columns of June 22, 1861.* The subsequent enlargement of the London, Brighton, and South Coast and South-Eastern (old) terminus, originally designed by Henry Roberts, in 1843-4, in conjunction with either Sydney Smirke or George Smith—the authorities do not agree on the latter point—occasioned the destruction of nearly all the St. Thomas's Hospital buildings in the Borough, Southwark, to which Wren, in 1692-1711, Samuel Robinson, surveyor of the hospital estates, and his partner, James Field, in 1814-42, Sir Robert Smirke (the principal façade), and Sir Charles Barry (the new wing), had in succession contributed various portions. Amongst his other architectural work we may mention some warehouses in St. Thomas-street, Southwark, for Messrs. Bevington & Sons, which we illustrated in our number of March 20, 1875;* St. Paul's Church, Grove Park West, near Chiswick railway-station, built chiefly at the charges of the late Duke of Devonshire, and enlarged by Mr. Currey in 1892; the Pump Room at Buxton, 1875; and a lych-gate at St. Bartholomew's Church, Westhill, Sydenham, for the Mayow W. Adams Memorial Committee. Together with his son, Mr. Percivall Currey, he carried out, in 1898, the repairs and superintended the redecoration of the church of St. Clement Danes in the Strand, and prepared the plans and designs for the recent reconstruction and extensive enlargement of the Queen Anne's Bounty Offices in Great Smith-street, Westminster, established in 1704. Messrs. Henry and Percivall Currey acted also as honorary architects in respect of the planning and designing of the St. Clement Danes and Clare-market Parish Hall, 1897-8. We will add that Mr Henry Currey officiated as assessor to the Metropolitan Asylums Board in the two important competitions for their Southern Hospital, and their new chief offices on the Victoria Embankment, Whitefriars, Mr. E. T. Hall being the architect. Of the latter building, erected at a contract price of 47,532*l.* and opened in July last, we published a perspective view, with plan, on June 11, 1898. For the Southern Hospital the Board have adopted Messrs. Treadwell & Martin's plans upon the cottage system, to be carried out (as revised) at an estimated total cost of 284,312*l.*, the cost per bed being reduced from 395*l.* to about 355*l.*, and that of the structure being 178,112*l.*

* Out of print.

GENERAL BUILDING NEWS.

ALTERATIONS TO ST. CHARLES'S CHURCH, HULL.—The dome and sanctuary, the memorial to the late Canon Sullivan, was opened at St. Charles's Catholic Church, Hull, on the 25th ult. The dome is situate immediately over the centre of the sanctuary at a considerable height from the floor. The outside of the dome is covered with copper and finishes with a gilded ball and cross. The ceiling below the dome and on either side of the sanctuary is groined and panelled. The side and end walls below the main cornice are filled with niches, which are to receive hereafter statues of patron saints. The sanctuary is divided from the nave by columns, the space between them and the wall pilasters being filled in with enriched canopied niches with the statues of St. Joseph and St. Charles. The altar has been taken down and set back some 4 ft.; a baldachino has been erected over it, with a carved and gilded canopy suspended immediately over the throne of the tabernacle. The floor of the sanctuary has been laid with a vitreous mosaic pavement. The steps are of rough royal marble. There is being executed a new oak pulpit, with canopied sounding-board. It will be placed under the first arch of the nave arcade, on the Gospel side. There will also be carved oak stalls in the sanctuary. The whole has been designed in the Italian Renaissance style, from plans and under the superintendence of Messrs. Brodrick, Lowther, & Walker, of Hull. Messrs. G. Jackson & Son, of London, have executed the fibrous plaster work, Mr. Levitt the brickwork, Mr. G. J. Scott the joiner's work, Mr. Quibell the mason's work, and Mr. J. Morley the plumbing and electric lighting. The colour decorations and the pictures have been done by Herr H. Immencamp, of Hull.

MISSION CHURCH, OLD HILL, STAFFORDSHIRE.—A mission church, dedicated to St. James, has been erected in the Waterfall-lane district of Blackheath, Old Hill, from designs by Mr. A. Ellis, of Birmingham. The building will accommodate 250 persons.

PRESBYTERIAN CHURCH, WHITLEY — The new Presbyterian church at Whitley was opened on the 23rd ult. The new church measures 90 ft. by 42 ft., and provides accommodation for about 470 worshippers. Included in the building is a minister's vestry 16 ft. by 9 ft., a small hall 20 ft. by 16 ft., and a central corridor 4 ft. 6 in. wide, communicating with the church hall, which was erected about four years ago. The building is a Gothic structure, with a chancel behind the pulpit. The church is heated with hot water on the low-pressure system. The contractors are Messrs. Fishburn & Co., of North Shields, Mr. Wm. Bowden, of Whitley, acting as clerk of works, and the plans have been prepared by Mr. Henry Gibson, of North Shields.

RESTORATION OF TOWER, CLARE CHURCH, SUFFOLK.—The tower of Clare Church was reopened on the 21st ult., after restoration. The work has been carried out under the supervision of Mr. Detmar Blow, the architect to the Society for the Protection of Ancient Buildings. The church bells have been rehung by Messrs. Day & Son, of Eye, Suffolk. The work has cost about 1,600*l.*

TEMPERANCE INSTITUTE AND HALL, DUDLEY, WORCESTERSHIRE.—The formal opening of the new Temperance Hall and Institute in High-street, Dudley, took place on the 21st ult. The building is of brick with an ornamental frontage of terra-cotta facings. On the right-hand side of the main entrance is a café, and on the left a first-class refreshment-room; whilst directly at the rear, and approached by a broad passage with encaustic tiled dado, is a hall, 75 ft. long by 42 ft. wide, capable of seating 750 people, with a gallery, stage, and all necessary accommodation for public meetings. Underneath the café and refreshment-room is a smoke and general dining room, with kitchen, stores, &c., and directly below the large hall is the gymnasium. The first floor consists of reading and committee rooms for the use of the members of the Temperance Society, and an assembly-room, extending the whole width of the building and capable of seating 150 people. On the floor above is a suite of similar rooms, which will be principally devoted to recreative purposes; whilst the roof, which is approached by a staircase and is flat, asphalted, and provided with parapet, is intended for a promenade in summer. Exclusive of the site, the total cost of the building, with fittings, will be about 8,000*l.* The building has been erected by Messrs. Webb & Round, Dudley, from the plans of Messrs. Wood & Kendrick, West Bromwich.

PAVILION, WESTON-SUPER-MARE.—The Urban District Council of Weston-super-Mare having applied to the Local Government Board for permission to borrow an additional sum of 5,203*l.* in connexion with the erection of a pavilion at Knightstone, Col. A. J. Hepper held an inquiry into the matter at the Town Hall, Weston-super-Mare, on the 16th ult. The original loan, which was based on estimates made in 1898, was 14,300*l.*, but owing to the increase in the prices of materials, and the fact that certain filling behind the sea-wall would be needed, it was found that the work could not be carried out for a less amount than just over 19,500*l.* At the inquiry just held, Mr. Hugh Nettleton, the Town Surveyor, explained in detail the works in connexion with the substructure, the sea-wall, &c., and Mr. J. S. Stewart, the architect of the pavilion, explained the details of the superstructure.

EPILEPTIC COLONY, WARFORD, CHESHIRE.—The preparations for the establishment of the Lewis epileptic colony at Warford, in Cheshire, are, says the *Manchester Courier*, making rapid progress. A considerable amount of work has already been accomplished in the way of draining and laying out the grounds, and the contract has been let for the erection of the numerous buildings for the housing and treatment of the epileptics forming the colony. The area within which the buildings are to be placed covers, roughly speaking, 3,000 yards, and the site is stated to be laid out like a beautiful park. The remainder of the estate will be available for recreation grounds, and for gardening and farming pursuits, in which the inhabitants of the colony will employ a portion of their time. The patients will live in detached homes in the form of two-story buildings, some accommodating twenty and others twenty-four inmates. The accommodation is also to include an infirmary, a recreation hall, observation blocks, kitchens, an administrative block, and laundry. An engine-house, water-tower, and workshops will also be provided. The administrative block will face the main entrance, and the recreation hall is to be placed a short distance in the rear of this building. The homes for the patients will be on either side, and the other buildings will be conveniently distributed over the site. The land is situated on the main road from Knutsford to Chelford. The architect is Mr. Alexander Graham, of London, and the contract for the building work, which amounts to somewhere about 50,000*l.*, has been secured by Messrs. W. Brown & Son, of Salford. In order to facilitate matters, brickmaking will be commenced on the site almost immediately.

PARISH HALL, STROOD.—The new parish hall, which is situated at the top of Brompton-lane, and which forms an addition to the Church's work at Strood, was dedicated by the Bishop of Rochester recently. The site of the hall, irregular in shape, has a frontage of 114 ft. to Brompton-lane, and 93 ft. 6 in. to Moore-street. The building has been placed close to the upper boundary in order to leave room for a church when the need arises. The walls are of stock bricks, with red brick dressings; the roof is covered with Broseley tiles. The entrance is by a side porch, the door of which faces directly down Brompton-lane, the main exit being by a separate pair of doors opening outwards in the centre of the main front. Within is a rectangular hall, 55 ft. by 33 ft., with the roof open to the collar at the height of 21 ft. 6 in. The artificial lighting is by Welsbach incandescent gas, and the heating is by stoves. The architect is Mr. E. F. Cobb, and the builder Mr. W. Coker, of Halling.

CO-OPERATIVE STORES, DARWEN, LANCASHIRE. The new Central Stores, on the Green, Darwen, were opened recently. Messrs. Sames & Green were the architects.

MUSIC-HALL, CLAPHAM JUNCTION.—On the 26th ult. the new Grand Palace of Varieties at Clapham Junction was opened. The exterior of the building has been executed in red brick and red stone, and has for its central feature on St. John's Hill a group of entrances to the grand vestibule, with varied arcades. On either side of the central arrangement two projecting turrets rise some 80 ft. above the pavement level. The vestibule has marble

* Out of print.

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steps, mosaic floor, decorated walls and ceilings, and on the right is the grand staircase to the circle. The pit is a spacious one, and the level of the ceiling is so arranged as not to curtail the range of vision in any way. The interior decoration has been treated in cream and gold. The hall will accommodate from 2,500 to 3,000 persons, and the stage is 68 ft wide and 28 ft. deep, the distance from the stage door to the gridiron being 53 ft. The building is lighted throughout by electricity. Mr. Ernest A. E. Woodrow was the architect.

FOREIGN.

INDIA.—The last section of the Hyderabad-Godavari Valley railway from Parhand to Basar, eighty-seven miles, has been opened for traffic, and the line is now linked from Secunderabad Junction to Manmar Junction.——The important bridge at Dihing has recently been completed; it is in six spans of 100 ft. triangulated girders.——A new dock is about to be constructed at Luff Point, near Calcutta, to facilitate the coal export trade, which at present is in a congested state.——The marine approaches to the Port of Calcutta are to be greatly improved, and a powerful hydraulic dredger has recently arrived there to assist in the work.——The Great Indian Peninsula Railway Company is about to construct a large passenger station at Dadar, near Bombay.——A girder bridge is about to be erected over the Swat river at Chakdarah.——The Secretary of State has given his sanction for the construction of a bridge of thirteen spans of 150 ft. each over the Teesta river at Kaunia, on the northern section of the Eastern Bengal State railway.—— The water taken from lakes for the supply of Bombay shows an increasing quantity of albuminoid ammonia; this is attributed to the growth of weeds in the water, especially in the Tausa lake. Nevertheless, the water as delivered to the public is stated to be of fairly good quality.——Competitive designs for the new Military Department buildings at Calcutta have been delivered in Simla, where they have been on exhibition in the Public Works Department. The new building is to be of considerable dimensions, and a special prize was offered for the selected design for the façade of the main entrance.

UNITED STATES.—It has been arranged to hold an art exhibition annually in Boston. The first was opened on the 20th inst. Only original works by contemporary American artists are to be admitted, and one of the features of the plan is that the exhibitors of each year are to select the jury for the following exhibition. Hitherto, European rather than American works of art have found favour in Boston, and the exhibition is intended to alter this state of affairs.——American architects are strongly protesting against the proposals to alter the White House, in Washington. The scheme of alteration has been chiefly drawn up by the Government engineer in charge of the executive mansion, in conjunction with Mrs. Harrison, wife of the ex-President of that name.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS. —The practice of the late Mr. Charles Henry Driver, architect, of 17, Victoria-street, is to be carried on by his eldest son, Mr. Charles H. Driver, in conjunction with Mr. Stanley Barrett, architect, who was for some time in Mr. Driver's office, under the style of "Barrett & Driver." The practice will be transferred to Mr. Barrett's office, 53, Blomfield-road, Maida Vale, W.——Mr. Joseph Hamblet, of the Eagle Engineering Works and Foundry, West Bromwich, has opened a London office at 110, Cannon-street, E.C.——Messrs. Young & Co., stable and cowhouse specialists, have removed their offices and showrooms from 12, Victoria-street to 161, Victoria-street, Westminster.

BRIDGE, ARDNAMURCHAN, N.B.—A new road-bridge over the River Shiel, at Ardnamurchan, has just been opened to traffic. The bridge is of stone, and is 150 feet in length. There are three spans, each of about 47 feet. The design was by Messrs. Blyth & Westland, Edinburgh.

SURVEYOR TO THE DULWICH ESTATES.—The Estates Governors of Dulwich College recently advertised for applications for the post of architect and surveyor for their estates. Out of a considerable number of candidates a selection was made by the Governors, and nine gentlemen were interviewed by them on November 15. From these nine, Messrs. Charles E. Barry, A. E. Pridmore, and G. Lister Sutcliffe were selected for a final interview on November 22. The ultimate choice lay between Mr. Barry and Mr. Sutcliffe, and the former was finally elected by, we are informed, a majority of one. Mr. Barry's father, the late Mr. Charles Barry, who died a few months ago, was the previous holder of the appointment.

ART UNION OF LONDON.—We have received from the Art Union a proof of the presentation etching to be issued to members of the Union for the current year. It is a large-sized etching of a landscape with water in the foreground, entitled "The Meadow Pool," and was commenced by Mr. David Law, who owing to illness was unable to complete it, and it has been completed by Mr. C. O. Murray. The plate is one of those large and highly-finished etchings for which Mr. Law is celebrated, and which we do not sympathise with, as they want the vigour and freedom of line which should be the special characteristic of etching; but it is a fine example of the class of work, which we presume is what best meets the taste of the majority of the subscribers.

AN ACETYLENE LAMP FOR INDUSTRIAL PURPOSES.—Messrs. Lockerbie & Wilkinson are manufacturing a new portable acetylene lamp for use on builders' works, railway works, and other places where a steady, brilliant illumination is required. The light intensity of the lamp is said to be about fifty candles, and it is stated that the cost of the light is only ¼d. per hour, and that the lamp will burn for eight hours without recharging. Unless this lamp gives a much higher light efficiency per cubic foot of acetylene than any burner yet placed on the market, we imagine that, in practice, the cost per hour for a fifty-candle flame will be found to be fully 1d.; but, even at this cost, there are many cases in which the lamp may with great advantage be employed. The brilliancy of the light should be greatly superior to that emitted by any ordinary oil lamp. The full title of the new lamp is "The Autolite Acetylene Industrial Lamp," and its price is 31s. 6d.

LONDON SCHOOL BOARD AND NEW SITES.—The School Board for London have issued their annual scheme of new sites which they propose to take under powers of the Education Acts, 1870-93, and, for the first time, of the Provisional Order Confirmation (London) Act, 1899. In terms of the latter statute they schedule some land and house property covering an area of about 16,700 ft. superficial for the erection of dwellings for the labouring classes on the site of twelve houses in Lowood, Dellow, and High streets, Shadwell. For additional public elementary schools and, in a few cases, the extension of existing school premises, they schedule a gross total of forty-one sites, but inasmuch as in each of three instances two alternative sites are named the net total amounts to thirty-eight, equivalent to an aggregate area of 50½ acres, including one site of 14 a. 2 r. on the west side of the proposed Stainton-road, Catford, Lewisham. The school sites are situated in the following divisions: Chelsea.—Vineyard, Hurlingham-road, or Draycott Lodge, New King's-road; Nos. 71-81 (odd), Lillie-road; market garden ground in Crabtree-road; MacMurdo-road; and Studdridge-street, Fulham; Ellerslie-road, Hammersmith; Lot's-road, and Nos. 72, 72A, and 74, Park-walk, Chelsea. Finsbury.—No. 33, Dalmeny-avenue, Holloway; and No. 143, Hornsey-road. Greenwich. —Timbercroft, Greening, and Heavitree roads, adjoining the eastern boundary of the Kent Waterworks reservoir, Plumstead; Leahurst-road; Catford; Dowanhill, and Torridon roads, Lewisham; Grange Hill-road, and two sites in Glenesk-road, Eltham; Glenister-road, Greenwich, and No. 10, Mulgrave-place, Woolwich. Hackney.—No. 101, Mandeville-street, and Northwold-road. East Lambeth.—Nos. 50-71 (odd), Mina-road, St. Mary, Newington. West Lambeth.—Telferscot-road; and Bellamy-street (garden ground), Clapham; Elm Court House and gardens (90,030 ft. superficial), Lambeth; Greyhound-lane; Mitcham-lane; and Broadwater-road, Streatham; houses in Gwynne-, Yelverton-, and Urswicke-roads, St. Mary, Battersea. Southwark.—The Magdalen-street School, and several houses in Magdalen-street, Shand-street, and Gibbon's-rents, St. John, Horselydown. Tower Hamlets.—Sixteen houses, with forecourts and gardens, in Blakesley-street, St. George's-in-the-East; Nos. 20-40, Arbour-square, or nineteen houses in Bromley and Portland streets, Mile End Old Town. Marylebone.—No. 3, Park-place, gardens, Campbell-street, Paddington; eight houses in Barrow Hill-road, Primrose Hill; and either Nos. 3-7, Worsley-road, and the school house, also Nos. 12-15, Downshire-hill, with forecourts and gardens, or Nos. 5, 7, and 9, Well-walk, with lands, houses, gardens, &c., in Christchurch and Well roads, Hampstead. We may here mention that No. 5, Well-walk (Weatherall House), is the "Long Room" of the Wells, a favourite resort for its assemblies in the last century, when the avenue of limes in the walk formed the promenade. On the opposite side stood the pump-room—having been converted into a chapel and then into a volunteers' drill-hall, and pulled down about twenty years ago. The Walk, in which lived Keats, with his brothers George and Thomas, and Constable, has been widened and considerably altered of late years by the trustees of the charity endowed, 1698, by Susanna Noel, with six acres lying around the chalybeate spring.

PUBLIC IMPROVEMENTS, BRIGHTON.—Lieutenant-Colonel A. C. Smith, R.E., held an inquiry at the Brighton Town Hall on the 16th ult. into an application by the Corporation to borrow 35,701*l.* and 1,605*l.* for works of hard-wood paving, and 4,500*l.* for the purchase of land for purposes of street improvement, public baths, and a reading-room. Mr. Hugo Talbot, the Deputy Town Clerk, explained the application. The paving proposed to be put down was wholly of hard wood. The roads included were Grand-parade, Richmond-place, leading up to Elm-grove, Marlborough-place and Lewes-road, Beaconsfield-road and Church-street up to New-road. The loan of 4,500*l.*, also asked for, was for the purchase of a site in London-road known as Brighton Lodge. The Corporation thought it desirable to get the house to enable them to carry out an improvement, and also to provide a place for public baths, which would be carried on in lieu of the Brunswick-place Baths; also to enable the Council to provide a district newsroom. The 4,500*l.* was divided as follows:—Public baths, 2,830*l.*; street improvements, 560*l.*; newsrooms, 1,110*l.* Evidence was given by Mr. F. J. C. May, the Borough Surveyor.

NEWCASTLE AND DISTRICT BUILDING TRADES EXCHANGE.—The annual dinner of the Newcastle and Gateshead and District Building Trades' Exchange, Limited, was held at the Hotel Metropole, West Clayton-street, on the 23rd ult. Mr. J. G. Walker presided, and amongst the sixty present were Messrs. W. L. Newcombe (Vice-Chairman), C. B. Cawood (Secretary), and others. The loyal toast having been honoured, "The Architectural and Kindred Professions" was given by Mr. J. S. Robson. In doing so, he said the architectural profession was a most honourable and ancient one. It was one of the oldest in the world, and had handed down to posterity more of the history of mankind than any other profession. The civilisation and progress of a nation were measured by its architectural results. What a nation felt in religion and domestic life were expressed in the architecture of the time in which the edifices were raised. The architectural need of the nineteenth century was strictly utilitarian. When a noble profession had to deal with such varied styles of art they should render them the more credit for what they did do, and not criticise so much what they had not done. It must be remembered that they had their money-saving, fanciful clients to please.—Colonel F. R. N. Haswell, J.P., replied. The architect, he said, was nothing unless he had those who would carry out his intentions. Specially did he praise architects for what they had done for the longevity of the human race by inaugurating the sanitary provisions they had done. He also spoke hopefully of the skill of their young architects. Mr. J. P. Allen, who also responded, said they liked those meetings because they promoted the harmony that should exist amongst those in the building trades.—"The Building Trades"—the next toast—was proposed by Mr. G. G. Laidler. He said he regretted the heavy cloud that was hanging at present over the building trade, and he did hope that the offer that had been made by the builders for arbitration would be accepted. If it should not be, he was afraid that they would have an unfortunate time during the present winter. He spoke of the advantages of having a Building Trades Exchange and of organisation. In response, Mr. Stephen Easten spoke of the difficulties that the builder had to contend with, and said that the builders tried to be as fair and as straight as it was possible for them to be.—On behalf of the allied trades Mr. W. H. Allen also replied. He said they were all trying to bring about better methods in making people more comfortable and happier in their surroundings.—At this juncture a presentation to Mr. W. Sutton, junior, the late secretary of the Exchange, took place. Mr. Allen said that Mr. Sutton was a model secretary, and the success of the Exchange was greatly due to him. Lately Mr. Sutton had married, and the members had subscribed for the purchase of the black oak secretaire and chair they saw before them. It was no recompense for his services, but a very slight token of their esteem for him and his skill.—Mr. W. Sutton, junior, in reply, spoke of what the Exchange could do in the way of reforms and prophesied there was a future before it. The final toast was "The Exchange," which was given by Mr. R. H. Millican, and the replies were by Mr. J. G. Walker and the Secretary.

THE SPREAD OF SANITARY LITERATURE.—Professor Corfield's Harveian Lectures on "Disease and Defective House Sanitation," of which translations into French and Hungarian have already been published by the Royal Society of Public Health of Belgium and the Hungarian Society of Public Health respectively, have now been translated into Italian by Dr. Solfantini, of Milan, and are being published, with the illustrations, in *Il Monitore Tecnico*, the leading engineering and architectural journal of that city.

GLASGOW ARCHITECTURAL CRAFTSMEN'S SOCIETY. —The fourth meeting of the session was held on Friday evening, 23rd ult., when a paper entitled the "Duties of a Clerk of Works" was read by Mr. Wm. A. Muir. In the course of his remarks the lecturer strongly recommended the regular reporting to the architect each week on the progress of the work by means of written statements framed on lines such as these: number of men in respective trades employed each day, with number of hours of each; state of weather and amount of work accomplished each day; drawings received and drawings required. The taking of notes of extras or modifications on the work was also considered to be essential, these being of great assistance at completion in the checking of accounts, &c. A discussion on the subject was opened by Mr. J. Fairweather, and continued by other speakers.

TRINIDAD TIMBER AND ASPHALT.—Timber to the value of 10,224*l.* was exported from Trinidad last year, the proportion sent to Great Britain being of the value of 2,463*l.* Of asphalt, 13,429 tons were exported to Great Britain and 109 tons to Canada.

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Reporting on these products, Mr. Bourne, the acting Colonial Secretary, observes: "There is much fine timber on the Crown lands of Trinidad, but under the long-needed system of forestry which is about to be introduced, felling will be chiefly restricted to the satisfaction of local demands for many years to come. There are, however, ornamental woods for which a demand might be created if they were judiciously placed on the English timber market. Of the mineral products of the colony, asphalt is, as is well known, by far the most important. The asphalt trade was more prosperous in 1899 than in any previous year of its history; 140,000 tons were exported—99,000 to the United States—representing a value of 150,000*l.* and a revenue to the Crown of 45,000*l.* Reliance, however, cannot be placed on the continuation of the business on this scale. Seven-eighths of the asphalt exported is dug from the Pitch Lake, which is leased to a company for a term, of which twenty-nine years have still to run, and the company are bound to ship as much as one-third of last year's output. In view of the fact that a similar lake at Bermudez, in Venezuela, ten times its size, and containing asphalt purer in the proportion of 97 to 50, is already being worked, Trinidad can no longer claim to command the asphalt market. The demand for asphalt is, however, growing, and there are greater difficulties in shipping it from Bermudez than from Trinidad. Pitch in a liquid form mixed with a bituminous oil is also to be found in the south of Trinidad, and coal exists in various parts of the island. The commercial value of these deposits has, however, not yet been satisfactorily tried."

REFUSE DESTRUCTOR, MOSS SIDE, MANCHESTER.—A Local Government Board inquiry into an application by the Moss Side Urban District Council for permission to borrow 10,870*l.* for the construction of a refuse destructor was held in the Free Library, Moss Side, on the 20th ult. The inquiry was conducted by Mr. W. O. E. Meade-King. The site for the proposed destructor is to the east of Beresford-street. Two-thirds of the site, it was explained, would be used for the destructor; on the remainder it was proposed to erect public baths. The scheme was described by Mr. H. B. Longley, the engineer and surveyor to the District Council. It has met with considerable opposition.

PUBLIC IMPROVEMENTS, &C., DUBLIN.—On the 22nd ult. Mr. P. C. Cowan, Chief Engineering Inspector to the Local Government Board, held an inquiry in the City Hall, Dublin, with reference to the application of the County Borough Council for sanction to the following loans:—(1) 10,400*l.*, supplemental loan for electric lighting; (2) 800*l.* for sewerage works in Prussia-street and Aughrim-street; (3) 9,884*l.* 4s 4d. for paving, asphalting, sewerage works, &c., in connexion with the Bull-alley area scheme; (4) 819*l.* for private improvement works; (5) 8,058*l.* for asphalting, wood-paving, concreting, and the purchase of steam road-rollers; (6) 3,000*l.* as loans under the Small Dwellings Acquisition Act. Mr. Campbell, Town Clerk, and Mr. Ruddle, Electrical Engineer, gave evidence as to the necessity for the loans. Mr. Harty, C.E., also gave evidence.

ELECTRIC LIGHT, WILLESDEN.—At a meeting of the Willesden District Council, on Tuesday night, it was reported that the Engineer had received the bills of quantities in connexion with the main and sub-electricity stations. The Council decided to apply to the Local Government Board for sanction to a loan of 52,550*l.* for use as follows:—Buildings, walls, sites, works, chimney shaft (main station), 30,104*l.*; tenants' compensation, 121*l.*; cost of road, 325*l.*; coal sidings, 2,500*l.*; offices and sub-station, 13,500*l.*

ELECTRIC LIGHT, KENSINGTON WORKHOUSE.—At the last meeting of the Kensington Board of Guardians a Report came up from the Special Electric Lighting Committee. They were unanimously of opinion that it was desirable to light the workhouse, infirmary, and office buildings in Marloes-road by electricity. The Board decided to instruct Professor Robinson to prepare and submit a complete plan and specification for the buildings, machinery, and plant required, at an estimated cost of 12,500*l.*

CAPITAL AND LABOUR.

PENRHYN QUARRIES. — The deadlock at these quarries continues, and numbers of the men are seeking work in other districts. The Chief Manager was interviewed by representatives of the Press, when the question of sub-contracting was discussed. There seems to be no valid reason why the system in force in other quarries of making the men partners, and the quarry providing means of traction, should not be adopted here.

STRIKE OF DUBLIN PLUMBERS.—A strike affecting several Dublin establishments and about 300 plumbers has been entered on in the city, arising out of a demand by the men for an increase of 1d. per hour in the wages they have hitherto been receiving.

THE BUILDING TRADE DISPUTE IN NEWCASTLE AND DISTRICT.—Owing to the decision of the men in Newcastle and Gateshead to reject the proposal of the employers, the practical lock-out of all bricklayers in the Northern Counties began to take effect from mid-day on Saturday last. The Northern Counties embrace Northumberland, Durham, part of Cumberland, and part of Yorkshire, including the important town of Leeds. The total number affected, says the *Newcastle Chronicle*, will be several thousands, and this will be greatly increased in the course of a very short time, owing to other trades engaged in building operations being brought to a standstill by the cessation of work by the bricklayers. The dispute originally started in Newcastle, when the men, to the number of 128, belonging to three branches of their union, known as Newcastle, Gateshead, and Byker lodges, in the early part of the year put in an application for an advance of wages, from 10d. to 11d. per hour. The employers intimated that the trade in this northern district would not allow of such application being granted. In order, however, to avert a strike or lock-out, the employers added that they would be quite willing to submit the claim to arbitration, or to give a guarantee to allow the present rate of wages to continue for the next two years. To this the men gave a refusal, contending that the state of trade, as evidenced in the erection of a large number of houses, justified them in asking for the advance. On the other hand, the employers considered that this was but the beginning of other things, that if the application were granted, similar demands would be made in other parts of the northern counties. Then other trades actively identified in building operations would in all likelihood put in demands for an advance of wages. Thus, it was contended, the employers would be seriously handicapped in carrying out their contracts, and it was deemed advisable to take counsel with the Building Trades Employers' Federation, and after several meetings, it was decided that if the proposals put forth by the Newcastle and Gateshead employers were not complied with by the bricklayers on November 21, a lock-out should ensue. In compliance with a request, the notice was extended until the 24th, and in the meantime, the General Secretary of the men's Federation (Mr. Bachelor) and other officials had an interview with the employers, but no definite arrangement was come to. The men's representatives, in reply to inquiries, state that out of the 128 men who came out on June 2, there are only about fifty now on the books, the rest having obtained employment elsewhere. The men who are not at work receive an allowance of 1*l.* per week—15s. each Friday night, and on the following Tuesday an additional 5s. from the levy made amongst the men in employment. Thus 15s. is taken out of the funds of the society, the balance being made up by weekly contributions. According to the constitution of the society, no distinction is made between the married and the single men, each receiving the sum named. Asked whether it was thought this allowance would be extended to all the men thrown out of work in the northern counties, a reply was given to the effect, that there is a large reserve fund in hand, and that this contingency had been well looked to before any definite step was taken. Despite the action of the employers in bringing a general lock-out, the men expressed themselves hopeful of ultimate success.—The *Chronicle's* Sunderland reporter writes:—In accordance with the resolution passed on November 23 at the meeting of the Sunderland builders, notices were issued on the 24th ordering a lock-out of bricklayers. The notices took effect at noon. The relations between the masters and men locally are of the best, and the masters, though regretting the step, feel that it is absolutely necessary in their own interests. The number of bricklayers in Sunderland is about 300, but with the labourers and others it is estimated that some 600 men will be affected immediately. The house building trade in Sunderland is exceedingly brisk just now, and the stoppage will be felt severely. The joiners will not be impeded for some time as the joinering work is a long way behind, there being sufficient in hand to keep the men going for a few weeks.—With reference to the lockout, so far as Middlesbrough is concerned, the master builders as yet have taken no action; but, if an amicable settlement is not speedily arrived at, the employers feel that they will have to join the movement. The master builders of Yorkshire, Lancashire, and Cheshire have decided to support those of Northumberland, Durham, Cumberland, and Westmoreland in their dispute with the bricklayers.—An important meeting under the auspices of the Yorkshire Building Trades Federation, was held in Leeds on Saturday last, for the purpose of formulating a Northern Counties Federation of Building Trades. Delegates attended from Manchester, Oldham, Blackburn, Hull, Barnsley, Halifax, Sheffield, Harrogate, and Bradford. Rules were adopted for the government of the Federation, and officers elected. Mr. Edwin Grist (Manchester) being chosen President, Mr. A. H. Driver (Sheffield) secretary, and Mr. T. C. Heal (Leeds), treasurer. The objects of the Federation are set forth as of a defensive character, and efforts are to be made to educate and organise workers in all branches of the building trade, and to assist in the formation of branches where none exist. The Federation anticipate in the near future, by holding conference with the employers, and by other conciliatory means, to settle the vexed questions between capital and labour without resorting to strikes or locks-out. Meetings have been previously held to discuss the details of the scheme, and it is stated that the Northern Counties Federation having now been firmly established, efforts will be made to extend the organisation over the rest of the country.

LEGAL.

STRANGE MISTAKE BY A BUILDING OWNER.

THE case of Butler *v.* Kennis and others, came before Mr. Justice Phillimore and a common jury in the Queen's Bench Division on the 21st ult., it being an action by the plaintiff to recover possession of two plots of land with houses upon them at West Ham, Essex. The facts were shortly these:—In September, 1897, two plots of land marked on the estate plan Nos. 172 and 173 were conveyed to the plaintiff. A person named Bethel owned the adjoining plots Nos. 170 and 171, and in 1898 he entered into agreement with a builder named Murty to build two houses upon them. Bethel pointed out to Murty the plots to be built upon but by some mistake the plots 172 and 173 were taken instead of plots 170 and 171. Murty built upon the plots 172 and 173 the houses, which cost about 200*l.* each. While in the course of construction the defendant bought the houses for 500*l.*, paying 100*l.* down, the balance of 400*l.* being afterwards obtained from a building society on a mortgage of the houses. The plaintiff's case was, that the first time his attention was called to the fact that the houses were built on his land was in April last, and he then laid claim to their possession. The defendant offered to give the plaintiff his two plots and also 200*l.* as compensation, but this was refused. The plaintiff was called, and gave evidence to the effect that he first knew that the houses had been built on his land in April last, and that was some time after the houses had been erected. On the other hand the defendant, Murty, the builder, and his foreman, were called to prove that the plaintiff had been on the premises while the houses were in course of erection and that he made no complaint.

His Lordship, in summing up, said the defence that the plaintiff stood by and knowingly allowed the houses to be built on his land was good if proved, but the burden was upon the defendant to prove that, because it meant that the plaintiff had been guilty of fraud. If the verdict was for the plaintiff, he did not think the defendant would lose his money, as he would have a good right of action against Bethel, and the building society would have a right of action against their solicitors.

In the result the jury found a verdict for the plaintiff, and judgment was given in accordance with the verdict, the question of costs being reserved.

On the 28th ult. the matter was again mentioned to Mr. Justice Phillimore.

Mr. Macaskie, for the plaintiff, said he was glad to be able to tell his Lordship that the parties had been able to arrive at a settlement, and he (counsel) would take judgment by consent for the plaintiff on terms, and execution was not to issue if certain things were done by the defendants. The learned counsel stated that the settlement arrived at substantially amounted to this, viz., that the plaintiff took part of the value of the houses and the defendants the other part. He understood that his learned friend Mr. Lush, on behalf of the defendants, withdrew entirely the charge of fraud which had been made.

Mr. Montague Lush said that that was so.

Mr. Justice Phillimore, in assenting to the arrangement, said he was glad that the parties had been able to come to terms.

A DISTRICT SURVEYOR AND HIS FEES.

AT Greenwich Police-court, Mr. Kennedy gave judgment in the case against Mr. Alexander Cameron Corbett, M.P., who had been summoned by Mr. Badger, District Surveyor, to recover fees, amounting in all to 54*l.*, in respect of the erection of houses on Corbett's Estate, Hither Green, Lewisham.

Mr. Barnard appeared for the District Surveyor, and Mr. Bethune for the defence.

The defence was that the builder, and not the defendant, was liable; also that the defendant was not actually the owner, and that the six months allowed for making the demand had expired.

Mr. Kennedy said that quiet reflection had led him to the conclusion that the fact that the defendant had already paid the builder was not enough to deprive the District Surveyor of his fees. The defendant would have to settle that with the builder. The owner at the time the fees became due was the person liable, and he gave judgment for the complainant with 12 guineas costs.

BUILDING BY-LAWS AT BIRKENHEAD

DOUGLAS LUTHER CLELAND, builder, New Chester-road, Rock Ferry, was summoned at the Birkenhead Police-court, on the 23rd ult., before the Mayor (Alderman Thomas Cook) and Mr. Edward Williams, for infringements of the Corporation building by-laws in connexion with a

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workshop erected off New Chester-road. Mr. Spencer, assisting prosecuting solicitor, conducted the prosecution, and Mr. Cotton defended. Mr. Spencer stated that, the defendant having been previously convicted for offences against the by-laws in connexion with the same erection, the Corporation had given him notice that he would be proceeded against also for continuing each offence. Evidence was then given that the plans were passed by the Corporation in February, but on July 15 a Corporation building inspector found a number of defects in the erection. The magistrates inflicted fines and costs, the total amount of the penalties and costs being 14*l.* 10*s.* Defendant pleaded that the shed was now being altered in accordance with the by-laws, but the magistrates alluded to concessions which had been made to the defendant by the Corporation long ago, and said the defence was unsatisfactory. The Mayor said that if every man was allowed such concessions as had been granted to the defendant, the Borough Engineer's staff would have to be doubled. The offences and penalties were—(1) having erected, on July 18, a building of the warehouse class, used as a joiner's workshop and storeroom, with an external wall of 4½ in. thickness instead of a minimum of 14 in., 1*l.* and 6*s.* 6*d.* costs; (2) continuing the said offence from July 21 to November 16, 100 days at 1*s.* a day, 5*l.* and 6*s.* 6*d.* costs; (3) not providing outlets to untrapped openings to the drain, on October 1, 1*l.* and 6*s.* 6*d.* costs; (4) continuing the offence from October 3 to November 16, thirty-five days at 2*s.* a day, 3*l.* 10*s.*, and 6*s.* 6*d.* costs; (5) continuing the infringement of not resting the walls on proper footings (for which defendant had been previously convicted), from July 21 to November 16, 100 days at 3*d.* a day, 1*l.* 5*s.*, and 6*s.* 6*d.* costs; (6) for continuing the offence of not causing the walls to have a proper damp course (for which defendant had previously been convicted) from July 21 to November 16, 100 days at 3*d.* a day, 1*l.* 5*s.*, and 6*s.* 6*d.* costs.—*Liverpool Mercury.*

THE WORKMEN'S COMPENSATION ACT:

ANOTHER ANOMALOUS CASE.

AT the Gloucester County Court last week, his Honour Judge Ellicott delivered his award in the case of Maria Dredge, Painswick, Gloucestershire, *v.* Conway, Jones, & Co. (painters and decorators, Gloucester). This was a claim under the Workmen's Compensation Act for 254*l.* for the death of applicant's husband, a foreman plasterer. From the evidence it appeared that deceased and another man were whitewashing and stopping the cracks of a staircase ceiling in Gloucester, when the scaffolding (consisting of an arrangement of ladders and planks) on which they were at work fell, and the men were precipitated a distance of some 30 or 35 ft. to the lobby beneath. Dredge was killed by the fall, and his fellow-workman much injured. Mr. Arthur Powell, who represented the respondents (virtually the insurance company), for the defence said that the case turned on the few words of Section 7 of the Act—"A building which is either being constructed or repaired by means of a scaffolding." It could not be contended, said Mr. Powell, that the building on which the deceased was at work was either being "constructed" or "repaired," because it was quite clear that decorative work—such as whitewashing ceilings and distempering walls—was not repairing. Counsel further argued that the erection used for doing the work was not scaffolding within the meaning of the Act. His Honour held that the ladders and planks used constituted a scaffolding within the meaning of the Act, but found that the work upon which deceased was engaged at the time of the accident was not structural repairs within the meaning of Section 7 of the Act. The case therefore failed upon that point, and although it was only natural that one's sympathy should be with the applicant, the award must of necessity be for the respondents. Leave was given to appeal.

ACTION AGAINST MESSRS. MOWLEM.

IN the Westminster County Court on Monday, before his Honour Judge Lumley Smith, Q.C., and a jury, the case of Walker *v.* Mowlem was tried.

It was an action by the plaintiff to recover compensation from the defendants, the well-known firm of contractors, for personal injuries sustained owing to the alleged defective condition of their plant.

The plaintiff's case was that on the day of the accident she was passing along James-street, Brighton, where the defendant's firm were carrying on some excavations, and owing to the insufficient way in which the cutting was protected she fell into the hole and suffered very severe personal injuries.

The plaintiff was called and said the hole into which she fell was protected by ropes attached to iron standards, but they were so loose that they did not afford any protection.

In cross-examination the witness said her injuries were very severe, and that was why there was delay in putting this claim forward.

The defence was that the work was properly protected in every way and that the accident was the result of the plaintiff's negligence, pure and simple.

His Honour in directing the jury, said that in order to find a verdict for the plaintiff they would have to satisfy themselves that the defendants' works were defective, and also that the plaintiff had not been guilty of contributory negligence.

The jury, without any hesitation, found a verdict in favour of the defendant firm, and judgment was entered with costs.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

15,310.—VARNISHES: *A. P. Bjerregaard.*—Unboiled linseed or some similar fatty oil is mixed with a copal gum or amber, finely ground, and is heated until the gum becomes melted; turpentine, &c., is then added for thinning, and a drier, such as precipitated manganese borate and litharge, is stirred with the compound. By another process cold gum is gradually added to the oil as the latter is being heated; the admixture is then further heated, stirred, and tested.

15,331.—GUIDE ROPES FOR COLLIERY CAGES, &C.: *B. F. Cocker.*—At the end of each guide rope is secured a bolt that passes through a cap, which is supported upon two springs within a cup, so that injury to the spring is obviated by the resting of the cap upon the cup when the tension becomes excessive, the initial slack being taken up by distancing bolts that sustain the cap.

15,340.—LEVELS AND CLINOMETERS: *E. O. Wiltsch.*—Two parallel blades that are joined by small bars pivoted on to a blade compose a straight-edge. Upon the blade are mounted two spirit-levels that are set at a right angle to one another. A screw-bolt, that passes through slotted and graduated arms, and a nut serve for clamping the straight-edge at the angle required. In order to test whether an arris forms a true angle of 90 deg., the two parallel blades of the straight-edge are turned outwards at an angle of 45 deg., and the bars are notched in line with the bent portions of the out-turned blades.

15,346.—SNOW PLOUGHS: *F. G. Weniger.*—In front of the carriage are mounted a pair of scoop-wheels which will be driven in reversed directions by means of spur gearing, or in the same direction with sprocket gearing, from a motor. The blades upon each of the scooping wheels are cone-shaped at the front ends and cylinder-shaped at their rear ends as attached to the disc, and they are set tangent-wise with the axle.

15,387.—NON-CONDUCTING COMPOSITIONS: *F. McLay.*—Heat-insulating coverings for pipes, vessels, &c., are composed of asbestos in the form of papier-maché or vegetable substances rendered incombustible, and are shaped in a mould which contains a mandrel and a loose core or sleeve by means of a piston which is worked with a screw or other mechanism.

15,388.—PIPE-JOINTS, PACKING AND STOPPING: *W. Morley and P. W. Barker.*—For the jointing of pipes or mains the inventors devise a shaft and hand-wheel for screwing together or opening out two discs, between which is placed an india-rubber or similar ring. The ring will become expanded or contracted accordingly, whilst its turning round is prevented by a rod and a tail-piece. In order that the contrivance may be duly centred, it is fitted with a roller at its one end and at its other end with a gauge-piece having pegs that rest upon the walls of the pipe; thus the rod and shaft are furnished with bearings. In modified forms one of the discs is stationary, and the central rod is made hollow for the admission of compressed air to the chamber formed by the india-rubber ring, the air's escape being regulated by a spring-governed valve worked by the side-rod. For purposes of stopping the outer ends of the branch side-openings of the pipes, the ringed space is filled with clay, &c., so as to fix the customary stop-piece in its place, over the stopper is placed a metal mould which forms a ringed cavity, and the binding material constitutes an annular flange. The binding material consists of coal tar and sulphur mixed with sawdust, sand, &c.

15,391.—A DOOR-HANDLE: *A. Jones.*—For opening the latch by squeezing the handle the inventor provides small tubes that are pivoted at their lower ends to the two handles; a squeezing of the handle forces the tube into a recess therein so as to compress a spring; a cross-bar which joins the tubes has an inclined face which operates upon the spring latch's roller.

15,405.—WINDOW-FASTENINGS.—*D. M'Kinnon.*—For fastening a sliding window-sash at any particular height (as may be desired in an asylum), a spring forces a hooked catch, which is pivoted on to a slotted plate in a recess cut in the pulley-stile, into engagement with the ratchet teeth of a rack which is secured to the sash-stile, a similar contrivance, but with the ratchet teeth turned in the opposite direction, being fitted on to the lower sash. When the sashes are to be freed, a key is used to unlock a part of the inside bead or batten rod, whereupon cranked spindles linked together and moved by a handle upon the lower spindle will force the catch backwards. By another adaptation the catch is mounted upon the sash and the rack is fastened to the pulley-stile, the catch being put back out of action with a key to be inserted through a keyhole in the sash-stile, which may be covered with a detachable portion of the inside bead.

15,422.—A FEEDING-RACK AND TROUGH: *J. H. T. H. de Burgh.*—The rack or trough can be filled by any one without entering into the shed or stable. Its back is composed of wire-work or wire-netting with strips, and its front of bars; the back and an outer part constructed of sheet metal form a passage which leads into the trough, and is closed (together with the top of the rack) with a hinged cover. The contrivance, which also provides for a water compartment in the trough, will, it is claimed, serve to improve the ventilation of the stable.

15,429.—SLEEVE AND FLANGE PIPE-JOINTS: *A. E. Dart and H. S. Crombie.*—The sleeves are fashioned so as to have convex and concave ends that will fit together as in the case of a ball-and-socket joint, and a packing-ring, curved to correspond, is fitted into a recess made in one of the sleeves, thus the two pipes can be moved out of alignment; or one sleeve may be flanged and be bolted on to a loose flange which is to be passed over the other sleeve so that it shall fit against the curved flange. Packing-rings, which ought to be made of lead for pipes containing corrosive liquids, can be fitted into the ends of both the sleeves.

15,430.—A BALL-AND-FLOAT VALVE: *H. G. Bell and J. Welsby.*—For purposes of ready removal the body of the casing of the supply valve for the cistern is screwed on to the cap, the valve's stem being set within guides, and its lower part being in engagement with the float lever. The valve may be adapted to open either against or with the water's pressure, and water, for purposes of a cushion, is collected within a small container. In the case of a valve after the latter kind the extent of its fall is limited with a lug or projection upon the float lever, and that of its opening by means of a boss upon the stem.

15,533.—BUILDING TILES: *W. Cartwright.*—Rounded corner-tiles or angle-beads are fashioned with inner edges which project and interlock with the cement upon the face of the wall, and are thicker than the facing-tiles. The tiles are also made with projections or dovetailed ribs, and with grooves that will take ribs of the same or some other material.

15,558.—ROOFING TILES: *L. Becker.*—The inventor's purpose is to afford means for ventilation; and for enabling the water that arises from condensation to find an escape from beneath the tiles, he fashions the tiles with collecting channels, which are arranged transversely in their upper ends, and joins them to the tiles' outer channels by drainage holes.

15,600.—DOOR HINGES: *F. Lindgens.*—The hinge, which will enable the door to become closed through its own weight, is formed out of two flaps, to one of which is fixed a pin upon which slides the socket of the other flap. Two rings, whose sloped surfaces touch one another, are placed between the two sockets, and each of them is detachably joined to its own socket with teeth that enter into recesses cut in the socket. The door's weight pressing upon the rings causes it to turn from either side into the closed position.

15,610.—LIFT VALVES: *E. Ziegler.*—The inventor seeks to furnish easy means for cleaning and repairing the tap. He arranges within the tap an india-rubber or other kind of ball so that it shall, under normal conditions, be forced away from the seating by a spigot at the lower end of the lift valve; when, however, the lift valve is raised, the flow of water will press the ball upon its seating, and so close the valve.

15,637.—A SEATING FOR A SCREW-DOWN VALVE: *J. Cockbill, E. Chamberlin, and C. Chamberlin.*—For a screw-down valve the seat is screwed into the valve casing, in order that when it has become worn it may be easily taken out; and to admit of the insertion of a key for screwing or unscrewing the seat, notches are formed in the seat's upper and larger portion.

15,640.—AN ARTIFICIAL STONE—*F. Gerhart and C. Libert.*—The stone is manufactured by treating with steam under pressure a mixture of crushed sand, lime, and the customary materials, the crushed sand being substituted, either in whole or in part, for the common sand, and being in some instances itself replaced with sand that has been "burst" in ice water after exposure to a high temperature. The inventors claim that the sand thus treated will combine more intimately with the lime, and that the artificial stone will be frost-proof.

15,650.—KILNS FOR BURNING SEWER PIPES AND SIMILAR CLAY GOODS: *J. T. Finch.*—The roofs of the kilns are dome-shaped and are constructed double so as to provide an additional chamber for the flow of the gases from the one kiln in which the burning has been completed into the other kiln where the burning is not yet finished. Openings, to be closed with removable covers, are made in the two double roofs of each kiln, and pipes—having pierced extensions, and fitted with dampers—communicate between the additional chambers of the several kilns. For each kiln chamber are provided flues, with their dampers beneath the floor, which pass to the chimney. When direct draught to the chimney has served to burn the goods in any one chamber the damper of that kiln is closed, the gases will thereupon be allowed to escape into another chamber through the openings in the lower roof, which have

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been uncovered in readiness, and through the dampers of the connecting pipes. During the process of drying, steam will escape by pipes set through the roof.

15,804.—ENAMELLING FOR BRICKS, &c.: *E. P. C. Willems.*—An enamelling compound is made by melting together silica (about 36 parts), an alkaline matter (7 parts), alumina (10 parts), with 47 parts of oxide of cobalt, oxide of tin, oxide of iron, or other metallic oxides for giving colour to the compound.

15,814.—A LIFTING-JACK: *A. L. Marcotte and M. A. Legros.*—The jack is made of two cylinders which are oppositely screw-threaded within, and which are in engagement with a corresponding screw. A pawl and ratchet, to be worked with a lever by the hand, turn the screw for purposes of both raising and lowering, while the screw is driven in opposed directions with two spring-pawls.

MEETINGS.

FRIDAY, NOVEMBER 30.

Architectural Association (*Discussion Section*).—Paper by Mr. F. G. W. Buss, entitled, "Is the Quantity Surveyor a Necessity?" 7 p.m.

Institution of Junior Engineers (*Westminster Palace Hotel*).—Inaugural meeting of twentieth session. Sir Lowthian Bell, Bart., will deliver his presidential address. 8 p.m.

Architectural Association of Ireland (*Technical Demonstrations: —II.*).—Messrs. Edmund and A. P. Sharpe on "Building and Decorative Stones." 4.30 p.m., at 17, Great Brunswick-street.

SATURDAY, DECEMBER 1.

Sanitary Inspectors' Association.—Mr. F. W. Morley on "Overcrowding in Domestic Dwellings." 6 p.m.

British Institute of Certified Carpenters.—Annual Meeting, Carpenters' Hall. 6 p.m.

Dundee Institute of Architecture.—Mr. J. J. Henderson on "Grammar of House-planning." 7 p.m.

MONDAY, DECEMBER 3.

Royal Institute of British Architects.—Business meeting.—(1) Election of candidates for membership. (2) The Chairman to move the adoption of amendments to the "form of agreement and schedule of conditions for Building Contracts," as agreed upon by the Council of the Royal Institute and the Council of the Institute of Builders. 8 p.m.

Society of Engineers. — Mr. H. C. H. Shenton on "Recent Practice in Sewage Disposal." 7.30 p.m.

Liverpool Architectural Society.—Mr. Alfred Darbyshire, F.S.A., on "Some English Cathedrals." Illustrated by lantern slides. 6 p.m.

TUESDAY, DECEMBER 4.

Society of Arts (*Cantor Lectures*).—Professor J. A. Fleming, F.R.S., on "Electric Oscillations and Electric Waves." II. 8 p.m.

Institution of Civil Engineers.—1. Discussion on Mr. Oscar Guttmann's paper on "Machinery for the Manufacture of Smokeless Powder." 2. Papers to be read, time permitting:—(*a*) "The Signalling on the Waterloo and City Railway"; and (*b*) "Note on the Signalling of Outlying Siding Connexions, by Mr. Alfred Weeks Szlumper; and (*c*) "Signalling on the Liverpool Overhead Railway," by Mr. S. Butler Cottrell. 8 p.m.

WEDNESDAY, DECEMBER 5.

Royal Archæological Institute of Great Britain and Ireland.—1. Rev. Dr. Cox on "Northamptonshire Wills, *temp.* Henry VIII." 2. Mr. P. M. Johnston on "Wall Paintings, &c., at Hardham Church, Sussex, and at St. Mary's, Guildford." 4 p.m.

British Archæological Association. — Mr. T. Cann Hughes, M.A., on "A Ramble in South Devon." 8 p.m.

Society of Arts.—Professor H. S. Hele-Shaw on "Road Traction." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Institute of Sanitary Engineers.—General Purposes and Finance Committee at 3.30 p.m. Election Committee at 5 p.m.

Edinburgh Architectural Society.—Mr. T. Hume on "Effects of Heat and Cold on Plumber Work, and How to Prevent Damage Therefrom."

THURSDAY, DECEMBER 6.

Civil and Mechanical Engineers' Society.—Professor R. H. Smith on "Valve Gears and Valve Diagrams." 8 p.m.

FRIDAY, DECEMBER 7.

Architectural Association.—Mr. A. Wallace Rimington on "Colour in Architecture seen through an Artist's Glasses." 7.30 p.m.

Institution of Civil Engineers (*Students' Meeting*).—Mr. F. K. Peach on "Dock Gates." 8 p.m.

Architectural Association of Ireland (*Technical Demonstrations.* III.).—Messrs. Alston and Hudman on "Timber." 2 p.m., at 29, Rogerson's Quay.

Glasgow Architectural Craftsmen's Society.—Mr. T. S. Fraser on "Some Principles of Design." 8 p.m.

SATURDAY, DECEMBER 8.

British Association of Waterworks Engineers.—Half-yearly Meeting at the Geological Society's Rooms, Burlington House, W. Presentation of Report from the "Water Boards" Committee on "The Control of Water Undertakings and Sources of Water Supply," and discussion. A paper will be subsequently read, entitled "The Protection of Underground Water," by Mr. Wm. Matthews, M.Inst.C.E. 11 a.m.

Institution of Junior Engineers.—Visit to the Electric Generating Station of the London United Tramways Company, 88, High-road, Chiswick. 3 p.m.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

November 14.—By FRANKLIN & SON (at White Roothing).

White Roothing, Essex.—Prow's, Manning's, and Nash's Farm, 210 a. 0 r. 1 p., f. and c. £1,450
Hatch's Tenements and 1 a. 2 r. 21 p., f. 330
Various enclosures of land, 41 a. 0 r. 10 p., f. .. 682
House and blacksmith's shop, f. 130
Six freehold cottages and tenements 425

November 15.—By HOOKER & WEBB (at Croydon).

Croydon.—Pemdevon-rd., thirteen plots of land, f. 858
Thornton Heath.—72 and 74, Bensham Manor-rd., u.t. 93 yrs., g.r. 16*l.*, r. 80*l.* 685

November 19.—By MONTAGU & ROBINSON.

City of London.—26, Walbrook, f., r. 350*l.* 8,700
14, Clement's-lane, u.t. 14½ yrs., g.r. 90*l.*, r. 350*l.* 1,650
Holborn-circus.—20, Thavies Inn, f. 2,500
Caledonian-rd.—Frederick-st., i.g.r. 54*l.*, u.t. 51 yrs., g.r. 4*l.* 850
Blundell-st., i.g.r. 105*l.*, u.t. 51 yrs., g.r. 5*l.* 1,480

By BEALE & CAPPS.

Notting Hill.—18, Bassett-rd., u.t. 74½ yrs., g.r. 10*l.*, e.r. 100*l.* 800

By FRED. VARLEY.

Finsbury Park.—323, Seven Sisters-rd., u.t. 64 yrs., g.r. 19*l.*, e.r. 150*l.* 2,000
16, Lennox-rd., u.t. 64 yrs., g.r. 5*l.*, r. 30*l.* 335

By FERRIS & PUCKRIDGE (at Swindon).

Little Hinton, Wilts.—The Grove and 31 a. 0 r. 28 p. f. 1,580

By HENRY HENDRIKS (at Birmingham).

Small Heath, Worcester.—108 and 109, Yardley-rd. f. 660
Edgbaston, Warwick.—148 and 150, City-rd., u.t. 98 yrs., g.r. 12*l.* 880
Handsworth, Staffs.—30 and 32, Linwood-rd., u.t. 85 yrs., g.r. 7*l.* 8s. 9d. 600
38 and 40, Montague-rd., u.t. 94 yrs., g.r. 9*l.* 7s. 855

By J. GLEW (at Selby).

South Duffield, Yorks.—A freehold farm, 100 acres 2,450
Low Common allotment, 6 a. 2 r. 11 p., f. 200
North Duffield, Yorks.—Hill Rows Close, 9 a. 3r. 10 p., f. 560

November 20.—By DANIEL WATNEY & SONS.

Tottenham Court-rd.—5, 7 and 9, Charlotte-st., f., r. 150*l.* 4,050
11 and 13, Charlotte-st., area 1,850 ft., f., r. 175*l.* 4,400
40 and 41, Upper Rathbone-pl., f., r. 72*l.* 2,030

By DAVID BURNETT & CO.

Chelsea.—2 and 6, Bywater-st., u.t. 8 yrs., g.r. 10*l.* 10s., r. 68*l.* 140

By HATCH & HATCH.

Catford.—40 to 50 (even), Laleham-rd., u.t. 74 yrs., g.r. 28*l.* 7s. (subject to mortgage of 1,200*l.*) 3,000

By HOLCOMBE, BETTS, & WEST.

St. John's Wood.—69, Hamilton-ter., u.t. 35½ yrs., g.r. 14*l.* 6s. 1,000
Hammersmith.—10 and 12, Augustus-rd., u.t. 63 yrs., g.r. 4*l.*, r. 64*l.* 810
Ca'edonian-rd.—84, 86, and 88, Brewery-rd., u.t. 59 yrs., g.r. 14*l.* 10s., r. 55*l.* 585
Shepherd's Bush.—26, Aldine-st., f., e.r. 50*l.* 850
Bulwer-st., Cyprus Villa, f. 700

By HUMBERT & FLINT (at Watford).

Bushey, Herts.—London-rd., Risingholme and 3 acres, f. 1,975
Abbotts Langley, Herts.—15 and 17, Langley-rd., f. 505

By WHETHERLY & HASLETT (at Masons' Hall Tavern).

Lewisham.—High-st., the White Hart p.h., u.t. 42 yrs., r. 150*l.*, with goodwill 10,000

November 21.—By BRIANT & SON.

Leytonstone.—33 to 45 (odd), Wellesley-rd., u.t. 69 yrs., g.r. 40*l.* 5s. 900
Clapham.—77 and 78, Cottage-grove, u.t. 45 yrs., g.r. 4*l.* 555
28, Albert-sq., u.t. 45 yrs., g.r. 5*l.*, r. 55*l.* 490
South Lambeth.—24, Wilkinson-st., u.t. 62½ yrs., g.r. 6*l.* 10s., r. 40*l.* 440
5, St. Stephen's-ter., u.t. 62½ yrs., g.r. 7*l.* 10s., r. 40*l.* 440
316, South Lambeth-rd., u.t. 39 and 40½ yrs., g.r. nil, r. 52*l.* 10s. 525

By FOSTER & CRANFIELD.

City of London.—Fenchurch-st., f.g.r. 450*l.*, reversion in 41¾ yrs. 16,560

By F. J. BISLEY & SONS.

Rotherhithe.—110, Paradise-st., f., e.r. 30*l.* 440
Bermondsey.—170 and 172, Spa-rd., u.t. 19 yrs., g.r. 8*l.* 8s., r. 65*l.* 460

By GILBERT & HOW.

Peckham.—Commercial-rd., i.g.r. 40*l.*, u.t. 60 yrs., g.r. 16*l.* 10s. 350

By Messrs. SPELMAN (at Norwich).

Norwich.—The Walk, a building site, area 342 ft., f. 1,000
Orford-place, two building sites, area 2,109 ft., f. 2,125

November 22.—By ALLAN BOOTH.

Hanwell.—Golden Manor-rd., Thurlow Lodge, and ½ acre, f. e.r. 85*l.* 955
Clapham.—34, Marjorie-grove, u.t. 93 yrs., g.r. 7*l.* 15s., r. 36*l.* 380
Holloway.—Milton-grove, f.g.r. 12*l.*, reversion in 61 yrs. 280

By C. C. & T. MOORE.

Mile End.—398, Mile End-rd., f., r. 80*l.* 1,020
10 to 18 (even), 19, 21, and 23, Calverley-st., u.t. 44 yrs., g.r. 39*l.* 2,010
90 and 92, Turner's-rd., u.t. 63½ yrs., g.r. 10*l.*, r. 64*l.* 850
Fulham.—20, St. Mark's-rd., u.t. 43 yrs., g.r. 4*l.*, r. 36*l.* 345

By STIMSON & SONS.

Peckham.—Maxted-rd., &c., i.g.r.'s 80*l.*, u.t. 47 yrs., g.r. 18*l.* 1,000
Wandsworth-rd.—7 to 14, Knutsford-st., also i.g.r. 50*l.*, u.t. 8½ yrs., g.r. nil 650
Norwood.—Biggin Hill, f.g.r.'s 21*l.*, reversion in 80 yrs. 420
Camberwell.—Station Vale, i.g.r. 35*l.*, u.t. 54½ yrs., g.r. 10*l.*, with reversion 575
Bermondsey.—66, Page's-walk, u.t. 11 yrs., g.r. 40*l.* 220
St. Pancras.—18, 20, and 33, Werrington-st., u.t. 43½ yrs., g.r. 24*l.*, r. 112*l.* 820
15, Penryn-st., u.t. 49½ yrs., g.r. 5*l.*, r. 36*l.* 375
Rotherhithe.—1 and 5, Neptune-st., f. 840
Lewisham.—19, Mount Pleasant-rd., u.t. 87½ yrs., g.r. 8*l.* 10s. 260
Norwood.—38, Palace-sq., u.t. 83 yrs., g.r. 7*l.* 7s., r. 48*l.* 250

By S. WALKER & SON.

Clapham.—42 to 45, Park-cres., u.t. 49 yrs., g.r. 13*l.* 10s., r. 108 935
Brompton.—9, Kempsford-gdns., u.t. 66 yrs., g.r. 6*l.*, r. 45*l.* 485

By NEWBON, EDWARDS & SHEPHARD.

Brixton.—88, 90, 94, 96 and 100, Dalyell-rd., u.t. 64 yrs., g.r. 31*l.* 10s. £1,660
Hoxton.—23, Bookham-st., u.t. 34 yrs., g.r. 5*l.*, r. 33*l.* 325
Caledonian-rd.—33, Bingfield-st., u.t. 40 yrs. g.r. 4*l.* 10s., r. 42*l.* 445
Holloway.—34, Parkhurst-rd., u.t. 45 yrs., g.r. 8*l.*, e.r. 45*l.* 410
310, Liverpool-rd., u.t. 35 yrs., g.r. 3*l.*, r. 55*l.* .. 555
33, Eden-gr., f., e.r. 50*l.* 685
42 and 44, George's-rd., f., e.r. 70*l.* 760
Kentish Town.—33, Woodsome-rd., u.t. 61½ yrs., g.r. 7*l.*, e.r. 52*l.* 505
Dalston.—7, Livermere-rd., u.t. 39 yrs., g.r. 4*l.*, r. 34*l.* 360
43 to 55 (odd), Brougham-rd., u.t. 45 yrs., g.r. 26*l.* 5s., r. 197*l.* 8s. 2,295

By WORSFOLD & HAYWARD (at Dover).

Dover, Kent.—24 and 27, Marine-parade, u.t. 24½ yrs., g.r. 3*l.* 13s. 6d., r. 195*l.* 1,725
4 and 5, Pioneer-ter., u.t. 93 yrs., g.r. 4*l.* 465

By PHILIP DAVIES (at Knighton).

Hopton Castle, Salop.—Hagley Estate, 281 a. 0 r. 4 p., f. (including timber) 5,350

By BEALE & CAPPS (at Notting Hill).

Notting Hill.—132, Portland-rd., u.t. 51½ yrs., g.r. 10*l.* 225
407 and 409, Portobello-rd., u.t. 80 yrs., g.r. 20*l.* 460
6 and 7, Queen's-pl., u.t. 40½ yrs., g.r. 4*l.* 350
119, Lancaster-rd., u.t. 46 yrs., g.r. 5*l.*, e.r. 50*l.* 485

By BATCHELAR & SON (at Croydon).

Croydon.—Elmwood-rd., Elmwood Lodge, f., r. 70*l.* 1,400

November 23.—By C. CASSIN & CO.

Catford.—161 to 177 (odd), Brownhill-rd., f., r. 336*l.* 5,000
Ladywell.—120 and 148, Ladywell-rd.; 4 and 10, Arthurdon-st.; 5 and 7, Francemary-st., u.t. 91 yrs., g.r. 35*l.*, r. 180*l.* 1,785

By DOLMAN & PEARCE.

Kentish Town.—50, Patshull-rd., u.t. 60½ yrs., g.r. 7*l.* 7s., r. 50*l.* 615
11, Burghley-rd., u.t. 62½ yrs., g.r. 10*l.*, r. 55*l.* .. 600
31 to 39 (odd) and 43, Leverton-st., u.t. 48 yrs., g.r. 45*l.*, r. 236*l.* 2,340
Leverton-st., i.g.r.'s 60*l.*, u.t. 48 yrs., g.r. 10*l.* 860
Falkland-rd., i.g.r.'s 15*l.*, u.t. 48 yrs., g.r. 2*l.* 270
Camden Town.—13, South-villas, u.t. 62 yrs., g.r. 11*l.*, r. 48*l.* 600
Haverstock Hill.—15, Maitland Park-villas, u.t. 52 yrs., g.r., &c., 11*l.*, e.r. 50*l.* 500
48, Parkhill-rd., u.t. 50 yrs., g.r. 12*l.*, r. 70*l.* .. 695
Hampstead.—42 and 45, Upper Park-rd., u.t. 50 yrs., g.r. 25*l.*, r. 115*l.* 1,085

By A. J. SHEFFIELD.

Commercial-rd. East.—No. 255, u.t. 13¾ yrs., g.r. 50*l.*, e.r. 150*l.* 175
14A, 14 to 20 (even), Philpot-st., u.t. 12 yrs., g.r. 130*l.* 700
Poplar.—46 and 48, Bath-st., u.t. 43 yrs., g.r. 8*l.* 485
19, Willis-st., u.t. 44½ yrs., g.r. 3*l.* 205
42, Wade-st., f., r. 26*l.* 280
Old Ford.—4 and 5, Tamar-st., f. 530

***Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.**

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 16 0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 12 0	,,	,, ,,
Smooth Bright Facing Stocks..	2 18 0	,,	,, ,,
Shippers	2 6 0	,,	,, ,,
Flettons.....	1 10 6	,,	at railway depôt.
Red Wire Cuts ..	1 15 6	,,	,, ,,
Best Fareham Red	3 11 6	,,	,, ,,
Best Red pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,, ,,
Do., Bullnose	4 12 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 6	,,	,, ,,
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	18 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

[See also next page.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Public Offices	Hindley U.D.C.	50*l.*, 25*l.* and 10*l.*	Jan. 18

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Sewerage Works	Bromley U.D.C.	Surveyor, Council Offices, Bromley, Kent	Dec. 4
Additions to Schools, Church-road, Gorleston	Great Yarmouth School Board	Bottle & Olley, Architects, Queen-street, Great Yarmouth	do.
Building Work, Kerr's Buildings	Belfast Guardians	Young & Mackenzie, Civil Engineers, Donegall-square, Belfast	do.
Alterations to Hospital, Grape-lane	Whitby Hospital Committee	E. H. Smales, Architect, 5, Flowergate, Whitby	do.
Alterations to "Stakesby," Whitby	J. H. Harrowing	W. C. Hall, Architect, Park-row, Leeds	do.
Sewerage Works	Leicester Corporation	E. G. Mawbey, Civil Engineer, Town Hall	do.
Sewer, Church-road	Shoeburyness U.D.C.	H. Harris, Surveyor, Southend	do.
Road Works	Newburn U.D.C.	T. Gregory, Engineer, Council Offices, Newburn	do.
Two Cottages, Claydon, near Fenny Compton	Great Western Railway Company	G. K. Mills, Paddington Station, W.	do.
Waterworks Extension, Waterton	Aberdeen Town Council	Jenkins & Marr, Civil Engineers, 16, Bridge-street, Aberdeen	do.
Water Supply, Lavernock	Llandaff R.D.C.	Surveyor, 35, St. Mary-street, Cardiff	do.
Disinfecting Chamber	Kilkenny U.D.C.	W. K. Cleere, Council Offices, Kilkenny	do.
*Supply of Stores	Great Northern Railway	Stores Superintendent, Doncaster	do.
*Window Cleaning	East Ham School Board	Clerk, School Board Offices, East Ham, E.	Dec. 5
*Making-up Roads	Fulham Borough Council	Surveyor, Town Hall, Walham Green, S.W.	do.
Sewage Purification Works	Ottery St. Mary (Devon) U.D.C.	E. G. Warren, Architect, Commercial Chambers, Exeter	do.
Additions to Workhouse Infirmary	Alcester Guardians	W. H. Ward, Architect, Paradise-street, Birmingham	do.
Bungalow, Hayle, Cornwall	Mrs. J. T. Mudge	S. Hill, Architect, Redruth	do.
Nine Houses, Eden-street, Saltburn-by-Sea	North-Eastern Railway Company	W. Bell, Architect, York	do.
Bridge, Bronant	Cardiganshire County Council	R. Lloyd, County Surveyor, Tregaron	do.
Road Diversion, Alltwen	Glamorgan County Council	T. M. Franklen, County Offices, Cardiff	do.
Paving Works, Victoria-place	Leith (N.B.) Town Council	Burgh Surveyor, Town Hall	do.
Additions to Electricity Works, Bolton-road	Bradford Corporation	R. A. Chattock, Civil Engineer, Town Hall	Dec. 6
Drainage Works, Stoke-road	Guildford School Board	E. L. Lunn, Surveyor, 30, High-street, Guildford	do.
Sewerage Works, Woodsmoor-lane	Hazelgrove U.D.C.	E. Sykes, Civil Engineer, 9, High-street, Cheadle	do.
Additions to Workhouse, Lyminge, Kent	Elham Guardians	R. Lonergan, Saltwood, Hythe	do.
Street Works, Arundel-road	Southend Corporation	A. Fidler, Civil Engineer, Town Hall	do.
Foundations, &c., Hayes, Middlesex	.....	Secretary, Electric Company, Woodfield-road, Harrow-road, W.	Dec. 7
School, South William-street, Workington	Rev. Mr. Hutchinson	J. Howes, Architect, 23, Curwen-street, Workington	do.
Street Works	Sandal Magna U.D.C.	F. Massie, Civil Engineer, Tetley House, Wakefield	Dec. 8
Drainage Works, Dalry, N.B.	.....	J. Barr, Civil Engineer, 221, West George-street, Glasgow	do.
Bank Premises, Cleator Moor	Bank of Whitehaven, Limited	A. Huddart, Architect, 22, Lowther-street, Whitehaven	do.
Additions to Hospital, Lytham, Lancs	.....	Haywood & Harrison, Architects, Lytham	do.
Alterations to Police Station, Merthyr	Glamorgan County Council	T. M. Franklen, Council Offices, Cardiff	do.
Additions to Police Station, Caerphilly	do.	do.	do.
Police Station, Clifynydd	do.	do.	do.
Road Works, &c., Cross Hills, Yorks	.....	F. W. Petty, Architect, Woodridge, Cross Hills	Dec. 10
Villa, Maidstone-road, Chatham	.....	E. J. Hammond, Civil Engineer, High-street, New Brompton	do.
Public Conveniences, Grand Parade	Eastbourne Town Council	R. M. Gloyne, Civil Engineer, Town Hall	do.
House, Boughton	Nottingham Corporation	W. B. Starr, Architect, 12, St. Petersgate, Nottingham	do.
Electric Light Station, Hylton-road	Sunderland Corporation	F. M. Bowey, Town Hall	do.
Lodge at Sanatorium, Hucknall-lane	Basford (Notts) R.D.C.	W. V. Betts, Architect, Radford-road, Old Basford	do.
Schools, Rofft-y-Crown, Denbigh	.....	J. Hughes, Architect, Denbigh	do.
Goods Shed, Broomielaw Quay, Glasgow	Clyde Navigation Trustees	W. M. Alston, Engineer, 16, Robertson-street, Glasgow	do.
Pumping Station, Loxford-lane	Ilford U.D.C.	J. Taylor, Sons, & Santo Crimp, C.E., 27, Great George-st., S.W.	do.
Granite Setts (3,000 tons)	Royston U.D.C.	T. Blensdale, Surveyor, Town Hall, Royston	do.
Asylum, Kingseat	Aberdeen Lunacy Board	A. M. Mackenzie, Architect, 343, Union-street, Aberdeen	do.
*Pulling Down Building	Barking Town U.D.C.	Surveyor, Public Offices, Barking, Essex	Dec. 11
Road Works, Allison-street	Amble U.D.C.	W. Gibson, Surveyor, 31, Queen-street, Amble	do.
*Road Making, &c., Works	Willesden District Council	Engineer, Public Offices, Dyne-road, Kilburn, N.W.	do.
*Buildings	Greenwich Guardians	T. Dinniddy, Architect, 12, Crooms Hill, Greenwich	Dec. 13
*Making-up Roads	Hackney Borough Council	Borough Engineer, Town Hall, Hackney, N.E.	do.
Sewerage Works and Five New Streets	Horwich (Lancs) U.D.C.	Surveyor, Public Hall, Horwich	Dec. 15
*Taking Down and Rebuilding Bridge	Headington R.D.C.	See Advertisement	Dec. 18
*Wiring, &c	Winwick County Asylum	Clerk, County Offices, Preston	Dec. 20
*Wiring and other Works	Metropolitan Asylums Board	Offices, Embankment, E.C.	Jan. 2
*Grayswood Church and Vicarage	.....	Oliver & Dodgshun, Architects, Carlisle	No date
*Barrack Blocks at Colchester	War Department	Royal Engineer Office, Colchester	do.
Stables, Engine House, &c., Bradford-road	East Ardsley (Yorks) U.D.C.	E. Brooke, Surveyor, Blackgates, Tingley	do.
Offices, &c., Yorkshire-street	Burnley Corporation	G. H. Pickles, Civil Engineer, Town Hall, Burnley	do.
Street and Sewerage Works, The Middles, Durham	.....	J. W. Rounthwaite, Architect, 13, Mosley-street, Newcastle	do.
Additions to Middleton Hall, Gorebridge, N.B.	Mr. H. E. Moss	J. MacIntyre Henry, Architect, 7, South Charlotte-st., Edinburgh	do.
Fifty-two Houses, The Middles, near West Stanley	.....	J. W. Rounthwaite, Architect, 13, Mosley-street, Newcastle	do.
Store Premises	York Equitable Industrial Soc. Ltd	Athron & Beck, Architects, Dolphin-chambers, Doncaster	do.
Four Houses, Balmoral-terrace, South Bank	do.	do	do.
Schools	Kinson (Dorset) School Board	W. Andrew, Architect, Alton Office, Parkstone	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Application to be in
*Borough Surveyor	Dartmouth Town Council	.....	Dec. 5
*Surveyor and Assistant Clerk	Penge U.D.C.	250*l.*, and 200*l.* per annum	Dec. 7
*Engineer and Engineering Assistant	Sheffield Corporation	200*l.*, and 130*l.* per annum	Dec. 8
*Quantity Surveyor's Assistant	London County Council	4*l.* 4*s.* per week	Dec. 10

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, p. iv. *Contracts*, pp. iv. vi. viii. x. & xix. *Public Appointments*, pp. xvii. & xix.

PRICES CURRENT *(Continued)*.

BRICKS, &c.

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	,, ,,
Best Portland Cement	38 0	per ton ,,
Best Ground Blue Lias Lime	24 6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12*s.* 6*d.* per yard, delivered,
Stourbridge Fire-clay in sacks, 32*s.* 6*d.* per ton at rly. dpt.

PRICES CURRENT *(Continued)*.

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt	
Bath ,,	1 7	,,	,,
Farleigh Down Bath	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,,	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale ,,	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,

PRICES CURRENT *(Continued)*.

STONE.

	s. d.		
Hard York in blocks	2 10	per ft. cube, deld. rly. depôt	
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super. at rly. depôt.	
,, ,, 6 in. Rubbed Ditto	3 0	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 3 in. self-faced Ditto	0 9½	,,	,,

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PRICES CURRENT (*Continued*).

SLATES.

in.	in.	£ s. d.	
20× 10	best blue Bangor	11 5 0	per 1000 of 120 at rly. dep.
,,	best seconds ,,	10 15 0	,, ,,
16× 8	best ,,	6 2 6	,, ,,
20× 10	best blue Portmadoc	10 18 0	,, ,,
16× 8	best blue Portmadoc	6 0 0	,, ,,
20× 10	best Eureka unfading green	11 2 6	,, ,,
16× 8	,, ,,	6 15 0	,, ,,
20× 10	Permanent green	10 0 0	,, ,,
16× 8	,, ,,	5 12 6	,, ,,

TILES.

	s. d.	
Best plain red roofing tiles	41 6	per 1,000 at rly. depôt
Hip and valley tiles	3 7	per doz. ,, ,,
Best Broseley tiles	48 6	per 1,000 ,, ,,
Hip and valley tiles	4 0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 ,, ,,
Do. ornamental Do.	60 0	,, ,, ,,
Hip tiles	4 0	per doz. ,, ,,
Valley tiles	3 9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000 ,, ,,
Hip tiles	4 1	per doz. ,, ,,
Valley tiles	3 8	,, ,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.	
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0	
Deals: best 3 by 9	14 10 0	15 10 0	
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0	
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.	
Deals: seconds	1 0 0	less than best	
Battens: seconds	0 10 0	,, ,, ,,	
	At per load of 50 ft.		
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0	
Seconds	4 5 0	4 10 0	
Small timber (8 in. to 10 in.)	3 12 6	3 15 0	
Swedish balks	2 15 0	3 0 0	
Pitch pine timber (35 ft. average)	4 0 0	4 10 0	

JOINERS' WOOD.

	At per standard.		
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0	
3 in. by 9 in.	24 0 0	25 0 0	
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0	
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0	
,, ,, 3 in. by 9 in.	20 0 0	21 0 0	
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0	
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0	
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0	
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0	
Do. 3 in. by 9 in.	22 0 0	23 0 0	
Battens	16 10 0	17 10 0	
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0	
Do. 3 in. by 9 in.	17 0 0	18 0 0	
Battens	14 0 0	14 10 0	
Third yellow deals, 3 in. by 11 in.	15 0 0	16 10 0	
Do. 3 in. by 9 in.	14 0 0	14 10 0	
Battens	12 10 0	13 10 0	
White Sea and Petersburg:—			
First white deals, 3 in. by 11 in.	15 10 0	16 10 0	
,, ,, 3 in. by 9 in.	14 0 0	15 0 0	
Battens	12 10 0	13 10 0	
Second white deals 3 in. by 11 in.	14 0 0	15 0 0	
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0	
,, ,, battens	11 0 0	12 0 0	
Pitch pine: deals	16 0 0	18 0 0	
Under 2 in. thick extra	0 10 0	1 0 0	
Yellow Pine—			
First, regular sizes	30 0 0	33 0 0	
Broads (12 in. and up)	2 0 0	more.	
Oddments	22 0 0	24 0 0	
Seconds, regular sizes	24 10 0	26 10 0	
Yellow Pine Oddments	20 0 0	22 0 0	
Kauri Pine—			
Planks, per ft. cube	0 3 6	0 4 6	
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 2 6	0 2 8	
Small ,, ,,	0 2 4	0 2 7	
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6	
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9	
½ in. do. do.	0 0 7	- - -	
Dry Mahogany—			
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11	
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0	
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0	
Teak, per load	16 0 0	20 0 0	
American Whitewood Planks—			
Per ft. cube	0 2 3	0 3 0	

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.	
Rolled Steel Joists, ordinary sections	9 2 6	10 2 6	
Compound Girders ,, ,,	12 5 0	13 10 0	
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0	
Flitch Plates	11 7 6	12 0 0	
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0	

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.	
IRON.—			
Common Bars	9 15 0	- - -	
Staffordshire Crown Bars, good merchant quality	10 5 0	10 10 0	
Staffordshire "Marked Bars"	12 0 0	- - -	
Mild Steel Bars	10 10 0	11 0 0	
Hoop Iron, basis price	10 10 0	11 0 0	
,, ,, galvanised	16 10 0	- - -	
(* And upwards, according to size and gauge.)			
Sheet Iron, Black.—			
Ordinary sizes to 20 g.	11 0 0	- - -	
,, ,, to 24 g.	12 0 0	- - -	
,, ,, to 26 g.	13 10 0	- - -	
Sheet Iron, Galvanised, flat, ordinary quality.—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	13 5 0	- - -	
,, ,, 22 g. and 24 g.	14 5 0	- - -	
,, ,, 26 g.	16 0 0	- - -	
Sheet Iron, galvanised, flat, best quality.—			
Ordinary sizes to 20 g.	17 10 0	- - -	
,, ,, 22 g. and 24 g.	18 0 0	- - -	
,, ,, 26 g.	19 10 0	- - -	
Galvanised Corrugated Sheets.—			
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 10 0	- - -	
,, ,, 22 g. and 24 g.	14 0 0	- - -	
Cut nails, 3 in. to 6 in.	11 10 0	- - -	
(Under 3 in. usual trade extras.)			
LEAD—Sheet, English, 3 lbs. & up.	19 17 6	- - -	
Pipe in coils	20 7 6	- - -	
Soil Pipe	23 7 6	- - -	
ZINC—Sheet—			
Vieille Montagne ton	27 0 0	- - -	
Silesian	26 10 0	- - -	
COPPER—			
Strong Sheet per lb.	0 1 1	- - -	
Thin ,,	0 1 3	- - -	
Copper nails ,,	0 1 3	- - -	
BRASS—			
Strong Sheet ,,	0 0 11	- - -	
Thin ,, ,,	0 1 1	- - -	
TIN—English Ingots ,,	0 1 5	- - -	
SOLDER—Plumbers' ,,	0 0 7½	- - -	
Tinmen's ,,	0 0 9½	- - -	
Blowpipe ,,	0 0 11	- - -	

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3½d. ,, ,,
,, ,, fourths	3d. ,, ,,
26 oz. thirds	4½d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5½d. ,, ,,
,, ,, fourths	5d. ,, ,,
Fluted sheet, 15 oz.	3½d. ,, ,,
,, ,, 21 ,,	4½d. ,, ,,
½ Hartley's Rolled Plate	3d. ,, ,,
⅝ ,, ,, ,,	3½d. ,, ,,
¾ ,, ,, ,,	4d. ,, ,,

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes	0 2 11	per gallon
,, ,, ,, in barrels	0 3 0	,,
,, ,, ,, in drums	0 3 2	,,
Boiled ,, ,, in pipes	0 3 2	,,
,, ,, ,, in barrels	0 3 3	,,
,, ,, ,, in drums	0 3 5	,,
Turpentine, in barrels	0 2 9	,,
,, in drums	0 2 11	,,
Genuine Ground English White Lead	28 0 0	per ton
Red Lead, Dry	25 0 0	,,
Best Linseed Oil Putty	0 9 6	per cwt.
Stockholm Tar	1 10 0	per barrel

VARNISHES, &c.

	per gallon. £ s. d
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 18 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

N. H. D. (Below our limit.)

NOTE.—The responsibility of signed articles, letters and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BRIGHOUSE.—For the erection of a Congregational church, Waring Green. Messrs. Sharp & Waller, architects, 32, Bradford-road, Brighouse:—

Masonry.—Fearnley Bros., Clifton	£1,123 17 0
Joinery.—Fielding & Bottomley, Halifax	737 16 8
Plumbing.—A. L. Waddington, Brighouse	227 5 6
Plastering.—Castle & Hynes, Brighouse	154 10 0
Slating.—Jas. Smithies, Brighouse	162 10 0
Painting.—John W. Turner, Brighouse	49 18 0

BROMSGROVE.—For the erection of isolation hospital at Hill Top, Bromsgrove, for the Bromsgrove, Droitwitch, and Redditch Joint Boards. Mr. Henry T. Hare London, and Herbert R. Lloyd, Birmingham, joint architects:—

Barnsley & Son	£12,388 0	J. Dallow	£11,195 0
C. Bryant	12,245 0	Dorse & Co.	11,185 0
T. Rowbotham	12,120 0	W. Hopkins	10,800 0
Hurley & Son	11,963 0	W. & J. Webb	10,550 0
Sapcote & Son	11,837 0	W. Bishop	10,445 0
Huino & Son	11,600 0	J. Tilt	10,400 0
D. Panter	11,506 12	Harvey Gibbs	10,350 0
Guest & Son	11,500 0	J. & A. Brazier, Bromsgrove*	10,080 0
Moffat & Son	11,370 0	Gowing & Ingram	9,993 0
T. Broad	11 325 0		
Smith & Pitt	11,277 0		

CASTLEFORD.—For the formation and laying out of extension to burial ground. Cemetery-lane, Castleford, for the Castleford and Glass Houghton Burial Board. Contract No. 1—Erection of boundary walls. Contract No. 2—Drainage and asphalting. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford:—

Contract No 1.

J. Craven & Son, Castleford* £514 10

Contract No 2.

J. L. Rodgers, Castleford* 686 0

CASTLEFORD.—For additions to business premises, Carlton-street, for Mr. Charles Farbar. Messrs. Garside & Pennington, architects, Pontefract:—

Walker Bros., Castleford* £150

CASTLEFORD.—For erecting play sheds at the Board schools, for the Glass Houghton School Board, Castleford. Messrs. Garside & Pennington, architects:—

Wilson & Sons, Castleford* £105

CHADWELL HEATH.—For the erection of villa residence in Whalebone-grove, for Mr. A. Tatham. Mr. J. M. H. Gladwell, architect, 34, Lawrence-road, Bow:—

A. Webb	£1,595	J. R. Holliday	£1,275
G. R. Reid	1,500	Finegan & Co.*	1,148
G. W. Death	1,350		

CRADLEY HEATH.—For the supply of broken Rowley granite (400 tons) for the Quarry Bank Urban District Council. Mr. J. T. Abbiss, surveyor, Quarry Bank:—

Edwin Richards	8 0 per ton.
Rowley Regis Granite Quarries, Ltd.	7 9 ,,
J. W. Knowles,* Rowley, Staffs.	6 11 ,,

DEVONPORT.—For the erection of electricity works, buildings, &c., East Stonehouse, exclusive of chimney and flues. Mr. Charles Furniss, Borough Electrical Engineer, Devonport. Quantities by Mr. H. Gray Robins, 55-56, Chancery-lane, London:—

May	£7,969	Wakeham Bros.	£5,906
Hortop	7,291	Blake	5,831
Skinner	6,821	Lapthorn	5,709
Hatcham & Co.	6,710	A. N. Coles, Plymouth*	5,433
R. H. B. Heal	6,140		

DONCASTER.—For the execution of private street works, Church-street, &c., Butcher-street, and Cross Butcher-street, Thurnscoe, for the Rural District Council. Mr. J. R. Dodds, Civil Engineer, 19, Baxter-gate, Doncaster:—

W. Johnson	£2,633 0 0	W. H. Cliffe	£2,021 17 10
R. T. Hodgson	2,307 9 6	J. Holmes	1,823 0 0
Jones Bros.	2,214 19 2	Yardley, Dransfield, and Taylor‡	904 6 7
W. Chapman	2,207 7 9		
F. Eyre	2,194 15 10		
B. Roberts, Retford*	2,040 16 10		

‡ Church-street only.

[Engineer's estimate, £2,283 5s. 8d.]

DUNDALK.—For additions, &c., to old Grammar School buildings and conversion into free library. Mr. Wm. Beck, architect, Dundalk:—

McAdorey	£1,168 0 0	McGuinness, Dundalk*	£1,041 18 6
Wynne	1,193 0 0		
Parks	1,171 16 10		

ILFORD.—For the erection of stables at St. Mary's Bakery, Ilford, for Mr. Alfred Brown. Messrs. Beet & Gray, architects, Albany Chambers, 41, Haymarket, S.W. Quantities by the architects:—

Cole & Mundy	£187 10	S. E. Moss	£177 0
John Beene	185 0	F. Wilmott	158 0

See also next page.

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ILFORD (Essex).—For erection of Methodist Free Church, Ilford-lane, for the trustees. Mr. F. W. Dixon, architect, Trevelyan Buildings, Manchester. Quantities prepared by Mr. A. Goodchild, 81, Finsbury-pavement, London, E.C.:—

F. & E. Davey	£6,995	F. Willmott	£5,225
G. H. Hosking	5,827	Battley, Sons, & Holness	5,167
Castle & Son	5,800	J. W. Jerram	5,123
G. Sharpe	5,756	F. J. Coxhead	5,027
S. J. Scott	5,695	W. J. Maddison, Clarkson-street, Canning Town, E.	4,926
A. E. Symes	5,550		
J. Jolliffe	5,395		
Shelbourne & Co.	5,249		

LONDON.—For structural repairs to the stable block at Deerfield, Beulah Hill, Norwood, for Mr. J. Jonas. Mr. Percy L. Marks, architect:—

J. & C. Bowyer	£140 0	A. V. Paddison*	£136 10

Including as a provision for ventilation:—
Boyle & Son* £13 5 6

For waterproofing walls and for complete decorative repairs:—
Szerelmey & Co.* £25

Sundry extra works, including to out buildings, &c.:—
A. V. Paddison* ..... £17 8 11 (net).

For structural and decorative repairs and alterations to house and messuage (including laying new drainage system):—

A. V. Paddison	£1,088 12	J. & C. Bowyer	£786 0
F. & H. F. Higgs	857 0		

For modified requirements (but including electric-light installation):—
Dance, Bryant, & Co.* £536

LONDON.—For the erection of a warehouse in High-road, Balham. Mr. M. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C. Quantities by Messrs. Stanger & Sons, 21, Finsbury-pavement, E.C.:—

J. Carmichael	£1,164	Somerford & Son	£973
F. & H. F. Higgs	1,110	Garrett & Son	935
Gregory & Co.	1,063		

LONDON.—For alterations and repairs to factory and premises, Union-street, Borough. Mr. M. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C.:—

Gregory & Co.	£469	W. E. Hill	£381
Garrett & Sons	401	G. Newton	327

NEWTON ABBOT.—For a new road, with sewers, boundary walls, &c., at Highweek, for the Feoffees of Highweek. Messrs. J. W. Rowell & Son, architects, Newton Abbot. Quantities by Mr. Vincent Cattermole Brown, of Paignton:—

W. Gibson	£885	F. A. Stacey	£567
L. Bearne	727	Geo. Hicks, Newton Abbot	550
W. A. Goss	698		
R. F. Yeo	635		

NEWTON ABBOT.—For new girls' school at Highweek, for the Highweek School Board. Messrs. J. W. Rowell & Son, architects, Newton Abbot. Quantities by Mr. Vincent Cattermole Brown, of Paignton:—

W. Gibson	£2,846 0	H. Drew	£2,180 0
F. J. Stokes	2,524 0	R. F. Yeo	2,160 0
W. A. Goss	2,398 0	F. Stacey, Newton Abbot*	2,051 19
L. Bearne	2,315 0		
Geo. Hicks	2,300 0		

ORPINGTON (Kent).—For rebuilding premises, consisting of a shop and dwelling-house, at the corner of Chapel-square. Mr. M. St. Pierre Harris, architect, Orpington, and 7 and 8, Ironmonger-lane, E.C.:—
E. R. Thorne (no competition)* £756

ORPINGTON (Kent).—For the erection of a pair of houses. Mr. M. St. Pierre Harris, architect, Orpington, and 8, Ironmonger-lane, E.C.:—

Somerford & Son	£948	W. Owen (too late)	£850
T. W. Graty	873	T. Knight	679

RADLETT (Herts).—For proposed residence. Messrs. S. Doddimeade Edmunds, architect, St. Albans and London:—

J. Verdon	£1,900 0 0	Boff Bros.	£1,230 0 0
C. H. Taylor	1,372 14 3	G. Wiggs	1,140 0 0
W. King	1,310 0 0		

RADLETT (Herts).—For residence, corner of Aldenham-avenue and the Crosspath. Mr. S. Doddimeade Edmunds, architect, St. Albans and London:—

J. A. Chote	£1,000	Goodchild & Sons, St. Albans*	£695
Stevens & Sons	780		
Boff Bros.	758		

SIDCUP (Kent).—For the erection of twelve villas at Northcote-road. Mr. M. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C., and Orpington:—
Stebbings & Pannett (no competition)* £3,114

SLIGO.—For the erection of chapel in the Asylum grounds for the Committee of Management of Sligo District Lunatic Asylum. Messrs. Sir Thomas Deane & Son, architects, 15, Ely-place, Dublin:—

J. & P. Good	£5,200	John Clarence	£4,600
Michael Gallagher	5,200	D. McLynn, Sligo*	4,275

WESTON-SUPER-MARE.—For the completion of roads on the Manor estate. Mr. F. Hans Price, surveyor, Manor Estate Office, Weston-super-Mare:—
William Dyer, Weston-super-Mare £687

WREXHAM.—For the erection of a workshop, Madeira-hill National School, Wrexham. Messrs. Davies & Moss, architects, 11, Regent-street, Wrexham. Quantities by architects:—

Davies Bros.	£217	W. Hughes	£171
J. Hughes	215	R. Jones, Wrexham*	168
W. E. Samuel	205		

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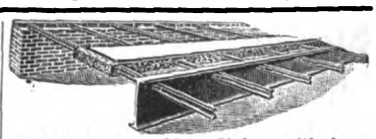

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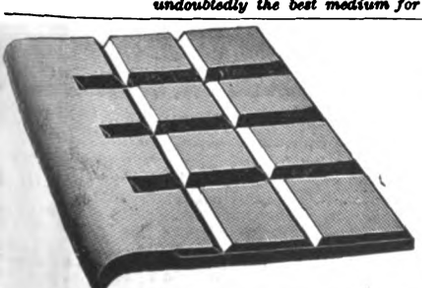

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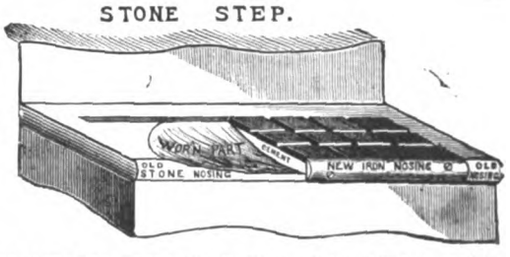

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Refer also to "TOO LATE" *column page* xii.

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CIVIL SERVICE COMMISSION.—FORTHCOMING EXAMINATION.—DRAUGHTSMAN in H.M. Patent Office (22-30), DECEMBER 5th. The date specified is the latest at which applications can be received. They must be made on forms to be obtained, with particulars, from the Secretary, Civil Service Commission, London, S.W.

THE London County Council requires the SERVICES (temporarily) of a QUANTITY SURVEYOR'S ASSISTANT competent to measure variations and prepare bills of quantities for small works.
Salary, 4l. 4s. per week.
Apply in writing, by 10th December, to the Architect of the Council (Quantity Surveying Branch), No. 13, Spring Gardens, S.W.

THE Town Council of the Borough of Clifton Dartmouth Hardness invite APPLICATIONS from persons desirous of filling the OFFICE of BOROUGH SURVEYOR, SURVEYOR to the URBAN DISTRICT COUNCIL, and SANITARY INSPECTOR, in the place of their late Surveyor and Inspector, who received a salary of about 180l. a year.
Applicants, who will be required to devote the whole of their time to the duties of the office, are requested to state the salary required.
Canvassing members of the Council is forbidden, and will disqualify any applicant for the office
Applications for the office, accompanied by testimonials, should be sent to the undersigned on or before the 5th DECEMBER.
ONESIMUS S. HARTLETT,
Town Clerk.
Dartmouth.
Dated November 16th, 1900.

WANTED, in the City Surveyor's Office, Sheffield, an experienced ENGINEER, who will have charge of Highway, Sewer, and Tramway work.
A large number of men and foremen will be under his charge, and the person appointed must be thoroughly experienced.
The Corporation are willing to pay a salary of 200l. per annum or upwards, according to the qualifications and experience of the applicant.
ENGINEERING ASSISTANT.
The Corporation also REQUIRE the SERVICES of a competent SURVEYING and ENGINEERING ASSISTANT, at a salary of 130l. per annum.
Both engagements will be subject to one month's notice from either side.
Applications should be made not later than DECEMBER 8th, 1900, to Mr. CHARLES F. WIKE, C.E. City Surveyor, on forms which can be obtained from his Office, Town Hall, Sheffield.

THE URBAN DISTRICT COUNCIL of PENGE.
REQUIRED, a SURVEYOR, salary 250l. per annum, and an ASSISTANT CLERK, salary 200l. per annum. Previous experience indispensable.
Applications, stating age and qualifications, accompanied by copies of testimonials, not exceeding three in number, to be sent addressed to the Clerk to the Council, Vestry Hall, Anerley, S.E. not later than DECEMBER 7th
Candidates must not be under 25 or over 40 years of age.
Canvassing will be considered a disqualification.
C. W. DONNETT,
Clerk to the Council.

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The Builder.

VOL. LXXIX., No. 3018. DECEMBER 8, 1900.

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Old House as Remodelled for the Leeds Board of Overseers.—Messrs. Bedford & Kitson, Architects ..... *Double Page Ink-Photo.*
Design for Church and Vicarage, Barnsley.—By Mr. H. C. Corlette, A.R.I.B.A. ..... *Double Page Ink-Photo.*
Bank at Aldershot.—Mr. W. Campbell Jones, A.R.I.B.A., Architect ..... *Single Page Photo-Litho.*
Bank at Battle.—Mr. W. Campbell Jones, A.R.I.B.A., Architect ..... *Single Page Photo-Litho.*

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The Widening of London Bridge.

THE Bridge House Estates Committee announce that they have determined on carrying out, subject to the sanction of Parliament, a scheme for widening the footways of London Bridge; a scheme which is illustrated in a model which has been on view at the Guildhall, and in the diagrams accompanying the Report of the Committee on the subject. From this Report it appears to be now definitely decided that the widening only affects the footways; and the reason given for this is that, while the Tower Bridge has very considerably relieved London Bridge as far as vehicular traffic is concerned, the pedestrian traffic over the latter has in no way diminished. As the bridge is now to be remodelled it would have 34 ft. 6 in. of roadway for four lines of vehicles, 2 ft. 6 in. in the centre for central lighting, and 14 ft. each for the footways, in place of the present width of 9 ft. 6 in. each.

The Committee have abandoned the idea of adding cast-iron cantilevers and a cast-iron balustrade, not apparently, however (if we may judge from the wording of the Report) from any care on their own part for the appearance of the bridge, but because of a conviction, which seems to have been fortunately brought home to them, that such a proposal would meet with the same opposition as before, and they have at all events recognised the practical wisdom of proposing what they are most likely to be allowed to carry out. If the Bridge House Estates Committee had any real regard for the architectural appearance of the bridge they would never have entertained such a scheme as the iron cantilevers at all. As it is, they enlarge upon its practical advantages, but conclude that they will not be allowed to adopt it. It is well that we have got as far as that, at all events.

The model shows, on its two sides, two alternative schemes for a granite corbelling to carry the extended footway. On one side the corbelling is continuous, in the shape of an assemblage of large mouldings carried along between the projecting piers; on the other side it takes the form of granite cantilevers with an interspace a little greater than their width. The former design has been erroneously published in a weekly illustrated paper as the one adopted; as a matter of fact the separate cantilever design has been adopted, and with good reason; it puts less than half the weight on the structure, and is more in keeping with its character; it is a kind of reminiscence, indeed, of the existing corbels or modillions under the parapet string course. We give a small portion of the arch from the drawing published with the Report, showing the difference, in elevation, between the present design and the proposed one—the drawing is a large one, and we could not reduce it sufficiently to give the whole arch on our page; and we give also the section of the parapet and footwalk as proposed, showing the side elevation of the cantilever. This is somewhat clumsy in form, and might be considerably improved. We must admit, however—opposed as we are to any interference with the bridge—that the design now proposed is less objectionable than we had expected. It is at any rate monumental in character, and the projection of the cantilevers is kept within the line of the present projection at the piers of the bridge, so as to appear to some extent to preserve a relation to the existing design. The substitution of an open balustrade for the present solid one was of course inevitable in such a position, for considerations both of real and apparent lightness.

Nevertheless, when the best has been said for it, this will form a very heavy and disproportionate cornice (for such it must be regarded) to the bridge, and will very materially alter its appearance and what may be called its architectural balance; nor can a model on a small scale enable people to realise what the effect will be in execution. The scheme is better than might have been expected, but it would nevertheless be an injury to the design of the bridge, and we feel no conviction whatever as to its necessity. We have never observed that there is any such crowd on the existing footwalks as to cause any material inconvenience or delay in crossing the bridge, but we were hardly prepared to find that the schedule of test observations of the foot traffic, appended to this very Report, actually negatives the Committee's own statement in regard to the increase of the traffic. From the list of observed records of the number of foot passengers over the bridge in twelve hours we extract the following:—

	Number of Persons Passing.
February 6, 1875	91,685
June 30, 1879	88,320
July 25, 1894	81,820
November 12, 1900	83,290

Thus it will be seen that while the most recent observation, last month, shows only a very slight increase, hardly worth mentioning, over the traffic of 1894, it is considerably less than that of 1875 and 1879. Thus the Committee's own statistics answer their own argument. It is odd that we have for years heard reiterated complaints—also we think much exaggerated, but still not without foundation—in regard to the inadequacy of the carriageway; this was always the point insisted on. Now that it has been discovered that vehicular traffic is so far relieved by the Tower Bridge that there is no longer ground for this complaint, the argument is shifted to the footways. This is only in accordance with that spirit of meddling with and spoiling ancient structures which seems to pervade all official authorities in London. The Committee seem determined to lay their hands on the bridge in some way or other; and the old excuse having been snatched from them, they now bring forward a new one. The prevalent official idea seems to be—never let an ancient structure alone if you can find an excuse for meddling with it. The proper feeling ought to be—never meddle with an ancient structure unless there is absolute

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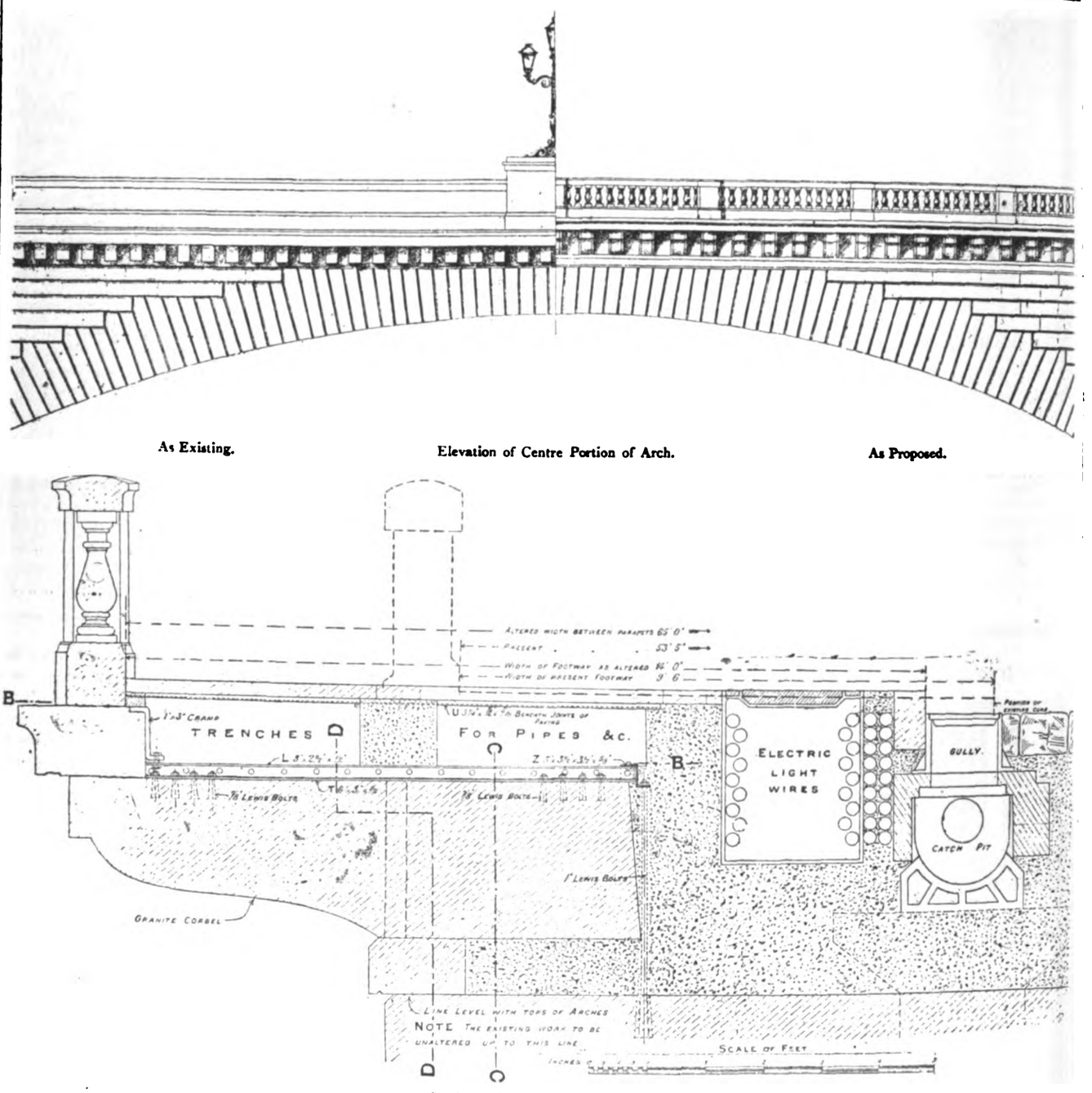

Section of Parapet, Showing Cantilever.

Proposed Alterations to London Bridge.

necessity for it. The necessity is certainly not proved in this instance.

Sir Benjamin Baker's Report, which is appended to that of the Committee, is of considerable interest. He says that the widening of the bridge by any other process than that of corbelling out would involve some risk to the present structure.

"If the piled foundations were extended, the vibration arising from the driving of the piles might cause settlements, and I had for that reason to abandon piling in a somewhat similar case in Scotland, and to substitute cylinder foundations. The sinking of cylinders or compressed air caissons near to the old piling of London Bridge might, however, cause even a more serious settlement than pile driving."

It is satisfactory to find that, in spite of some movement in the piled foundations at an early period in the history of the bridge, there is no evidence of any settlement worth taking into account for more than half a century past; so that the bridge seems to have fairly come to its bearings, and it is certainly a point of wisdom, in such a case, *quieta non movere*. As to the additional weight of the corbelling, it is calculated to amount only to 67 lbs. per square foot on the foundations, which, as the engineer observes, is a negligible quantity. But in regard to the appearance of the alteration Sir Benjamin Baker has a significant paragraph:

"I have seen many masonry arch bridges at home and abroad which have been widened by corbelling out the footpaths, but although in some cases much ingenuity has been exercised in the attempt to make the corbelling appear an integral part of the design, complete success has not in my opinion been in any instance achieved. There is no doubt that the corbelling out of the footpaths and the substitution of open balustrades for the present solid parapets would materially alter the appearance of the bridge from an architectural point of view, and I think that before any decision is come to on the subject it would be well to prepare a model of the centre arch of the bridge to a scale of say 5 or 6 ft. to the inch, showing on one side the existing arrangement, and on the other side the granite corbels and open balustrade, as no drawing will enable the Committee to form an opinion as to the real effect of the alteration."

Considering that this is the spontaneous expression of an eminent engineer who was called in to advise only on the constructional aspect of the work, and who, as an engineer, can hardly be supposed to have any strong prejudices in favour of the æsthetic view of the matter, we would suggest that this paragraph in his Report is of great weight, and ought to receive every consideration. And in regard to the argument for the necessity of greater accommodation, the Bridge House Estates Committee, as already pointed out, have actually stultified themselves by their own statistics. Under these circumstances we hope that they will not obtain Parliamentary sanction to spoil London Bridge.

THE L.C.C. AND WORKING-CLASS DWELLINGS.

SOME of our readers may remember that Parliament last Session passed an Act which enlarges the operation of the Housing of the Working Classes Act of 1890 by permitting Local Authorities to purchase land outside their own area. If locomotion by rail or tramways is to be of any real value in solving the difficulties in regard to the housing of the working classes, it is obvious that advantage should be taken of the Act of last Session. It is very satisfactory, therefore, to find the London County Council proposing already

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to make use of this new machinery. The place which they have suggested for the new buildings is at Norbury, in Surrey, on the western side of the road from Streatham to Croydon, and a quarter of a mile from the London and Brighton station. The return fare for workmen is fourpence. In addition, there will, within the next two years, be tramway connexion with the lines of the County Council.

It is proposed that the frontage shall be reserved for shops. On the actual plot there will be built 551 single cottages of three, four, and five rooms each, and 211 double cottages. The rent of the single cottages with three rooms will be 7s. to 9s. per week; the double, 6s. 6d. to 11s. 6d., according to their size. Such are the outlines of this the first scheme under the new Act, which stands for early consideration in the agenda of the Council.

The number of inhabitants in this workman's colony will, of course, be large, and it is at once obvious that the success of the scheme must, to some extent, depend on the facilities which are given by the Railway Company for the conveyance of the workers to and from their daily labour. A mechanic, no more than a merchant, can put up with unpunctuality and slowness. He wants to get to and from his work as rapidly as he can. If the facilities for locomotion in a locality which is selected for working class dwellings are inadequate, it is pretty certain that workmen who are engaged at a distance during the day will not make use of it. Another point which has to be borne in mind is, that a workman living in a corner of the outskirts of London cannot reach different places within the Metropolitan area with the same ease as he can from a more central point. A bricklayer is not like a City merchant; he has now to work here and now there. Norbury may be convenient for one district in London; it may be very inconvenient for another. Thus it is clear that this new departure is something in the nature of an experiment.

A working colony, placed in what is in a sense a country district, will also be in a different condition from one in the town itself. Something in the nature of a town will soon, we may expect, spring up round it. But a strain will quickly be placed on the educational system of the district, and the first need for workmen's families is an easily accessible and efficient elementary school. Another matter also which deserves consideration is the question of recreation. The shorter hours of the workman give greater opportunities for recreation. Is the inhabitant of one of the Norbury cottages to have anything provided for him in this respect? Or is Mitcham Common to be his only pleasure-ground? A cricket and football ground, and a reading-room and library, and a coffee-house at once suggest themselves as necessary appurtenances to an artisan's colony pitched outside the Metropolitan area. For it is clear that colonies planted outside the Metropolis or the great provincial towns must be regarded in a broader light than ordinary workmen's dwellings erected in a crowded part of a great city. In the one case the Local Authority is rather running against the tendencies and habits of those who have to inhabit these buildings; in the other it is acting in accordance with their practice, which is to crowd into the towns, as near as possible to their work, to the parts where they may obtain all that a city can provide for them. In the one case, also, it is only an experiment from the financial point of view; in the other it is an experiment not only from the financial, but from the social point of view.

It is most desirable, therefore, that great care should be taken by Local Authorities before they decide to build outside their areas, or what is certainly an excellent piece of legislation may not bear the hoped-for fruit. It will be desirable, also, for the London County Council not to multiply these colonies too rapidly, but to observe their results from that at Norbury before committing themselves to large expenditure. We believe that years ago Baroness Burdett Coutts built, at Highgate, small houses intended for hardworking and poor clerks: they have often been found to be the homes of quite another class. The stream of popular tendency sets strongly in these days towards the city, and it may be that the artisan will not care to go against it.

While we are dealing with this social problem it may be desirable to say a word on a letter from the Sanitary Institute which, we understand, has been sent to the members of the Government, enclosing a copy of the resolutions which were passed at the Conference on the Housing of the Working Classes which was held last July. These resolutions were noticed in this journal at the time they were passed. The two points contained in them are that the period for repayment of loans to Local Authorities should be extended to sixty years, and that the restrictions on building cottages should be relaxed by the Local Government Board. These points are well worthy of being pressed on the notice of this Department, but we doubt if the circular will have any effect. The proper manner of bringing it effectually to Mr. Long's notice is by a deputation. Cabinet Ministers, like editors, have waste-paper baskets.

NOTES.

The London Water Supply.

THE speech which Mr. Ritchie, the new Home Secretary, delivered at the recent banquet to the Mayors of the new London boroughs pointed—not obscurely—to a more sympathetic policy on the part of the Government with the London County Council, more especially in regard to the water question. They should be allowed to pass all Bills which are reasonably necessary, and which, as the Council for London, they deem desirable. Such in effect were the Home Secretary's words. If this policy is carried into action, it points clearly to the intention of the Government not to oppose the water plans of the County Council. It is high time London was left to manage its affairs without interruption from the Government. The absence of municipal spirit in London is owing in some measure to the fact that it is regarded as falling under the control of the Central Government. We hope Mr. Ritchie will be able to obtain the sanction of his colleagues to a policy of non-intervention in the municipal affairs of London.

Proposed New Lambeth Bridge.

BY the courtesy of the Engineer to the London County Council we have had an opportunity of seeing the four sketch elevations which have been made for the proposed Lambeth Bridge. These consist of a cross-braced bridge—a lattice arch through which the straight line of the roadway is carried; a suspension bridge; a steel bridge of the same type as Westminster Bridge, but with fewer and wider spans; and a concrete bridge faced with granite, of the same type constructionally as the new Vauxhall Bridge. Of these however, it may be taken that the cross-braced bridge and the suspension bridge are practically abandoned, as it is a condition that the roadway should allow of a trough 2 ft. 6 in. deep for electric tram motors, and this of course cannot be got, in a construction where there must be cross girders, without building up the roadway on the top of the girders to an inconvenient thickness. It will lie therefore between the Westminster Bridge type and the concrete and granite type, and it is understood that Sir A. Binnie is in favour of the latter. So are we; Westminster Bridge is a weak though rather elegant design, and we have no wish to see anything of the same type repeated. The sketch for the granite and concrete bridge indicates at present some of the same features which we have disliked in the original Vauxhall Bridge design; the course of very heavily rusticated voussoirs, for instance, which serves to exaggerate the thinness of the arch at the crown; and the sketch for the piers appears to present one of those large columnar appendages which we always dread the sight of; but it is understood that these are merely drawings to show different classes of bridge, and that the details of the design may be entirely modified in execution; and the County Council seem at last to have had the conclusion hammered into them that some special architectural assistance is desirable in designing a bridge, unless where the simple and unadorned construction is left to speak for itself.

Electricity *v.* Steam.

MR. LANGDON'S paper, "On the Supersession of the Steam by the Electric Locomotive," attracted several railway managers and engineers to the meeting of the Institution of Electrical Engineers last week. As some misconception exists on this subject, it may be as well to premise that if ever electricity be adopted on existing lines, it will only be adopted gradually. There will be no sudden revolution, and little extra capital will be required. If, as electricians seem to be convinced, considerable economies can be effected by the displacement of the travelling generator by the stationary generator, the shareholders in railway companies need not be afraid that the gradual adoption of electricity will diminish their dividends. Mr. Langdon is the electrician to the Midland Railway, and in his paper he estimates the cost of working the Midland main line between St. Pancras and Bedford by electricity. He calculates that the direct saving effected on this portion of the line, after paying the interest on the increased capital outlay, would be nearly 200,000*l.* per annum. In making this estimate he took the average working expenses of this line for the last twenty-four years. If he had taken it for last year the saving would be much greater, owing to the great advance in the price of coal. Mr. Langdon treats the subject from the shareholders' point of view, but the working of all our railways by electricity would no doubt present advantages of other kinds; the

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saving of three million tons of coal per annum, for instance, and the sanitary advantage of doing away with smoke and coal-dust. Mr. Cunningham, the manager of the Central London Railway, agreed generally with Mr. Langdon's figures, but thought that they were somewhat too favourable to the steam locomotive. Colonel Crompton, who has designed a large electric railway in Cashmere, said that his recent experiences in South Africa led him to the conclusion that the driver of a steam locomotive must be a much more highly trained and competent man than the driver of an electric locomotive. These however, are the opinions of those who would have a natural bias in favour of electrical power, and the other side of the question must not be forgotten. If Mr. Langdon's 600 volts as a working pressure were adopted, special precautions would have to be taken to prevent leakage currents from the rails causing damage to neighbouring property, not to speak of the danger to life in the cases of persons straying on the railway, which it is impossible entirely to prevent. The most serious question of all however, is, whether the substitution of a central power for a power carried by the locomotive itself would not interfere seriously with the elasticity of working of a great railway system. Central electrical power is all very well for a railway like the Central London, which merely runs passenger trains backwards and forwards all at the same speed and stopping at all stations; but when all kinds of trains, passenger and goods, are to be run at all kinds of speed, and complicated shunting operations have to be carried out, an engine with its own independent power, which can be driven about like a horse, must certainly have very distinct advantages in working the traffic.

Cantor Lectures.

DR. FLEMING gave the second of the Cantor Lectures to a crowded audience on Tuesday night. The subject was electrical resonance, and the lecturer illustrated it by many novel experiments. He first discussed the subject mathematically, and showed the method of calculating the period of an electrical oscillation. For his purpose he divided all oscillators into good electric radiators and bad electric radiators. With a good electric radiator like a charged sphere it was difficult to note the oscillations, as the charge died away so rapidly, but with a bad electric radiator, like a circuit containing capacity and inductance, the oscillations were persistent. He mentioned the difficulties electricians had in transmitting power through concentric mains owing to resonance effects, and showed an instrument for measuring the frequency which worked on this principle. Electrical resonance is analogous to resonance in sound. Just as gas globes, &c., sometimes respond to a note on a musical instrument, so a resonant electrical circuit is exceedingly sensitive to electric waves of a certain frequency. He illustrated this by putting a small lamp in series with a coil of wire and a Leyden jar, and showed how it became incandescent when electric waves fell on the circuit, a current of half an ampere apparently passing through the thick glass of the Leyden jar. He showed the nodes on two parallel wires when electric oscillations were set up in them, and so measured the wave length of these oscillations. He mentioned that by photographing the spark, so as to find the period of the oscillation, this enabled us to find the velocity of propagation of these waves, which is the same as the velocity of light, namely, 186,000 miles per second. He stated that optical absorption, and therefore the colour of bodies, was caused by electrical resonance. Dr. Fleming stated that Mr. Marconi had recently shown and explained to him some marvellous advances in wireless telegraphy. All the wireless telegraphic instruments used in the British Navy are tested between the Portsmouth and Portland stations, a distance of sixty-five miles, and through hills six or seven hundred feet high near Swanage. Marconi's stations are at Niton, in the Isle of Wight, and at Poole, a distance of thirty miles, so that the messages sent by Marconi and the Admiralty must cross one another apparently without interference. Marconi has succeeded in sending and receiving two messages simultaneously without the slightest sign of interference in the printed messages at the receiving station, several of which the lecturer showed. In Dr. Fleming's opinion there is a great future for not only wireless telegraphy, but also for wireless electric lighting and wireless transmission of power.

The Grafton Gallery.

IT may be questioned whether "Romney exhibitions" are very good for Romney's fame, unless restricted to a small collection of his best works. Whatever Romney himself and his admirers may have thought, he was far behind "the man in Leicester-square" in variety of character and power of colour; and the present exhibition at the Grafton Gallery is, as a whole, a rather dull one, including a good many portraits which are heavy in character and deficient in interest. The large picture of "Newton Discovering the Prism" is very fine in conception, but the head of Newton gives rather too much the impression of having been, as it actually was, "painted from a cast taken after his death"; it has not the expression of life. Nor is "Shakespeare Nursed by Tragedy and Comedy" a picture to delight us much at the present day, however it may have suited the conventional taste of Romney's time. The most interesting of the works in the gallery are among those which are large sketches rather than finished pictures; "Lady Hamilton reading a gazette recording one of Nelson's victories" (23), for instance, and "Matilda, daughter of John Lockwood" (36), a half-length painted with a freedom and spirit very different from the heavy flat execution of many of the works exhibited. The portrait of "Charles, Second Earl Grey" (27) is exceptionally good in colour; and the large picture of "Lady Hamilton as a Bacchante leading a goat" (69), with the indication of a stormy landscape as a background, is one of the really fine things of the collection, which as a whole leads one to the conclusion that it is possible to have too much of Romney all at once, and that he is more favourably shown by individual pictures than by his collective work.

Mr. Arthur Hopkins's Exhibition.

AT the Society of Fine Arts is a collection of water-colours by Mr. Arthur Hopkins which is certainly calculated to add to the reputation of this clever artist. Mr. Hopkins has chiefly been known as a painter of very well-executed scenes of rustic life of a popular character and not burdened with any very recondite sentiment; pictures which suit the general public and the illustrated papers. The majority of the works at the Fine Art Society are, however, pure landscape, and of a high order as such. It would be difficult to find a small landscape more perfect in its way than the heath scene entitled "Where the Bee Sucks" (49), and "The Singing Sands of Studland" (73) has excellence of the same kind; also "The Purple Moor" (3). Trees with a background of sea form the elements in other charming examples—"On the Top of the Cliff" (16), "Copper Beeches in Spring" (24), "The Edge of a Pinewood, Studland Bay" (37), &c. We note also the fine colour in the one entitled "Near Haslemere" (16), and in another way "Tudor House, Yaverland" (20) is a perfect little picture of an old country house. The larger work, "Bathing in the Surf" (18) showing a fine sea with two or three figures of young women in irreproachable bathing dresses, belongs to the artist's more usual class of work, as also "The Mermaids" (47); as usual in such pictures, the mermaid is much too human in physiognomy—a watering-place young lady with a fish-tail tacked on to her; if painters want to make one (momentarily) believe in a mermaid, they should give her a character and expression of her own, different from that of humanity. Pictures like this, however, are hardly to be taken quite seriously; but the landscapes are truly artistic work. "The Mowers" (10), a landscape with figures, is also admirable as a composition.

The Dutch Gallery.

MESSRS. VAN WISSENBURGH have on view at their Gallery at 14, Brook-street a small collection of pictures, some of which are of what we call the "dingy school" of modern Dutch landscape, from which light and colour seem to be banished. "A Marine Sunset" by Dupré is, however, an impressive though gloomy work; there is a fine little "landscape study" by J. Maris, also a "nude study" by the same artist which has dignity and power; a figure-subject by Diaz, two fine flower-paintings by M. Fantin-Latour in his well-known style, and a view of Paris by A. Vollon, showing the Institut building on the left. M. Daumier's Don Quixote pictures are what we should call bad jokes. There are eight small Corots, of various degrees of interest; probably early works.

Jewellery and Metalwork Exhibition.

THE Fine Art Society has on view a collection of very original jewellery and metalwork by Mr. and Mrs. Nelson Dawson. All the articles show an endeavour to import original thought into work of this class and to give to each object an individual interest. Among the larger objects are an electric light standard (3) in bronze, silver and marble, the marble forming the base, the bronze stalk terminating in a fawn's head; two or three wall sconces for candles or electric light, treated in grey steel or in brass, which are very good though exceedingly simple in design; fire-irons and other articles of the same class. In some cases simplicity is carried too far. We cannot see, for instance, the beauty of the "fender in brass and forged iron" (13) with the plain surface of the iron merely beaten into some

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lumps or swellings here and there. Metal is not equally suitable, either, for all objects of household use—not for a fire-screen, for instance; it suggests the idea of getting heated, and in fact probably would get so, and therefore does not properly fulfil the purpose of a screen; and this one in fact (33) really rather suggests a dinner-gong in appearance. Among the jewellery designs are many charming and original things; we may mention especially the necklet in gold with enamel (104), bracelet in pearl, enamel and beaten gold (132), cloak clasps in beaten silver with carbuncles (133), the necklets numbered 180 and 185, the necklet of Egyptian mummy beads with gold ornaments introduced (172)—the modern gold ornaments with which the long beads are "sandwiched" are singularly delicate and pretty; and a bag in gold brocade with a silver and *cloissonné* enamel medallion on it is quite admirable. We do not like imitation insects for ornament, such as Nos. 131 and 152; and we may observe also that an article for use, even in the shape of jewellery, should not be too fragile; such an object as the "Pin in gold with spinel ruby" (151), though it looks very pretty, suggests the idea that it would be very difficult to push it into anything without injurying or crushing the little bars which form a kind of cage for the ruby. But there is much beautiful work here, and there is what may be called a better tone about it than about French jewellery; it is more simple and less pretentious in taste.

THE SURVEYORS' INSTITUTION:

COVERED SHEDS FOR FARMYARD PURPOSES.

THE following paper, as announced in our last issue, was read at a meeting of the Surveyors' Institution on the 26th ult. by Mr. A. T. Walmisley:—

"The arrangement of improved farm homesteads and their influence upon agricultural prosperity was ably dealt with, in a paper read by Mr. A. Dudley Clarke, F.S.I., at a meeting of the Surveyors' Institution in January, 1883, which was followed by a useful supplementary paper contributed by Mr. C. John Mann, F.S.I., and published in the 'Transactions.' In the discussion which followed, the advantages of covered yards were thus summed up: In the first place, they were economical; secondly, stock never did so well as under buildings where they were protected from the elements, provided care was taken to turn the stock out in the spring and summer to avoid making the stock delicate; and thirdly, that one load of cake-fed manure stored under a covered yard was equal to three or four loads kept in an uncovered yard. All agreed that the approach to covered yards for the protection of stock during 'feeding time' and during inclement weather should approximately face the south, so as to obtain a maximum of sun and of air with a minimum of exposure, but that in the case of sheds for machinery and for implements the open end should be turned towards some shelter. The Chairman stated that many points had been raised upon which there existed differences of opinion, and that such points admitted of an extended discussion.

The present paper does not pretend to arrive at any definite conclusions so far as arrangement of farm buildings is concerned, but to touch upon a few considerations of details of structures. Farming practice differs so much that buildings which would be really needed in one district or upon an individual farm might be entirely out of place in another. Farmyard buildings are indispensable aids to farming practice, but in the midst of the present financial difficulties which embarrass agricultural interests, it is questionable how far the erection of very substantial farm buildings is now justified, as it is impossible to foresee what changes of occupation may take place in the future, which would render them more or less useless. Elaborate and expensive structures do not add, except in a minor degree, to the actual productive capacity of a farm. As regards implements, arable farms of a given acreage require more storage for implements than pastoral farms of the same extent.

The design or shape of any building or structure for farm requirements may assume almost any form, depending not only upon the stability of the structure, but mainly on its situation and requirements, so that very little of a general nature can be said on this point. Many farmers advocate an open yard with sheds round it for storing cattle, as they consider that although there is a small waste in the manure, the cattle thrive better and are more healthy when turned out in the open as much as possible. Other more up-to-date farmers insist that the animals kept under cover in a shed, free from draught and amply ventilated, and built over a non-absorbent floor, are fatted quicker and at less cost than those exposed to weather. The manure made is also of greater value, as it is not exposed to the rain, which washes a large proportion of the valuable manurial constituents away. In open yards a suitable covering for a manure pit would consist of a rectangular enclosure surrounded by a wall of 3 ft. or 4 ft. high, except in the centre at one end, as shown in the fig. 5, and surmounted by a painted corrugated iron roof, supported on H section stanchions standing 10 ft. high from ground to eaves, so as to leave the upper portions of the ends and sides over this wall open, and provided with all necessary wrought-iron tie-rods, gutters, down-pipes, and fastenings. Exclusive of foundations and brickwork, the price delivered ready for erection is about 1s. 5d. per ft. super of area covered.

The most suitable materials for farm buildings depend upon local circumstances. Too much stress can scarcely be laid upon the proper location of manure pits and also upon the efficient drainage arrangements of all sheds. It is of primary importance to ascertain the various materials most accessible and the best that can be obtained in the district of the proposed structures, whether bricks, stone, cement, slates, tiles, timber, concrete, or iron, having regard also to the distance and convenience of carriage and the selection of the time most agreeable to the tenant, if, as is generally the case, he is to do the transport. Where bricks are reasonable in price and of near carriage, 9-in. brick walls upon proper footings with piers 14 in. wide under the principals are well adapted for single-story buildings. Concrete walls are well done in some parts, care being taken that the gravel or sand mixed with the cement is free from loam or clayey material. In a stone country a good rough rubble wall with drafted stone quoins, if the stone can be easily dressed, or otherwise with brick quoins, may be recommended, or where neither suitable stone nor brick are procurable, concrete may be used, either placed *in situ* in a plastic condition between timber sheeting and subsequently rendered in cement for the sake of appearance upon the removal of the boards, or the concrete may be cast in blocks, and these blocks built up like ashlar. For floors of any outbuilding concrete is more suitable than flagstone, as joints in flags frequently become washed out. Flagstones crack, and the cavities so formed become depositories for filth which no broom can clear. Weather-boarded buildings well tarred, upon brick bases, carried about 2 ft. above the ground, are inexpensive in some places, and make satisfactory enclosures. Fig. 7 shows an outside covering resting upon four courses of brickwork, viz., a bottom course of 18 in. width, the next course 14 in. wide, both below the ground level, and a double course of 9-in. work above the ground level. In the case of a corrugated iron covering at the sides of the building, a galvanised iron flashing piece is indicated to be fixed around the bottom timber plate, which flashing runs up about 2 in. behind the iron sheets and returns over the top 9-in. brick course. A damp course can also be added by a layer of felt placed between the timber plate and brickwork below the floor level. Air bricks can also be built at suitable intervals in the upper portion of the footings.

A cheaper plan is to carry the building upon iron base pillars, as shown in fig. 6, placed 9 ft. centres and to omit the brickwork footings. By carrying these pillars up to a height clear of the ground a store can be built with a strong floor, vermin proof. The price for a shed 25 ft. by 15 ft., suitable for a grain store, 8 ft. to eaves and 12 ft. to apex of roof, constructed on vermin-proof pillars, would be about 2s. 6d. per square foot of area covered.

For corrugated iron work, self-supporting structures are, for sake of economy, introduced. Trusses are dispensed with in curved roofs up to 30 ft. span, the sheets alone with light bracing being sufficient. Its form gives it strength, and allows it to be fixed in a minimum time. Up to 20 ft. span (fig. 1) a single tie-rod, slung up at the centre, is generally employed, the sheets being curved to the required radius and maintained in position simply by tie and king rods spaced about 10 ft. apart. In spans of 20 to 24 ft. (fig. 2) the single vertical central rod is removed and angle iron struts with their ends bent round for connexions are substituted. Comparatively heavier gauge sheets are introduced, and wall plates added along the eaves to carry the sheets. In spans of 24 to 30 ft. the vertical central sling rod is added, as shown in fig. 3, thus forming a kind of half-way design between an ordinary principal roof and the curved self-supporting roof described above. Above this span principals and purlin bars need to be introduced so as to form a complete framework on which to secure the sheets.

A shed designed by the author shown in elevation in fig. 16* is furnished with a strong form of roof, 30 ft. span, suitable for an exposed situation. Fig. 17 gives a plan with position of wind ties and sliding doors, the elevation of the sliding-doors and enlarged details of their connexions being given in fig. 18. The half elevation of roof principal and the half span in elevation of the end principal or screen end covered with corrugated iron carried on angle iron bracing, are furnished respectively by figures 19 and 20. Details are also shown of the side framing, struts, tie-rods, and forgings. Where circumstances admit of the expense in a farm building this structure provides a substantial enclosure of convenient size but where expenditure is an object, a roof at less cost than the corrugated iron roof above described can be built with curved timber trusses for 50 ft. span, such as that in fig. 21, can be easily erected on the following lines. Rise, 7 ft. Depth of truss at centre, 5 ft. Curved roof boarding, 36 ft. 6½ in. radius. Radius of curve to tie-beam, 46 ft. 10 in. Rafter of tie-beam, composed of battens 7 in. by 1¼ in. and 6 ft. long, fixed side by side, butt joints made by two battens occurring in the centre of the adjoining batten. Diagonal bracing, 2½ in. by 1¼ in., with packing pieces at intersections. Two vertical struts, spaced equidistant, composed of 5 in. by ⅞ in. battens. Purlins, 3 in. by 2 in., and 3 ft. apart (centres). Roof boarding, ⅞ in. thick (to a curve as above). V gutter, 9 in. by 9 in. by 1 in. Wall-plate, 9 in. by 3 in. Principals at 7 ft. 6 in. centres, supported on wood standards with intermediate bracing.

For the sake of comparison, fig. 22 has three timber queen post truss roofs of 27 ft. 9 in., 36 ft., and 26 ft. 3 in. spans respectively, and fig. 32 shows corrugated iron roofs suitable for 40 and 20 ft. spans in exposed situations. The limits of time allowed for this paper do not permit me to do more than to present them as examples of actual work, but I shall be happy to reply to any questions that may arise in the discussion connected therewith.

The cheapest shed that can be erected consists of timber framing to sides and ends carrying a self-supporting covering. Where timber rafters are introduced, with longitudinal battens fairly close together, from rafter to rafter, the usual bolt connexions in the side laps are frequently dispensed with, the corrugated iron as a weather covering being simply nailed to the battens and a ridge capping added. The cost of the necessary timber framing for such roofs, the rafters 5 in. by 3 in. having collar braces and 2 ft. 6 in. apart with wall plates 4½ in. by 4½ in., the battens being 3 in. by 1½ in., would be about 6d. per square foot of area covered. Fig 32 show a comparison between a slated and a zinc roof, and illustrates a corrugated iron self-supporting roof, each covering an area of 100 ft. by 25 ft., the slate roof costing about 1s. 1d., the zinc roof 10½d., and the corrugated iron roof 7½d. per square foot of area covered.

Where zinc is employed it is of great importance that the zinc should be pure. If it contain any iron it will not satisfactorily resist the atmospheric influences, and when placed in direct contact with brickwork has, under certain conditions, been found to suffer corrosion.

* For figs. 16 to 20 see sheet ii. of diagrams, pp. 516, 517.

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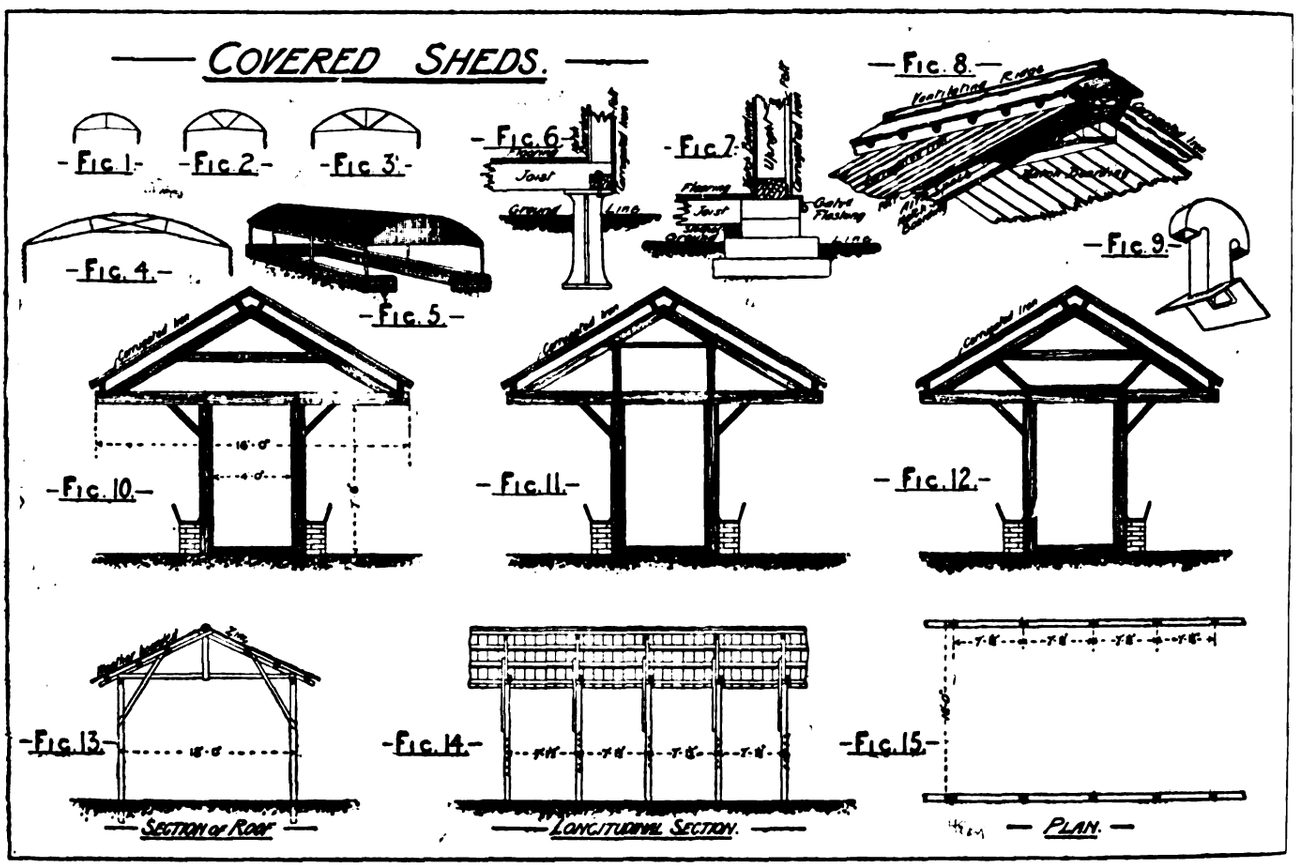

Illustrations to Paper on Roofing of Farm Buildings.—Sheet I.

In Berlin a portion of zinc supported on a brick wall in the city market-hall was reported to have become pitted, and subsequent chemical examination of the bricks showed they contained a percentage of soluble salts which became acted upon by moisture in the atmosphere. Ordinary corrugated zinc cannot be recommended. For roofs of a permanent character either No. 14, No. 15, or No. 16 gauge should be used in the case of zinc, and either 18 B.W.G., 20 B. W. G., or 22 B.W.G. in the case of corrugated iron. The weight of the corrugated iron (22 B.W.G.) in the case of the shed shown in fig. 32, 25 ft. span, would be about 2 tons, exclusive of bracing. Good iron well galvanised, or ungalvanised and painted if near the sea, will last longer than thicker sheets of inferior quality, and with regard to thin sheets of zinc it must be remembered that a surface crack allows the commencement of deterioration. It is an erroneous idea that iron buildings do not last for any length of time. With proper treatment and periodical coats of paint, say every three years, these structures can be preserved thirty to forty years. Where exposed to acid or alkaline fumes, such as is occasionally the case in the immediate neighbourhood of covers to fold yards or dung steads, the galvanising may quickly deteriorate, and when once the galvanising is broken through the sheet quickly becomes perforated, whatever the thickness of gauge may be. A covering of copper sheets in such situations is preferable. The best protection under such circumstances for corrugated iron is to coat the sheets with good red lead paint or even a composition of pitch and tar, a month or two after they have been erected, and to repeat this coating as necessary—probably every three or five years. The reason for delaying the application of this covering until after the erection is completed, is to allow the sheets to become tarnished upon the surface, since they will then allow the paint to adhere more firmly than when it is applied to a fresh metallic surface, and the whole area becomes covered without risk of further openings being made for connexions. When, for the sake of economy, galvanised sheets are used it must be remembered that while the galvanising process protects the iron from corrosion, it also tends to render the iron brittle. Notwithstanding this fact, the author is acquainted with a corrugated galvanised iron covering which stood over the large area of the Borough Market, Southwark, for thirty years, when it was found to be completely riddled in holes, and taken down as being dangerous owing to the vibrations communicated from the railway viaducts which carried the roof framework.

The value of the galvanised sheets employed for coverings mainly depends upon the quality of the iron. Although a certain excellence of quality is essential to allow the rolling of comparatively thin sheets which shall be able to endure the corrugation required without risk of damage, yet it will be found upon examination that large quantities of inferior sheets are sold in the market which have minute cracks or a blistered surface. Sheets of this character will not hold the spelter properly, or if ungalvanised and painted the smallest flaw in the continuity of covering gives an entrance for the weather, with a serious result. Rust from the exposed spot spreads laterally under the covering, and when the rust separates from the iron the paint comes off with it. Charcoal sheets for galvanising are not an ordinary article of commerce. The sheets sold by manufacturers at extra prices for galvanising and other purposes under the name of "charcoal sheets" are generally made of steel.

Figs. 23, 24, and 25 illustrate a hay-shed with a corrugated iron roof 20 ft. wide constructed in 15 ft. bays. The shed is 14 ft. high at the eaves, and the curved roof has a rise of 4 ft. 6 in. The intermediate framing of the roof, as shown in the cross-section (fig. 24), is formed of angle-iron rafters with flat iron tie-bars. They are partly riveted together at the maker's yard, and are provided with a necessary shoe and splicing plates. The roof is carried on H steel columns, spaced 15 ft. centres, and special attention needs to be paid to the connexions between the column heads and the roof framing. This form of stanchion is the best to adopt, where the columns are liable to be knocked against by carts or the like. Where possible, they should be let in from 1 ft. to 2 ft. into solid concrete blocks bedded in the ground, and spur stones added. In the case under review the columns have angle bases riveted on to their feet, for anchorage into the concrete foundation. In each bay, between the heads of columns, there is a light lattice girder formed of angle-iron eaves bar, and spandril with flat iron bracing all riveted together, including the necessary splicing plates on the columns. The end frames shown in the end elevation are formed of angle-iron rafters, tie-bar, and uprights, with the necessary shoe and splicing plates, and have a stay of angle iron from the tie-bar to the crown of the roof, as shown in the side elevation (fig. 23). The roof in this case is covered with Braby's No. 22 W.G. best "Empress" brand galvanised corrugated sheets, laid with 6-in. end laps and one corrugation side lap, fixed to the eaves bar with clips, and to the crown bar with hook bolts, and bolted to each other by means of sheet bolts all provided with galvanised material and lead washers. Angle-iron crown purlins extend from end to end of the roof, secured to the crown of the gables by means of splicing plates. Galvanised half-round wrought-iron eaves gutter is fixed along each side with gutter hooks spaced every 3 ft. Galvanised wrought-iron down-pipes secured to the stanchions by galvanised iron clips are added but it will be noticed that their ends are left free to avoid connexions to the underground drains. The ends of the shed can be clad with vertical corrugated sheets similar to the roof. Gutters and down pipes should be of ample size to facilitate clearance, and the top of a down pipe should be provided with guards to prevent choking by leaves and dirt. When not galvanised they are usually formed in cast iron, since this material, as a rule, will better resist corrosion from the greater body of thickness in a casting compared with thin wrought iron or steel gutters and down-pipes. An open shed as described above could be erected for about 1s. 5d. per square foot of ground covered. If side sheeting be necessary, the price to include covering the sides down to a depth of 4 ft. below the eaves would be an addition of about 2s. 3½d. per foot run of covering.

With hay and corn sheds head room is a consideration, hence the adoption of trusses with a raised tie-beam, as in fig. 4. But in many cases they are braced, as in fig. 32, and covered with corrugated iron, carried at the eaves on a wall plate, which may be of timber or of iron. For hay-sheds it is always advisable to have the framework entirely of iron or steel, as in case of fire, the damage done will not be so considerable as if part of the framing were of timber. As regards the facilities of erection, a light pole, a ladder, and a few planks, with a rope and tackle, are about all that it is needful for a purchaser to provide. The required framework being riveted together prior to delivery, the chief labour in the erection lies in fixing the covering, for which it is important to employ an experienced sheeter; but the handy labourers usually employed about farmhouses could erect the remainder of the structure complete. Such

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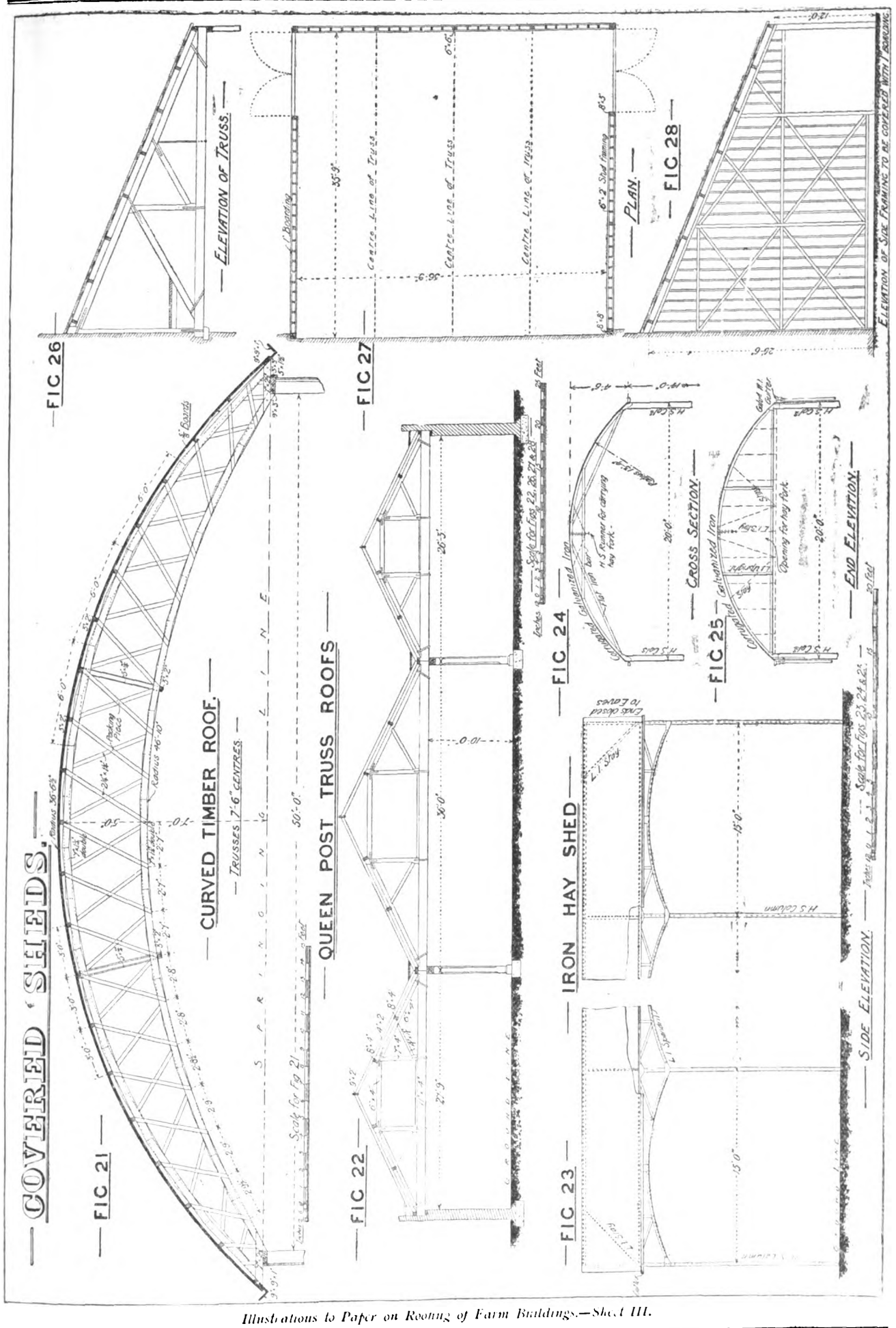

Illustrations to Paper on Roofing of Farm Buildings.—Sheet III.

sheds are extremely useful for other purposes than storing hay, in parts of the country where there is any difficulty in obtaining brick or stone for building purposes. For instance, a shed, such as that shown in figs. 23 to 25, could be used as cattle shelters and feeding sheds by placing troughs along one side and putting the necessary railings between the columns, with gates to allow of ingress and egress. They could also be used as cart or implement sheds when lighted by side windows. The hay sheds are sometimes fitted up with a carrier to take an American hay fork, as shown on the diagram, the ends of the shed being suitably framed to allow of a bundle of hay and the fork passing through without any obstruction. The carrier is formed of steel of H section, and is hung from the top by brackets, and

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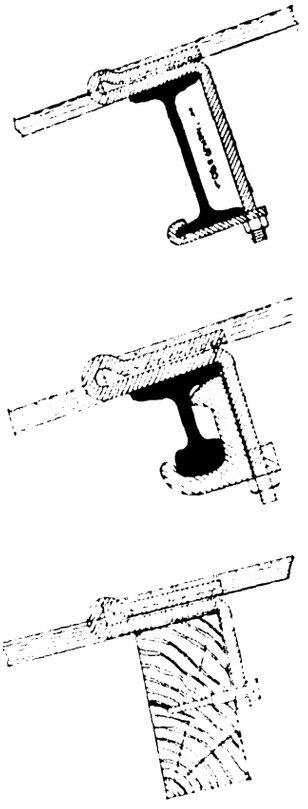
stayed between each of the couples by means of flat iron sway bars, the hay fork running on the bottom flanges of the H steel carrier. The price of a carrier delivered and erected adds 3s. per foot run to the cost of the shed.

Fig. 29 shows a simple arrangement for a coach house and stable, 40 ft. by 13 ft., costing 95*l.* fixed, or 3s. 8d. per square foot of ground space. Fig. 30 shows a shelter for forty-six cattle, erected by Messrs. John Lysaght, Limited. It covers a space 80 ft. by 33 ft., and is a particularly cheap class of building erected upon timber uprights, without rafters or purlins and costs 190*l.* fixed or about 1s. 5d. per square foot.

The corrugated iron sheet fittings designed by Mr. C. Thomas, consisting of saddles with concave washers to fit the corrugations as shown in fig. 31, can be applied to angle iron purlins or to joists, or to tee-shaped bars as required, and are supplied to order by The Metal Agencies Company, Limited, Queen-square, Bristol. Their use is calculated to overcome the leakage around the hook bolts sometimes introduced in the connexions, and to reduce to a minimum the dropping of condensation, by the saddle raising the corrugated sheet to the extent of about a quarter of an inch off the purlin, and so preventing the interception of the condensation by the purlin as in the old method. It will be observed that the metal saddle employed has a raised boss around the hole through which the hook bolt passes, and when the outside nut of the hook bolt is screwed down, the burr of the punched hole in the sheet is pressed into a concave washer and the corrugated iron sheet becomes embossed around the hook bolt without distorting the sheets to an extent likely to lead to leakage. The saddle also contributes to the action of a lock nut, thus reducing the liability of the nut of the hook bolt to work loose through vibration; and the condensation, instead of dropping under each purlin from one end of the building to the other, is conducted uninterruptedly to the eaves, rendering the centre of the floor dry.



The "Windle" Patent Clip (designed to overcome the difficulty, in corrugated iron roofs, of keeping the joints from leaking through the bolt-holes).

Where possible, all lighting should be obtained from the sides or ends of a building enclosed at the sides and ends, as roof lights, besides being somewhat costly, are apt to leak during wet and stormy weather.

Ventilation may generally be arranged mainly under the level of the eaves, only a limited amount (if any) being required in the roof itself. Nothing can be worse than a draught, especially a cross draught induced by too large openings in the ends and at the sides of a building. Ventilation is needed above and not across a yard. The usual louvre ventilators seen in the roofs of railway stations admit snow in winter. By raising the covering at its junction over an intermediate purlin in wide sheds and adding a pile plate or ridge piece above an upper purlin, effective ventilation is evenly distributed along the whole length of the roof in lieu of the ordinary louvre board arrangement. Fig. 8 shows a system which can be recommended in truss roofs. A ventilating ridge is provided by the introduction of 4 in. by 2 in. woodwork, perforated and running the whole length of the ridge both sides, but there are very few roofs of farm buildings that provide a double roof to admit of this means of ventilation, and with self-supporting roofs it would be only practical and safe to provide a number of small ventilators at prescribed intervals along the ridge. Of course, with ridged framed roofs any amount of ridge ventilation can be given, either continuously, or by means of small independent ventilators at intervals. The double-horned ventilators shown in fig. 9 are absolutely weather-proof, and can be readily attached to either curved or ridged roofs. The prices are 40s. with 18-in. shaft, and 25s. with 12-in. shaft.

Strong winds or gales should be specially taken into account in all buildings standing exposed to their action, and extra precautions adopted to prevent the force of such gales getting under the roof, since the majority of accidents to light self-supporting roofs are due to the lifting tendency of wind having free play underneath them, without being able to escape. In designing roofs it is sufficient for ordinary purposes to assume that there may be a lateral wind pressure of 28 lbs. per square foot and a weight of snow equal to 5 lbs. per square foot. These, added to the weight of the structure, give the total load to be sustained, and the working strain upon the material employed under such circumstances should be about one-fourth, and should never exceed one-third of the calculated breaking strain. Wrought iron of from 20 to 22 tons per square inch ultimate breaking strain is a fair assumption. To specify a higher unit breaking strain, is to invite a manufacturer to deliver mild steel, which for such very light sections as here needed would not be expedient.

Continual progress is being made in the application of iron and steel to building purposes, and the demand for structures of these materials increases. This is not surprising when we consider the advantage which iron and steel possess, in allowing a building to be sent to the place of erection complete and ready for fixing, in the small extent of ground surface taken up by walls and partitions, in their imperviability to moisture, and the practicability of rendering a building fire-resisting though not fireproof, and also in the ease with which a complete and thorough ventilation of a building can be arranged, and in the facility of removal and comparatively small cost of reconstruction in any other part of the farm.

Rectangular buildings may be covered with roofs having gabled ends, or the ends may be hipped. The hipped portion is, however, more expensive than the ordinary parts of a roof, the framework requiring more labour, and the covering is greatly cut to waste. As an approximate rule, one-third should be added to the general price per square of 100 superficial feet for that portion of the area which is covered by the hip. Against this extra, however, we have to consider the saving effected in the material that would be needed if gables were used. By simplicity of construction expense may be saved. Smith's work should be reduced to a minimum, and welding both at the joints and other paris avoided as much as possible. So far as the site will permit, a roof should be arranged to contain a repetition of parts, as upon the extent to which this is effected the cost so much depends. A building divided into equal spaces, and in which the principals occur at regular intervals, is the cheapest that can be adopted.

It is evident that expense may be saved by preserving as far as possible all existing buildings and making use of the existing walls, also by roofing in considerable areas in a block so as to subdivide the interior by light and inexpensive partitions with a view to facilitate subsequent alterations and save the cost of numerous outside walls. This affords opportunities for an advantageous disposition of material in unbraced structures, as it admits of introducing the nave and transept principle by placing the direction of one portion of the covering at right angles to the remainder. The use of expanded metal in concrete may be advantageously introduced in wide spans of roofing or partition.

While the limited amount of framework needed for corrugated iron recommends it for rapidity of erection at moderate cost, it is sometimes objected to as a covering because it does not moderate the extremes of heat and cold, and the interior of such buildings is consequently easily affected by changes of temperature. A double roof is the best means of retaining warmth and of excluding external heat, but in ordinary sheds an inner lining of boarding, leaving an air space of about 9 in., would be too expensive, so the difficulty has been surmounted by running some light wires parallel with the purlins of a roof, and about 12 in. apart, upon which a thin layer of straw is laid. The comfort of a thatched roof is to some extent attained in this way.

Thatching possesses some advantages over other methods. It is light, impervious to moisture, and of good weathering quality when skilfully laid. Wheat straw is the best to employ, being a good non-conductor and more durable than oat straw. For coverings in isolated positions it is very suitable, but needs to be particularly secured at the eaves to avoid lifting under the influence of high winds. In some farms galvanised rick covers are used, fastened by strand wire looped both ends in an approved manner.

Tile roofs are seldom watertight. Pan tiles are common and cheap. Plain tiles are expensive, and they are smaller than pan tiles, but requiring more lap they are heavier per square. They can be laid to any slope from 25 deg. to 60 deg. Slates need an angle of about 2 to 1 or 25½ deg. to 30 deg., but zinc, lead, and corrugated iron can be laid at a slope of 4 deg. Pan tiles are mostly used for barns and sheds. They need strong roof timbers. Their size is about 13¾ in. by 9½ in. by ½ in., weighing 5½ lbs. each. Plain tiles are 10½ in. by 6½ in. by ½ in., weighing 2½ lbs. each, and 11 in. by 7 in. by ⅝ in., weighing about 3 lbs. each. A square of roofing requires 800 plain tiles laid to a 3-in. gauge, 700 tiles to a 3½-in. gauge, and 600 to a 4-in. gauge. They need to be fastened with a galvanised iron nail for security to fir laths attached to rafters, no boarding being necessary. Pan tiles hold the moisture a long time, and are inferior to plain tiles.

Figs. 26, 27, and 28 show elevation and plan of a substantial shed constructed in timber as a lean-to against an existing building.

Roofs covered with felt should have a slope of at least 1 in 5; indeed, 1 in 2 would not be too much. Croggon's asphalte roofing felt is specially coated with an admixture of bitumen, and is considered impervious to rain, snow, or frost. It is sold at 1d. per square foot, subject to discount.

Willesden paper has also been employed for roofing purposes. The 4-ply at 9d. per yard run, 19 in. wide, or 2s. 6d. per yard run, 60 in. wide, can be laid directly on rafters or partition studding without boards. In the case of roofs it is held in position by outside battens 2½in. by 1 in., firmly nailed through the overlapping roofing. To suit the width of the paper, rafters 19 in. from centre to centre are required. At the eaves it is turned round a feather-edged board for security. It is found to be durable, but for permanent work should be painted every three years. In exposed situations it needs protection from wilful destruction, as it is easily damaged by mischievous boys throwing stones. When properly fixed at the outset, with ample overlap at the ends, Willesden paper proves itself capable of resisting gales and of withstanding the weather, but its sagging in wet weather is unsightly. It answers very well as a covering to keep dry, but is too free a conductor of heat and cold for covering cattle-sheds. It, however, makes a first-class underslating.

As an example of a covering for the feeding of cattle in yards, figs. 10 to 12 show a central feeding passage directly communicating with the food store, and the roof allows space for a manger and shelter for the cattle on each side. The posts are about 9 ft. apart and support the rails over the mangers, which form the fence to keep the animals out of the passage. There are no rafters beyond the principals, but it is evident that with a light tie-beam, the form of principal shown in fig. 11 is preferable to that in which the supporting verticals tend by their position, as in fig. 10, to create a transverse strain in the tie-beam. As

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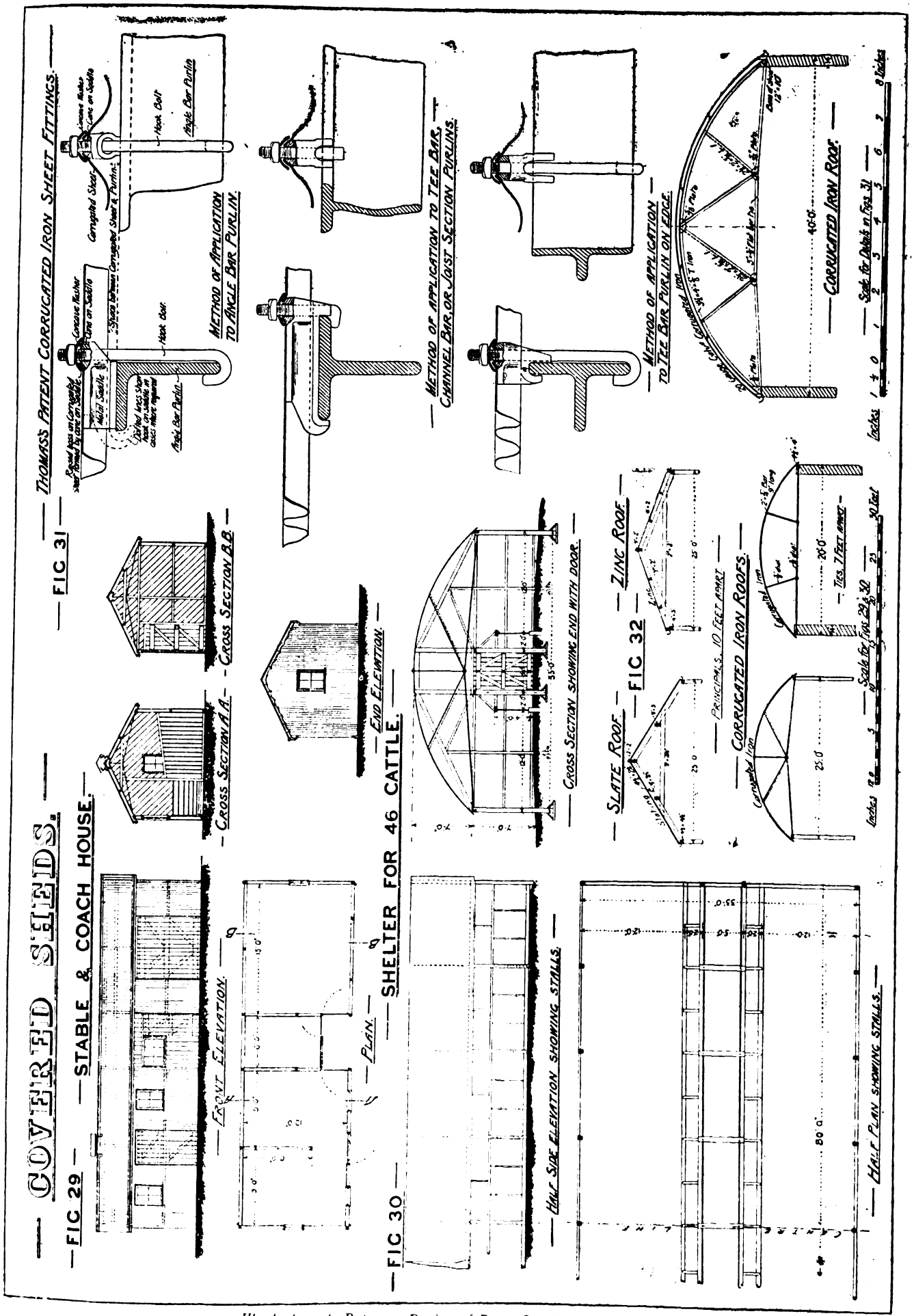

Illustrations to Paper on Roofing of Farm Buildings.—Sheet IV.

shown in fig 10 the weight mainly comes at the ends of the tie-beam, but if a straining beam with side struts were inserted as shown in fig. 12 these struts would communicate a large portion of this weight direct to the top of the vertical posts. In this case the collar-beam would remain the same for fig. 12 as for fig. 10.

A substantial form of continuous timber roofing is illustrated in figs. 13, 14, and 15, consisting of timber verticals 7 ft. 1½ in. apart longitudinally, and 18 ft. span weather-boarded to be covered with zinc or corrugated iron or other covering. Although, windows, doors, and sideboarding are not shown in the figures

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they can be fixed as required, and the whole forms a class of covering suitable for a sheltered position that can be easily erected.

Mr. A. Dudley Clarke said he had much pleasure in proposing a vote of thanks to Mr. Walmisley for his paper, which would form a most serviceable addition to the literature which the Institution possessed on the subject. There was no doubt a need for serviceable farm buildings at the present time, but the difficulty to contend with was the cost. Frequently substantially-erected buildings, which were sometimes used only for a few months in the year, could be adapted to more serviceable purposes than open shedding or barns. When this was done the building adapted had to be replaced by a cheap building, with a roof of corrugated iron or felt, although he did not approve of that material, and sometimes a wooden roof could be used, composed of creosoted board laid from ridge to eaves. He was surprised that the author had not referred to such a roof; it was very popular in some parts of Yorkshire and the eastern counties where such roofs had been found more satisfactory than iron. He did not think the author had been very happy in commencing his paper with a roof for a manure pit, for he did not see what use there could be for manure pits, and he would rather cover up more of the yard for cattle to run in in bad weather. As to the cost, as given by the author, of corrugated iron roofs for these manure pits, 1s. 5d. per foot super, or 12s. 9d. per yard super was too much for a roof of that kind. Figs. 1, 2, 3, and 4 represented the spans of corrugated iron roofs constructed in a manner familiar to most of them, but in his practice he had found it more economical to use timber instead of iron tie rods; iron tie rods were apt to sink in the middle, although they were suspended by a king rod, and in some cases by two queen rods. Farmers had a habit of hanging up all sorts of things on those rods, and when such a thing as a ladder was hung up, it was easy for the roof to get out of shape. He had also found it very advantageous whenever roofs were being erected by country carpenters to run a piece of 4½ by 3 timber along in the centre of the roof or at each side, according to the span of the roof, as a kind of purlin. It added a certain amount of rigidity to the whole structure. As to the covering for wide spans, Mr. Walmisley showed a roof for a span of 50 ft., which was constructed in a very ingenious manner, but, so far as he could understand, the roof was intended to be covered with boards; but how could boards be fixed on a roof like that, and the roof be weather-tight? There was very little fall in the roof for water to run off, and if the boards were lapped there would be scarcely any fall at all. Reference had been made by the author to the cheapest roofs, which worked out at 6d. per square foot, or 4s. 6d. per yard of ground covered. In using corrugated iron, he did not see what the rafters were wanted for at all. The only rafters which he used were those which might be called principal rafters, which might be placed 10 ft. or 12 ft. apart, wherever the ties went across. If the principal rafters were put 10 ft. or 12 ft. apart, and some light purlins about 2½ by 3 placed about 4 ft. apart up the sides of the roof, that would be equally effective, and would be much more economical. Mr. Walmisley's cheapest roof was certainly a cheap form, but he (the speaker) thought it did not include the posts, which, of course, were very necessary. In the last edition of his book on "Farm Buildings," he had given particulars of a cheap form of roof which worked out, with posts, at 4s. 8d. per yard, as against the 4s. 6d. mentioned by Mr. Walmisley. As a matter of fact, he believed that if flat sheets of iron were used with a galvanised iron ridge, it was cheaper than a curved roof, but he did not think it was so sightly, and he questioned whether it was equally secure. As to the price of corrugated iron roofs, the one illustrated in fig. 3 was quoted at 0·64 per square foot. That was about 8d. per foot, or 6s. per square yard; but there were no posts, and he should think that that was a fair estimate of what roofs of that kind should cost; but if one compared that with another roof—referred to later on in the paper—a roof for an open shed, that cost 1s. 5d. per square foot of ground covered, or 12s. 9d. per square yard, he could not see why one roof should be double the cost of the other, as in both cases they were simple iron roofs on posts. The author had referred to painting on corrugated iron and the advisability of allowing the roof to remain some time unpainted, so as to allow the paint to get a better hold of the iron. That he was fully able to endorse, and his practice was to allow one winter to pass before he had such a roof painted, during which time certain chemical changes took place in the surface of the iron, causing the paint to adhere and penetrate to some extent. That was worth remembering, especially as people objected to the grey and cold look of corrugated iron; when painted with a common brown or oxide paint—a little of which went a long way, as iron could not absorb much—all objectionable looks disappeared. The author recommended the use of iron as far as possible, considering it more suitable than wood in the case of fire. He (the speaker) recently saw the ruins of a building when the fire had twisted the corrugated iron about in such a way as to render it quite unserviceable. Ventilation was an important and very often a troublesome question. Shaft ventilators were sometimes serviceable, but those mentioned were too expensive. He preferred an arrangement of perforated wood placed at intervals under the ridge; that was very serviceable and certainly not costly. There were certainly a number of advantages attached to the use of iron roofs. Such roofs were easily erected and easily taken down and put up again, and they were much less liable to damage by storm. An excellent Broseley tile or slate roof might be put up, but occasionally tiles were blown off, and the trouble of repair in such a case was avoided when corrugated iron was used. Felt he would rather not have anything to do with nor Willesden paper. As to wooden roofs, one had to be careful in laying the boards to allow a little for shrinkage, and where the roof was to be absolutely impervious to rain, wooden ones were not suitable, though they formed excellent roofs for open stock yards. These were the creosoted timber roofs before mentioned, with boards laid from ridge to eaves, with a slight space between as described in the last edition of his book.

Mr. T. A. Dickson seconded the vote of thanks. He said that in reference to Mr. Walmisley's remarks about well tarring weather-boarded buildings, he had found that such buildings treated with carbolineum lasted better. He had just been inspecting some recently-erected farm buildings, and he was able to say that a small building of brick and slate cost 4s. 2d. per square foot, and the weather-boarded and slated buildings only 2s. 6d. per foot of ground covered, and he thought that with proper treatment a weather-boarded building could be quite a permanent one. He had had no experience of zinc roofs, but he had with corrugated iron roofs, which he was afraid it was necessary to paint; and if that were so, he was not sure whether slate roofs were not the most satisfactory in the long run. As to hay sheds, he could emphasise what had been said as to the necessity of having the columns or girders which supported them as firm as possible in view of the occasional excessive wind pressure which the buildings were subjected to. As to tile roofs, if they were properly laid, there was no objection to them, and in some parts of the country where the carriage of slate or corrugated iron would be expensive, and when there were tile yards in the neighbourhood, pantiles, properly laid, made an excellent and economical roof.

Mr. C. John Mann said that small farms were in demand, while large ones were continually being cut up. As to covered yards and manure-pits, he agreed with Mr. Walmisley in saying that the more up-to-date farmers insisted on having them. He thought that Mr. Walmisley's suggestions for fixing and fitting corrugated iron were excellent. The painting of such roofs seemed to be necessary, but it was very expensive. The choice of materials must depend upon experience of the most easily obtainable materials and labour in the district. Weather-boarded buildings with a brick base 2 ft. above the ground made excellent buildings, but in Fig. 7 Mr. Walmisley did not show the brickwork to go so high; it would have been very much better to have put it at least 2 ft. above the ground, to prevent splashings from rain, &c., getting to the timber construction. Many old barns had been put into repair by him and converted into various sorts of buildings, and he rarely found a farmer ready to pull them down, however bad the state of repair. As to damp courses and air bricks, he thought they should never be omitted. Timber posts for curved corrugated iron roofs were generally more suitable than iron stanchions. He would have liked to have heard more as to movable roofs, which he thought might be serviceable and would probably come into more general use. Figs. 19 and 20 showed an excellent shelter for cattle, and he thought that 1s. 3d. per square foot seemed to be a very reasonable price for such an erection. Thatch made an excellent roof when it was put on well, but it was subject to vermin. He could not agree with Mr. Walmisley in saying that tiled roofs were not watertight. If properly laid, pantiles answered well. He wondered whether any one had ever thought of applying in a simple way the bacterial principle to farm drainage. Farm drainage, if treated in that way, would flow long distances, being absolutely liquefied, and it might be a good way of irrigating land at little expense.

Mr. S. Taylor said he had no prejudice against iron, for he was using it largely at the present time, but he thought it was out of place as a covering for live stock in farmyards. It was no doubt very well adapted for covering manure pits or hay and straw barns. He agreed with Mr. Walmisley that pantiles did not make a very satisfactory cover unless they were well laid, as they were very porous; but as to flat tiles, they were the very best covering that could be used. He had used them for twenty-five years and never had a complaint of a flat tile leaking or of their being carried away by storms. As to cost, small buildings could be covered with good timber roofing and slates at 9d. per foot super. of area covered and with best Staffordshire tiles at 11¾d., while for larger roofs with framed trusses, the cost was, for a slated roof 10½d. and for a flat tiled roof 1s. 0½d., which he thought would compare well with corrugated iron. The necessary supports for a roof of about 50 ft. span would cost 1s. 4½d. per foot, and for a roof 20-ft. span the price would be 11d. per foot super.; and so even from the point of view of cost everything was in favour of slates or flat tiles. As to wood roofs, a cheap material was creosoted board, which cost 7½d. per foot super., and that made a very good covering, very much better than corrugated iron.

Mr. A. Michelmore said that slate, when possible, and tile, pan or plain, were preferable to corrugated iron. The roof he preferred would work out, with posts 20 in. by 10 in. and Bangor slating, at 65s. per square of 100 ft. Mr. Walmisley in reference to corrugated iron roofs fixed the cost at 60s. per square, but in his (the speaker's) part of the country their cheapest corrugated iron roofs would cost 42s. They considered gable roofs preferable to circular iron roofs. As to the objection of a previous speaker that slates were occasionally blown off, he had known the whole of a corrugated iron roof to be blown away. He would have liked the lecturer to have said more as to the class of timber which should be used in roofs. In his opinion it was a matter of great importance that good foreign timber should be used in preference to English. He knew that English timber was going out of use for permanent roofing, but landlords sometimes thought that because they grew larch they should use it for all permanent buildings. That was a mistake, because larch buckled badly. As to pantiles, when the pitch was sufficient they made a good roof. His opinion was that for first-class farm buildings they must endeavour to get slate roofs or plain tiles; for second-class buildings they might have pantiles, and for third-class buildings they might use corrugated iron.

Mr. A. McDonald Brown said that the use of corrugated iron was advocated because it was supposed to be the cheapest material, but it was very difficult to get at the exact cost. He ventured to dispute the statement that iron was the best and most efficient covering for the price, and he thought that for the price quoted for iron roofs a slated or tiled roof could be put up which would be altogether preferable. He hoped that surveyors would not make themselves responsible for dotting England with tin tabernacles, and if they did they would be sure to hear of it at one of the Royal Academy banquets.

Mr. J. R. Parkin said felt was sometimes useful when a roof had been perforated.

Mr. J. H. Sabin said that he very seriously questioned whether the cost of covering a Dutch barn could be so serious as had been

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suggested by the author of the paper if reasonable care were taken.

The Chairman said he agreed with Mr. Taylor to a great extent in his comparison of costs. In cheap buildings he had generally adapted the plan of using creosoted wood buildings, and he would like to ask the author of the paper whether he had had any experience of wood buildings?

The vote of thanks having been heartily agreed to,

Mr. Walmisley, in the course of a brief reply, owing to the lateness of the hour, said his object had not been to advocate corrugated iron roofs above other classes of construction, but to show from an engineer's experience how a corrugated iron roof might be put up. He certainly did not stand before them to say that corrugated iron was the best form of covering. As to Mr. Dudley Clarke's remarks he (the speaker) acknowledged that his paper was not exhaustive; it merely touched on some points of construction. There were a good many arguments in favour of timber, as against iron, but in all cases the local circumstances had to be considered, *i.e.*, how the material could be obtained as well as the labour for putting up the buildings. As to corrugated iron 22 B.W.G. could be fixed for an ordinary straightforward roof. As to creosoted timber buildings, creosote was an excellent preservative in certain circumstances, but how far did the preservation go when one bored a hole for a bolt? That hole was not creosoted and there was at once an element of weakness.

The meeting then terminated.

The next meeting will be held on the 10th inst., when a paper will be read by Mr. R. E. Middleton, entitled, "The Future of the London Water Supply."

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—An ordinary meeting of the Institution of Civil Engineers was held on the 4th inst. at Great George-street, Westminster, Mr. James Mansergh, President, in the chair. It was reported that eighty-five candidates had been admitted as students. The monthly ballot resulted in the election of ten members, eighty associate members, and one associate.

SOCIETY OF ENGINEERS.—At a meeting at the Royal United Service Institution, Whitehall, on the 3rd inst., Mr. Henry O'Connor, President, in the chair, a paper was read entitled "Recent Practice in Sewage Disposal," by Mr. Henry C. H. Shenton. The author first referred to the older methods of sewage disposal, pointing out that, until recently, failures of sewage works, constructed under all the older systems, had been notorious. As an example, he quoted the failure of the combined chemical treatment, filtration and land irrigation system at Sutton in 1895, two years after the works were constructed. Passing on to the modern system of bacterial purification he stated that it consisted of the resolution of impurities into inoffensive materials by the agency of micro-organisms. He pointed out that changes, formerly considered chemical, were really due to the action of bacteria, and that the bacteria necessary for the purification of sewage already existed in it. Turning to practical work, the author pointed out that for the bacterial treatment of sewage there were two methods—(1) that in which sewage passed through a tank where anaërobic organisms produced liquefaction of solids, and putrefaction as a step towards purification, the effluent being then purified on bacteria beds; and (2) the system in which no tank was used, the crude sewage being purified on bacteria beds only. In describing the practical construction and working of the bacteria bed, the author said it consisted of a water-tight tank, containing furnace clinker or other durable material likely to form a home for bacteria into which sewage could be run, and in which it could be held to bring it into contact with bacteria. The effluent from this bed, after it had stood a short time, would be greatly purified, and could be again treated on second or third contact beds. In describing the septic tank, the author said it was of practical use in getting rid of sludge, but he pointed out that the storage of putrid sewage in bulk was not an ideal arrangement. The septic tank was an air-tight chamber with trapped inlet and outlet, from which liquid only should be discharged, owing to the fact that solids must either float or sink. While pointing out the many admirable results obtained at works constructed by the Septic Tank Syndicate, the author drew attention to the failure of a septic tank constructed by the Leicester Corporation. He then showed that a septic tank need not necessarily be air-tight, as open and closed tanks had produced identical results. He also stated that gas generated in the Exeter septic tank was used for lighting purposes and for generating steam by which an 8 h.p. engine was driven. He pointed out the folly of allowing road grit to go on to bacteria beds, and said that first-contact beds were generally much over-worked. He suggested a possible improvement to obviate this, which consisted of an alteration in the construction of the first bed. He also said that automatic working was essential for success, and, in conclusion, he pointed out that the new system was equally applicable for the largest city or the smallest cottage. The paper was illustrated by diagrams and lime-light views of works.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE third general meeting (business) of this Institute for session 1900-1901 was held on Monday at No. 9, Conduit-street, Regent-street, W., Mr. E. A. Gruning, Vice-President, in the chair.

The decease was announced of Mr. Henry Currey and Mr. Francis Chambers, and a vote of sympathy and condolence with relatives of the deceased was passed.

Mr. Frank W. Wills, of the Bristol Society of Architects, having been admitted a Fellow, the following gentlemen were then elected. As *Fellows*:—Messrs. Louis Ambler, London; T. Phillips Figgis, London; H. G. Ibberson, London; E. J. Jackson, Sydney, N.S.W.; C. E. Mallows, Bedford; J. W. Simpson, London. As *Associates*:—Messrs. S. Chesney, Stourbridge; G. E. Clay, Gravesend; C. H. Fitzwilliam Comyn, London; H. Cooper, Feniscowles Old Hall, near Blackburn; C. A. Daubney, London; W. E. Emerson, London; J. E. Franck, London; A. R. Groome, Manchester; H. Haines, New Brompton; E. V. Harris, London; J. S. Heath, Blackheath; W. Bonner Hopkins, London; P. Erskine Nobbs, M.A. Edin., Edinburgh; S. V. North, London; C. Wontner Smith, London; W. H. Swann, London; Alexander Symon, London; A. M. Torrance, jun., London; R. P. S. Twizell, Newcastle-on-Tyne; C. E. Varndell, London; C. F. Young, London. As *Hon. Associate*:—Mr. E. W. Smith, Member of the Royal Asiatic Society, Archæological Surveyor to the Government of India, N.W. Provinces and Oudh Circle, and Curator of the Lucknow (Government) Museum, Oudh; of the Museum, Lucknow, India; and Cheena Lodge, Naini Tal, N.W.P., India. As *Hon. Corresponding Members*:—MM. Joseph Antoine Bouvard (Director of the Architectural Works of the Paris Exhibition, 1900), of Paris; and L. C. Pedro D'Avila (Hon. Architect to the King of Portugal, Architect to the Government, Member of the Royal Academy of Fine Arts, Lisbon), of Lisbon.

The results were then announced of the November examinations.

The Preliminary examinations, qualifying for registration as *Probationer R.I.B.A.*, were held simultaneously in London, Birmingham, Bristol, Manchester, and York on the 6th and 7th ult. The examinations in the provinces were conducted by the Allied Societies of the respective centres. Of the 172 candidates admitted, claims for exemption from sitting were allowed to the number of thirty-two. The remaining 140 were examined, with the following results:—

	Examined.	Passed.	Relegated.
London	78	58	20
Birmingham ...	9	9	0
Bristol	11	7	4
Manchester	25	22	3
York	17	13	4
	140	109	31

The successful candidates, together with those exempted, making a total of 141 newly-registered Probationers, are as follows:—

A. W. Anderson, Horsham; A. Ashton, Rugby; G. T. Austin, Edgbaston, Birmingham; W. T. McN. Barrett, Stoke-on-Trent; J. C. Beare, Stanmore, Newton Abbot; Baron W. R. Beaumont, Exeter; F. Bell, Manchester; H. Black, Hampstead; C. L. Blethyn, Cardiff; Annie W. Bradshaw, Bolton; J. E. Braithwaite, Leeds; C. H. Brightiff, Southampton; F. G. Brooker, Peckham Rye; C. F. H. Brookes, Eye, Peterborough; R. J. Buck, Horsham; H. W. Burchett, Brixton; C. L. Burns, Forest-row, Sussex; H. W. Cathie, East Sheen; E. Chaplin, Hove; A. W. Clapham, Beckenham; P. M. B. Collcutt, London; J. O. Cook, Plumstead; L. J. Coussmaker, Walthamstow; P. G. Crawley, Peterborough; T. E. Crompton, Petersfield, Hampshire; J. J. Crowe, Brentwood; L. Crowley, Portsmouth; J. Day, Wakefield; W. H. Evans, Southampton; H. J. Fairburn, London; G. A. Farrar, Huddersfield; C. Forsyth, Glasgow; R. C. Foster, Loughton; W. J. Freeman, Halifax; E. L. Frost, Anerley; N. H. T. Fuller, Taunton; A. H. Gadsdon, Chichester; R. M. Geater, Holloway; W. H. George, Cheltenham; W. H. Godfrey, Catford; G. H. Goldsmith, Cheshire; A. C. Goulder, Leytonstone; A. G. Greenwood, South Kensington; C. Groves, Chester-le-Street; A. W. Hall, Ealing; L. H. Harrington, Bromley; W. Harvey, London; D. P. Hayworth, London; C. J. Hazard, Boscombe; A. J. Healey, London; H. Healey, Didsbury, near Manchester; W. B. Hellard, Teddington; J. L. Henderson, Edinburgh; F. Higginbottom, Withington, Manchester; E. F. Hill, Winchester; R. M. Hilton, Wimbledon; C. V. Hodges, Leicester; S. R. Hollingdale, Bayswater; J. B. Holt, Levenshulme; P. B. M. Hope, Perth; C. E. Howitt, Nottingham; H. Hunnisett, Rye, Sussex; D. B. Hutton, Glasgow; W. H. Hyde, Nailsworth, near Stroud; A. L. Iredale, Stroud; J. P. Irvine, Lincoln; J. W. Jarvis, Moseley; H. F. Keighley, Moss Side, Manchester; A. H. Laister, Wakefield; W. B. Lates, Birmingham; W. Leahy, Yeovil; G. Leresche, Kersal, Manchester; T. C. Little, Longtown, Cumberland; R. A. Loveitt, Coventry; A. S. W. Mackay, West Walls, Carlisle; W. K. McDermott, Boro' Green, Kent; R. B. Medcalf, Aughton, near Ormskirk; R. Mercer, Great Harwood, near Blackburn; S. Moss, Eccles; G. E. Moxon, Barnsley; S. H. J. Murch, Loughton; A. F. Murray, London; J. R. Musto, Hornsey Rise; G. V. Myer, Maida Vale; F. G. Newton, London; F. Nicholls, Whipps Cross, Leyton; F. A. C. Old, Highgate; G. M. Owen, Birkenhead; B. C. Page, Tonbridge; J. Page, South Lowestoft; H. J. Parr, Brixton; W. E. Paterson, Cheltenham; A. E. S. Payne, New Cross; J. H. Pearson, Balham; W. A. S. Pettit, Balham; W. H. Pickard, Whitchurch, Shropshire; J. Plottel, Middlesbrough; H. A. Porter, Gravesend; C. H. Potter, Matlock Bridge; G. A. Potts, Manchester; A. F. Potts, Leytonstone; W. Pyper, Cults-by-Aberdeen; L. G. Rayner, Gravesend; C. A. Reed, Clapham; T. H. Rhodes, Leeds; A. S. Robertson, Perth; D. G. Round, Sutton; J. A. Ryan, London; H. Savage, St. Albans; D. G. J. Saw, Green-lanes; H. S. Sawyer, Winchester; J. H. Sayner, Harrogate; H. S. Scott, Handsworth, Birmingham; H. E. Seccombe, Clapham Common; W. C. B. Sinclair, Bexley; B. C. Smith, Caversham; H. S. Smith, Manchester; H. Solomon, Haulgh, Bolton; P. H. Solon; Stoke-on-Trent; S. M. Spoor, East Putney; W. Stockdale, North Shields; E. A. Sudbury, Nottingham; F. Sykes, Kendal; R. J. Tall, Gravesend; T. T. Tallon, Bolton; H. F. Tasker, Hampstead; B. W. Thomas, Southampton; T. Thorne, Brockley; J. E. Tindall, Lavender Hill; W. Turpin, Roker, Sunderland; H. Unwin, Bolton; F. Wade, Frizinghall, Bradford; F. A. Walker, Hampstead; P. Weston, Sheffield; N. C. Wetherilt, South Hampstead; O. White, Barton-under-Needwood, near Burton-on-Trent; E. C. M. Willmott, Roath, Cardiff; A. W. Wilson, Peterborough; R. Wilson, Sheffield; J. L. Worssell, Regent's Park; R. Wylie, Gateshead-on-Tyne.

The Intermediate examination, qualifying for registration as *Student R.I.B.A.*, was held in London and the various provincial centres indicated below on November 6, 7, and 8. The examinations in the provinces were conducted by the Allied Societies of the respective districts. Fifty-nine candidates were examined, the results being as follows:—

	Total Examined.	Passed.	Relegated.
London	45	29	16
Bristol	6	2	4
Manchester	8	4	4
	59	35	24

The successful candidates, whose names have

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been entered on the Register of *Students R.I.B.A.*, are as follows, the names being given in order of merit :—

A. J. Hope, Atherton, Manchester ; E. L. Gaunt, Ilkley ; W. E. Dobson, West Hampstead ; D. L. Allan, Dundee ; H. A. Hall, Hastings ; H. J. B. Hoskins, Birmingham ; A. J. Taylor, Bath ; F. Haswell, North Shields ; T. W. Whipp, Scarborough ; H. Prince, Bayswater ; S. C. Stephens, Hockley, Birmingham ; O. P. Milne, Bedford ; W. R. Davidge, Teddington Park-road, S.W. ; N. C. Smith, London ; E. J. Dixon, Stratford ; A. R. Gradwell, Blackburn ; V. Hooper, Redhill ; J. G. Wilson, Maida Hill ; J. H. de C. Ballardie, London ; G. B. H Hoole, Highgate ; G. H. Lovegrove, Herne Hill ; M. N. Castello, London ; J. J. S. Naylor, Bayswater ; R. Bennett, Buxton ; C. E. L. Parkinson, Kennington ; B. C. Chilwell, Wednesbury ; A. C. Notley, London ; H. F. Clarke, Pendleton, near Manchester ; L. Leeper, Great Yarmouth ; F. A. Ling, Mitcham, A. A. Midwinter, London ; W. B. Rees, Cardiff ; C. E. B. Sutton, Warrington ; C. R. Thickpenny, Bournemouth ; F. E. Tomson, King's Norton.

The Final and Special Examinations, qualifying for candidature as *Associate R.I.B.A.*, were held in London from November 16 to 23. Of the fifty-one candidates examined, twenty-six passed, and the remaining twenty-five were relegated to their studies. The successful candidates are as follows :—

T. B. Ball, Weston-super-Mare ; E. W. Banfield, Camberwell ; G. Brumell, jun., Morpeth ; H. M. Cautley, Westminster ; *W. G. Cogswell, Wallasey, Chester ; *W. E. F Crook, London ; H. A. Douglass, Brighton ; T. W. Gordon, Nottingham ; A. H. Goslett, Great Stanmore ; S. Harrison, Leicester ; *C. E. Hutchinson, London ; A. L. MacGibbon, Edinburgh ; R. H. J. Mayhew, Anerley ; W. V. Morgan, Carmarthen ; R. W. Owen, Waterloo, Liverpool ; A. W. Papworth, Maida Hill ; J. Quail, Leamington Spa ; F. J. O. Smith, Westminster ; E. J. Tench, Cambridge ; C. B. Thomas, London ; N. Thorp, Clapham ; *H. A. Tinker, Kensington ; P. J. Turner, Stowmarket ; W. J. Walford, Anerley ; R. D. Wells, London ; E. P. Wheeler, Chelsea.

[* Candidates marked thus * were admitted to the Special Examination, under the following regulation :—"Architects in practice not less than twenty-five years of age, and chief assistants over thirty years of age, who desire to be admitted as Associates, can be exempted from passing the Preliminary and Intermediate Examinations and in sending in Testimonies of Study. They can be admitted, by resolution of the Council from each case, to a Qualifying Examination (namely, the Final of the three examinations), which is conducted with especial regard to the requirements of such architects, their professional works and position being duly taken into account by the Board of Examiners."]

The following table shows the number of failures in each subject of the Final and Special Examinations :—

I. Design	24
II. Mouldings and Ornament	10
III. Building Materials	5
IV. Principles of Hygiene	1
V. Specifications	4
VI. Construction : Foundations, &c.	3
VII. Construction : Iron and Steel, &c.	3

Amendments to the Form of Building Contract.

The meeting then considered amendments to the "Form of Agreement and Schedule of Conditions for Building Contracts" as agreed upon between the Council of the Institute and the Council of the Institute of Builders. The clauses as they stand in the existing Form of Contract, and the same clauses as amended, are here set out in opposite columns.

The Chairman announced that in consequence of representations made to the Council they had decided to postpone consideration of Clause 32 in order to consider it further, and to bring it forward at a future business meeting.

After some discussion of Clauses 1 and 32, it was agreed to postpone further consideration of the amended clauses until the Council had had an opportunity of reconsidering Clause 32, and of bringing it before members in the shape the Council should then consider it advisable to recommend.

The meeting then terminated.

The Original Clauses.	*The Clauses as Amended and Now Proposed for Adoption.*
1. The works shall be carried out in accordance with the directions and to the reasonable satisfaction of the architect in accordance with the said drawings and specification, and in accordance with such further drawings, details, and instructions in explanation of the same as may from time to time be given by the architect. The contract drawings and specification shall remain in the custody of the architect, and shall be produced by him at his office as and when required by the employer or by the contractor.	1. The works shall be carried out in accordance with the directions, and to the reasonable satisfaction of the architect, in accordance with the said drawings and specification, and in accordance with such further drawings, details, and instructions in explanation of the same as may from time to time be given by the architect. If the work shown on any such further drawings or details, or necessary to comply with any such instructions, directions, or explanations, be, in the opinion of the contractor, in excess of that comprised in the contract, he shall, before proceeding with such work, give notice in writing to this effect to the architect. In the event of the architect and contractor failing to agree as to whether or not there is any excess, and of the architect deciding that the contractor is to carry out the said work, the contractor shall accordingly do so, and the question whether or not there is any excess, and if so the amount thereof, shall, failing agreement, be settled by the arbitrator as provided in Clause 32, and the contractor shall be paid accordingly. The contract drawings and specification shall remain in the custody of the architect, and shall be produced by him at his office as and when required by the employer or by the contractor.
12. The contractor shall not vary from the drawings or specifications except as provided by Clause 5, or by the authority of the architect, which is to be sufficiently proved by any writing or drawing given by him or by any subsequent written approval by him. If the work shown on any of the details or the further drawings or details referred to in Clause 1, or necessary to comply with any instructions, directions, or explanations which may be given from time to time by the architect be, in the opinion of the contractor, in excess of that comprised in the contract, he shall, before proceeding with such work, give notice in writing to this effect to the architect. In the event of the architect and contractor failing to agree as to whether or not there is any excess, and of the architect's deciding that the contractor is to carry out the said work, the contractor shall accordingly do so, and the question whether or not there is any excess, and if so the amount thereof, shall, failing agreement, be settled by the arbitrator as provided in Clause 32, and the contractor shall be paid accordingly. No claim for an extra shall be allowed unless it shall have been executed under the provisions of Clause 5, or by the authority of the architect as herein mentioned. Any such extra is hereinafter referred to as an authorised extra.	12. The contractor shall, when authorised by the architect, or as provided by Clause 5, vary by way of extra or omission from the drawings or specification ; such authorisation is to be sufficiently proved by any writing or drawing given by the architect, or by any subsequent written approval by him. No claim for an extra shall be allowed unless it shall have been executed under the provisions of Clause 5, or by the authority of the architect as herein mentioned. Any such extra is hereinafter referred to as an authorised extra.
17. Any defects, shrinkage, or other faults which may appear within months from the completion of the works, arising in the opinion of the architect from materials or workmanship not in accordance with the drawings and specification or the instructions of the architect, or any damage to pointing by frost appearing within the like period, shall upon the directions in writing of the architect, and within such reasonable time as shall be specified therein, be amended and made good by the contractor at his own cost, unless the architect shall decide that he ought to be paid for the same ; and in case of default the employer may employ and pay other persons to amend and make good such defects, shrinkage, or other faults or damage, and all expenses consequent thereon or incidental thereto shall be borne by the contractor, and shall be recoverable from him by the employer, or may be deducted by him from any moneys due or that may become due to the contractor. Should any defective work have been done or material supplied by any sub-contractor or other person* employed on the works who has been nominated or approved by the architect, the contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the contractor, and been subject to the provisions of this and the preceding clause.	17. Any defects, shrinkage, or other faults which may appear within months from the completion of the works, arising in the opinion of the architect from materials or workmanship not in accordance with the drawings and specification or the instructions of the architect, or any damage to pointing by frost appearing within the like period shall upon the directions in writing of the architect, and within such reasonable time as shall be specified therein, be amendsd and made good by the contractor at his own cost, unless the architect shall decide that he ought to be paid for the same ; and in case of default the employer may employ and pay other persons to amend and make good such defects, shrinkage, or other faults or damage, and all expenses consequent thereon or incidental thereto shall be borne by the contractor and shall be recoverable from him by the employer, or may be deducted by him from any moneys due or that may become due to the contractor. Should any defective work have been done or material supplied by any sub-contractor employed on the works who has been nominated or approved by the architect, the contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the contractor, and been subject to the provisions of this and the preceding clause.
* The omission of these words "or other person" is the sole difference between the original and the revised Clause 17.	
20. No sub-contractor or other person nominated by the architect shall be employed upon the works against whom the contractor shall make what the architect considers reasonable objection, or who will not enter into a contract with the contractor guaranteeing the due performance of his work, and indemnifying the contractor against any claims arising out of misuse by the sub-contractor or his workmen of any scaffold erected or plant employed by the contractor, or that may be made against the contractor in consequence of any act, omission, or default of the sub-contractor, his servants, or agents.	20. All specialists, merchants, tradesmen, or others executing any work, or supplying any goods for which prime-cost prices or provisional sums are included in the specification, who may at any time be nominated, selected, or approved by the architect, are hereby declared to be sub-contractors employed by the contractor ; but no such sub-contractor shall be employed upon the works against whom the contractor shall make what the architect considers reasonable objection, or who will not enter into a contract with the contractor upon terms and conditions consistent with those in this contract, and securing the due performance and maintenance of the work supplied or executed by such sub-contractor, and indemnifying the contractor against any claims arising out of the misuse, by the sub-contractor or his workmen, of any scaffold erected or plant employed by the contractor, or that may be made against the contractor in consequence of any act, omission, or default of the sub-contractor, his servants or agents, and against any liability under the Workmen's Compensation Act, 1897, or any amendment thereof.

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21. The contractor shall be responsible for all structural and decorative damage to property, and for injury caused by the works or workmen to persons, animals, or things, and shall hold the employer harmless in respect thereof. He shall also be responsible for all injuries caused to the buildings, the subject of this contract, by frost, or other inclemency of weather, and shall reinstate all damage caused by the same, and thoroughly complete the whole of the works.

28. The provisional sums mentioned in the specification for materials to be supplied or for work to be performed by special artists or tradesmen, or for other works or fittings to the building, shall be paid and expended at such times and in such amounts and to and in favour of such persons as the architect shall direct, and sums so expended shall be payable by the contractor without discount or deduction, or (without prejudice to any rights of the contractor existing under the contract referred to in Clause No. 20) by the employer to the said artists or tradesmen. The value of works which are executed by the contractor in respect of provisional sums, or in additional works, shall be ascertained as provided by Clause 13. At the settlement of the accounts the amount paid by the contractor to the said artists or tradesmen, and the said value of such works executed by the contractor, shall be set against all such provisional sums or any sum provided for additional works, and the balance shall be added to or deducted from the contract sum.

29. The contractor shall, unless otherwise stated in the specification, provide and erect all necessary scaffolding and plant for the due execution by the artists and tradesmen referred to in the preceding Clause of the work entrusted to them. He shall also permit of the execution of work by any other artists or tradesmen who may be engaged by the employer.

32. Provided always that in case any dispute or difference shall arise between the employer or the architect on his behalf and the contractor, either during the progress of the works or after the determination, abandonment, or breach of the contract, as to the construction of the contract or as to any matter or thing arising thereunder (except as to the matters left to the sole discretion of the architect under Clauses 4, 9, and 19, and the exercise by him under Clause 18 of the right to have any work opened up), or as to the withholding by the architect of any certificate to which the contractors may claim to be entitled, then either party shall forthwith give to the other notice of such dispute or difference, and such dispute or difference shall be and is hereby referred to the arbitration and final decision of or, in the event of his death or unwillingness or inability to act, of or, in the event of his death or unwillingness of inability to act, of a person to be appointed on the request of either party by the President for the time being of the Royal Institute of British Architects, and the award of such arbitrator shall be final and binding on the parties. Such reference, except on the question of certificate, shall not be opened until after the completion or alleged completion of the works, unless with the written consent of the employer or architect and the contractor. The arbitrator shall have power to open up, review, and revise any certificate, opinion, decision, requisition, or notice, save in regard to the said matters expressly excepted above, and to determine all matters in dispute which shall be submitted to him, and of which notice shall have been given as aforesaid, in the same manner as if no such certificate, opinion, decision, requisition, or notice had been given. Upon every or any such reference the costs of and incidental to the reference and award respectively shall be in the discretion of the arbitrator, who may determine the amount thereof, or direct the same to be taxed as between solicitor and client or as between party and party, and shall direct by whom and to whom and in what manner the same shall be borne and paid. This submission shall be deemed to be a submission to arbitration within the meaning of the Arbitration Act, 1889.

21. The contractor shall be responsible for all structural and decorative damage to property, and for injury caused by the works or workmen to persons, animals, or things, and shall hold the employer harmless in respect thereof, and also in respect of any claim made under the Workmen's Compensation Act, 1897, or any amendment thereof, by any person in the employ of the contractor. He shall also be responsible for all injuries caused to the buildings, the subject of this contract, by frost or other inclemency of weather, and shall reinstate all damage caused by the same, and thoroughly complete the whole of the works.

28. The provisional sums mentioned in the specification for materials to be supplied or for work to be performed by special artists or tradesmen, or for other works or fittings to the building, shall be paid and expended at such times and in such amounts and to and in favour of such persons as the architect shall direct, and sums so expended shall be payable by the contractor without discount or deduction, or (without prejudice to any rights of the contractor existing under the contract referred to in Clause No. 20) by the employer to the said artists or tradesmen. The value of works which are executed by the contractor in respect of provisional sums, or in additional works, shall be ascertained as provided by Clause 13. At the settlement of the accounts the amount paid by the contractor to the said artists or tradesmen, and the said value of such works executed by the contractor shall be set against all such provisional sums or any sum provided for additional works, and the balance, after allowing *pro rata* for the contractor's profits at the rates contained in the contractor's original estimate, shall be added to or deducted from the contract sum, provided that in estimating the amounts paid as last herein provided no deductions shall be made by or on behalf of the employer in respect of any damages paid by the sub-contractor to the contractor, the intention being that the contractor and not the employer shall have the benefit of any such damages.

29. The contractor shall permit the execution of work by any other artists or tradesmen who may be engaged by the employer.

32. Provided always that in case any dispute or difference shall arise between the employer or the architect on his behalf and the contractor, either during the progress of the works or after the determination, abandonment, or breach of the contract, as to the construction of the contract, or as to any matter or thing arising thereunder (except as to the matters left to the sole discretion of the architect under Clauses 4, 9, and 19, and the exercise by him under Clause 18 of the right to have any work opened up), or as to any objection by the contractor to any certificate, finding, decision, requisition, or opinion of the architect, or to the withholding or failure by the architect to give the same, then either party shall forthwith give to the other notice of such dispute or difference, and such dispute or difference shall be and is hereby referred to the arbitration and final decision of or, in the event of his death or unwillingness or inability to act, of or, in the event of his death or unwillingness or inability to act, of a person to be appointed on the request of either party by the President for the time being of the Royal Institute of British Architects, and the award of such arbitrator shall be final and binding on the parties. The arbitrator shall have power to determine all such matters in dispute except as aforesaid which shall be submitted to him, and of which notice shall have been given as aforesaid. The works shall not be stopped pending such reference excepting by the direction in writing or award of the arbitrator. If either party desires to have such dispute or difference determined forthwith, he shall give written notice to that effect to the other party, and the arbitrator shall, with the assent in writing of the other party, proceed with the arbitration. In the event of the other party failing within days of such notice to give to the other his assent in writing to the immediate determination of such dispute or difference, the arbitrator shall, after written notice to the non-assenting party of a time and place of hearing, decide whether such dispute or difference shall be immediately determined or whether such determination shall await the completion or alleged completion of the works, and the same shall be determined at such time or times as the arbitrator shall decide. If in any such reference the arbitrator shall be of opinion that either party has been unreasonable or vexatious or dilatory either in invoking or insisting upon reference or in the mode of its conduct, or that injury from delay or otherwise has been occasioned thereby to the other, he may by his award indemnify the latter in respect of such injury. Upon every or any such reference the costs of and incidental to the reference and award respectively shall be in the discretion of the arbitrator, who may determine the amount thereof, or direct the same to be taxed as between solicitor and client, or as between party and party, and shall direct by whom and to whom and in what manner the same shall be borne and paid. This submission shall be deemed to be a submission to arbitration within the meaning of the Arbitration Act, 1889.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The inaugural meeting for this session of the Edinburgh Architectural Association was held on the 28th ult. in the Royal Institution. The President, Mr. Henry F. Kerr, A.R.I.B.A., delivered an opening address, which took the form of a paper describing "A Visit to Melrose Abbey." The subject was copiously illustrated by limelight views. Mr. Kerr sketched in outline the history of the Abbey, from its foundation by David I, in 1136, when a colony of Cistercian monks (only lately settled in England) were established on the silver banks of the Tweed from Rievaulx, in Yorkshire. Like all the border abbeys and churches, its buildings suffered many devastations, most notably by Edward I., Edward II., Richard II., and the Earl of Hertford. But, though damaged and pillaged by the Kings of England, it was honoured and fostered by the Kings of Scotland. Founded by David I., gifted with fines and forfeited lands by Robert the Bruce, and further enriched by Alexander II., it reached the zenith of its fame in the thirteenth century. Mr. Kerr then described in detail the existing remains. He indicated the probable extent of the church and the cloisters, and observed that the importance of the Abbey was apparent from the great size of the latter. At Melrose the cloister was evidently 150 ft. square, only that of St. Andrews being greater in Scotland, and those of Salisbury and Norwich alone being greater in England. The very excellent carving which is noticeable in the earliest work in the cloister is also to be seen throughout all the remains. Examples of these carvings were shown in detail on the screen. The ritual choir, with rood screen and great arch over it, and the examples of flying buttresses, were fully explained. The north transept with its early and late work, its Crown of Thorns window, and late clearstory, were all in turn commented on. The south transept, with its south gable with doorway and great window, its adornment with niches and buttresses, and the grouping of all the parts next claimed attention. Mr. Kerr explained the difficulties in the way of dogmatising about the dates of later work in Scotland, and mentioned the various opinions that are held on this subject. The unusual features in the plan claimed some attention. For example, the cloisters being on the north side of the nave rather than as usual on the south side; the range of chapels opening off the south side of the nave; and the shortness of the choir, or eastern arm of the church, necessitating the ritual choir encroaching to the length of three bays into the nave. The last King whose name is associated with this abbey was James IV., who married Margaret Tudor. The royal arms, with the date 1505, are borne by one of the chapel buttresses, and it is said that one of the bosses in the vault of the sanctuary, or extreme eastern portion of the choir, is sculptured with the arms of his queen. The beautifully-ribbed vault of this portion of the building, the skill and originality of the tracery of its windows, culminating in the glorious eastern window of world-wide renown, were treated of in detail. In summary, Mr. Kerr expressed the opinion that visits to such a building were of great moment, both to lay and professional students of architecture. The old-world associations, the wondrous rise to prosperity and worldly greatness, the terrible retribution of ruin for laxity and evil—all tell their own tale. Above all, to the truly architectural student there was the thoughtful plan, the careful adjustment of parts, the bold yet skilful detail, the grasp of the capabilities of almost every phase of Gothic style, rare and unstrained originality—especially in tracery—and the whole conception adorned with carvings of remarkable grace and spirit—to educate and delight.

GLASGOW INSTITUTE OF ARCHITECTS.—A general meeting of this Institute was held on the 29th ult. in the rooms, Pitt-street, Mr. John James Burnet, A.R.S.A., F.R.I.B.A., President, in the chair. Mr. C. J. MacLean, writer, secretary, reported the action taken by the Council regarding the Woodside District Halls Competition. They had informed the Corporation that considerable hardship would be inflicted on the competitors if the scheme, on which they had spent their labour on the understanding that the building was to be erected in accordance with the published conditions, should now be altogether set aside, and

(*Continued on page 518.*)

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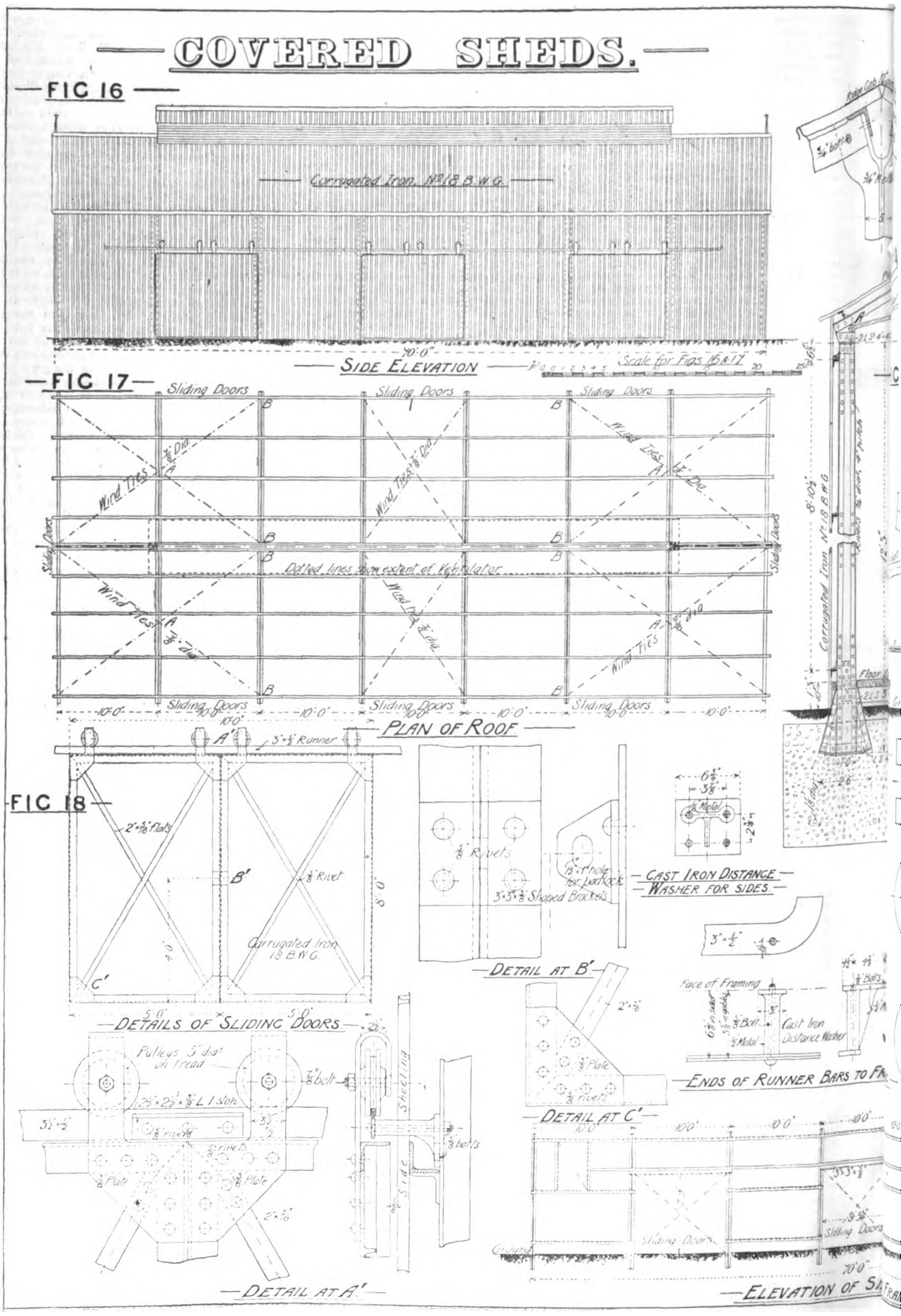

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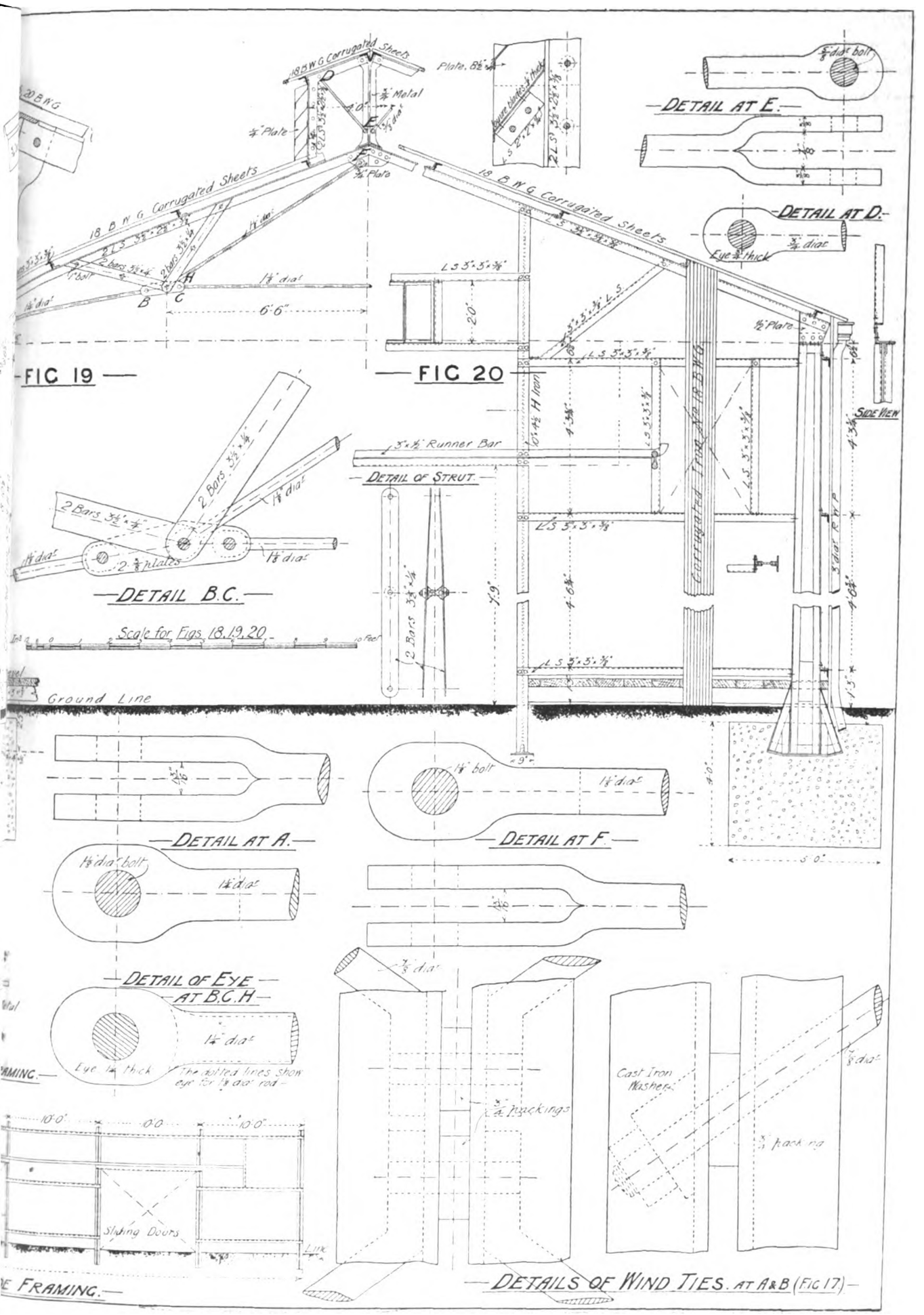

Buildings.—Sheet 11.

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also that in their opinion the competitor whose design in the first competition had been recommended for adoption by the assessors should be employed to design the combined public hall and library.—The President thanked the Institute for having elected him for a second term of office, and while regretting that they had not secured the services of an older member, and one who was better known to their brethren of the Royal Institute, he assured them that with their indulgence he would do his best to fulfil the duties of the office, however arduous they may be, during the coming Exhibition year.

ARCHITECTURAL ASSOCIATION OF IRELAND.—The second technical demonstration of this Society was held on Friday, November 30, at the works of Mr. Edmund Sharp, Great Brunswick-street. Nearly fifty members were present, and followed with the closest attention the remarks of the lecturer. The operation of laying mosaic was performed in their presence from the cutting of the material as received from abroad, and its arrangement of patterns on tracing paper, to its final setting in cement. Several fine specimens of Irish and foreign marbles and other decorative stones having been shown, the party adjourned to the extensive workshops at the rear, where they saw the machinery in action for stone-cutting, punching, turning, steel polishing, and sand polishing. Panels in various stages, from the clay model to completion, were exhibited, the first rough-dressing and much of the initial work being performed by drills and chisels driven by compressed air. At the conclusion of the meeting, which lasted an hour and a half, a hearty vote of thanks was passed to Mr. Sharp for the trouble he had taken in arranging the demonstration.

Illustrations.

DESIGN FOR A WROUGHT-IRON SCREEN.

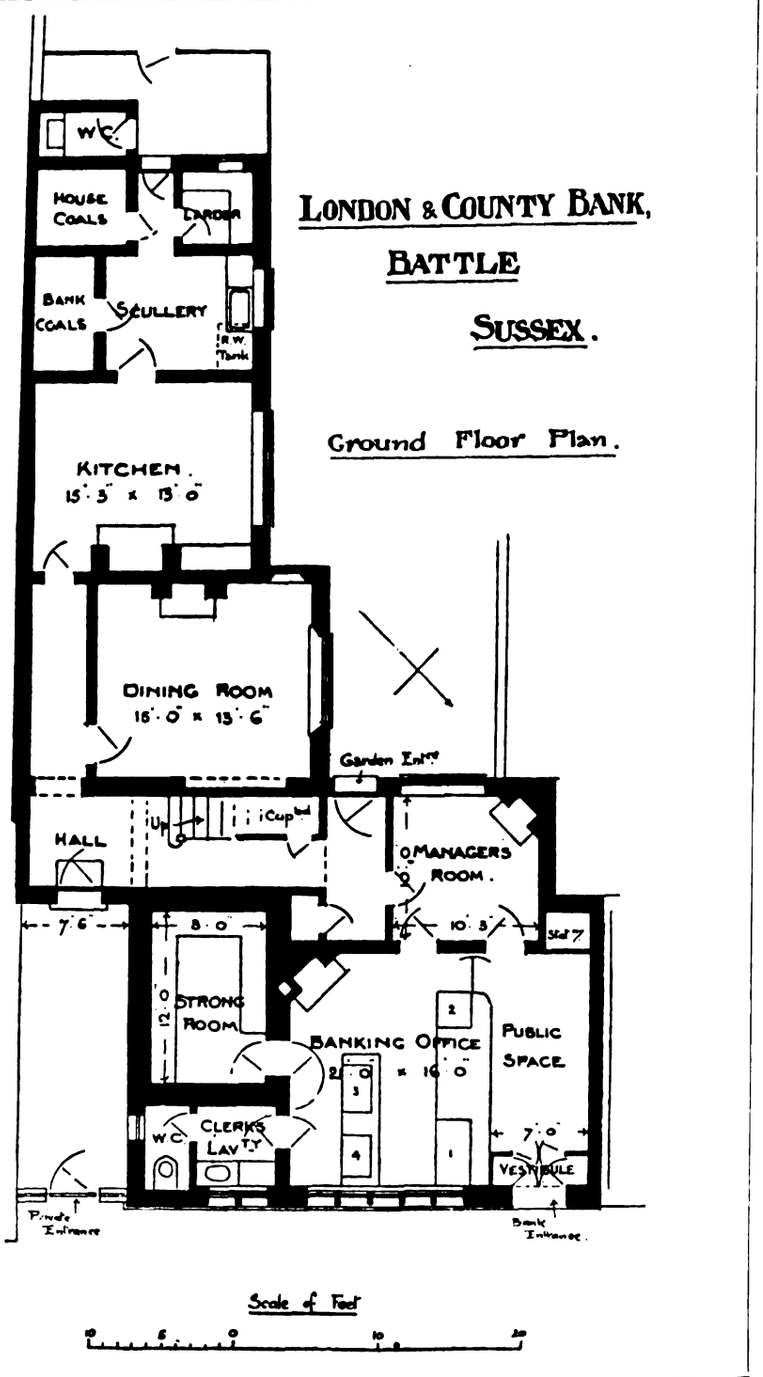
THIS design, by Mr. John J. Shaw (the author of other designs of the same class which have been published in the *Builder*), was exhibited at the last Royal Academy exhibition.

It is a fine example of modern metal-work designed in the Renaissance spirit, and requires no explanation beyond what the drawing itself affords.

OFFICES FOR THE BOARD OF OVERSEERS, LEEDS.

THIS building, No. 5, South Parade, was originally erected about eighty years ago as a private house, but had long been absorbed in the business part of the town and occupied as offices. It was recently purchased by the Leeds Board of Overseers, and altered and adapted to their uses. The walls forming the four offices, vestibule, and staircase, which occupied the front portion of the block, have been swept away, and the whole of the ground floor of this portion is now the Poor Rate office. A new staircase, lavatories, and other offices have been formed at the back, and a board room and committee room on the first floor. A strong room and several large book stores have been built in the basement.

The new front to the ground-floor is built in Portland stone. Messrs. Chas. Myers & Sons, were the principal contractors. The carving was executed by Mr. G. W. Milburn, of York. Messrs. Bagshaw & Sons supplied the steel-work. The tileing to the walls of the rate office and staircase is by Messrs. C. W. Williams & Co., Manchester; mosaic flooring by Rust's Vitreous Mosaic Company; heating by Mr. J. Woffenden; ventilating by the Blackman Ventilating Company; wrought iron gates, railings, and door furniture, and electric light fittings, &c., by Messrs. Elgood Bros., Leicester; the electric lighting by Mr. E. C. Wallis, Leeds; leaded glazing by Mr. Wm. Pape. The counters, desks and other fittings have been made by Messrs. Horsman & Co.; Mr. F. W. Bedford and Mr. S. D. Kitson, of Leeds, were the architects, and Mr. F. L. Stell the clerk of works.



DESIGN FOR PROPOSED CHURCH AT BARNSLEY.

THIS church was designed so that 312 of the congregation should be seated in the nave. The total accommodation required was 400, exclusive of the choir. Two shallow and short aisles on the north and south, close to the chancel, provide room for the additional seating. One of these is arranged so as to be available as a side chapel. The pulpit is placed in that on the north. In this position it would be less difficult to speak than if the preacher were under the high roof of the nave, as the aisle is ceiled at a much lower level; and also the voice would carry further, having the walls of the shallow aisle, rather than the deep space of a chancel, behind it. The sanctuary is 25 ft. wide and 13 ft. deep. The space allotted to the choir is 32 ft. wide, the same as the nave. By this arrangement there is sufficient room for the communicants to approach the sanctuary by the centre and return by the sides. And, also, in keeping the space between the choir benches a full 11 ft. in width, the dignity of the altar and sanctuary are less impaired than would be the case if the furniture of the choir were allowed too much to intervene. The organ is on the south side of the choir, within the tower walls above the clergy vestry. It was proposed that the space at the west, between the porch on the south and the baptistry on the north, should be treated as a narthex, separated from the nave by a screen. On either side of the west porch are small recesses for the use of the vergers, where spare books, &c., might be stored, and notices posted.

The roof of the nave is of wood. Framed principals without tie-beams are carried over in the shape of a pointed arch. These carry the boarded ceiling and the purlins of the outer roof, which are used closely spaced instead of common rafters. Above each window of the clearstory a portion of the pointed barrel-roof is cut away so as to provide for the insertion of the windows under a kind of groined compartment. It was estimated that in brick, with stone dressings, the building would cost about 6,000*l*. H. C. CORLETTE.

TWO COUNTRY BANKS.

LONDON AND COUNTY BANK, ALDERSHOT.

THIS building was erected to replace the old and smaller one which previously stood on this site. It is situated at an important corner in the town, at the junction of Victoria-road and Wellington-street.

The plinth is formed of roughly-hewn granite blocks, the upper part of the fronts being faced with Ancaster stone and Lawrence's red sand faced bricks. The roof is covered with similar red tiles. The window-frames, doors, bank fittings, &c., are all in unpolished teak. Over the bank is a manager's residence on two floors.

The contractors were Messrs. Martin Wells

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& Co., of Aldershot, and the cost was about 7,000*l.*

LONDON AND COUNTY BANK, BATTLE.

This branch bank is situated in the High-street, not far from the entrance gates of Battle Abbey. Ham Hill stone is used for the front, with red facings in the upper part. The woodwork and fittings are in unpolished oak. The roofs are covered with local tiles. There is a manager's residence over.

The contractors were Messrs. Eldridge & Cruttenden, of Hastings.

An attempt has been made in each case to design a building suitable for its purpose and, at the same time, in harmony with its surroundings.

The Aldershot bank is in a busy, modern, military town. The Battle one is in a village street, which street contains many relics of the past. W. CAMPBELL JONES.

ARCHÆOLOGICAL SOCIETIES.

LONDON AND MIDDLESEX ARCHÆOLOGICAL SOCIETY.—The first winter evening meeting of this society was held on Monday, the 26th ult., at the London Institution, Finsbury-circus. Mr. Deputy White presided, and introduced Mr. H. W. Fincham, who read an interesting paper entitled "An Antiquarian Ramble through Clerkenwell." This was done with the aid of lantern illustrations. Views of St. John's Gate and Church and the restored ancient crypt of the Hospital of the Knights of St. John of Jerusalem at the church were shown and described. Various other places of interest were also exhibited and explained by the lecturer, such as Hicks' Hall, the old Baptist's Head, St. Mary's Nunnery, St. James' Church, Red Bull Theatre, House of Detention, House of Correction, New River Head, Sadler's Wells, London Spa, and Bagnigge Wells. Portraits of old celebrities were also shown, such as Thomas Britton, known as "the musical small-coal man," who at his own expense maintained musical soirées at his house for forty years. Mr. George Potter, of Highgate, exhibited a number of relics of the small-coal man, including a sale catalogue of his library (1694 and 1716), a deed relating to some adjoining property (1687), and a book plate and sale catalogue (1714) of Dr. Gilbert Burnet, of St. John Square, Clerkenwell.

METROPOLITAN ASYLUMS BOARD.

THE fortnightly meeting of this Board was held at the Board's offices, Thames Embankment, on Saturday, Sir E. Galsworthy presiding.

The Works Committee, reporting with regard to Leavesden and Darenth Asylums, at which it was proposed to erect female attendants' homes, expressed the opinion that the work should be carried out by an outside firm of architects, and recommended that Messrs. Newman & Newman, of Tooley-street, be appointed in that capacity at a commission at the rate of 4 per cent. on the total cost of the works to be carried out under their supervision.—This was agreed to.

With regard to the Western Hospital, the Works Committee submitted a statement showing the estimated and the actual cost of three diphtheria blocks, six isolation blocks, two staff blocks, and the engineering works in connexion therewith at this hospital. The original estimate stood at 59,521*l.*, while the actual cost had been 56,964*l.* This report was adopted.

THE "FRIEZE OF THE ATTIC MONTHS."—By a printer's error in the description of Mr. Babb's design in our last issue, the name of the Greek Bacchus appeared as "Dionysius"; it should of course have been "Dionysus."

THE NATIONAL PHYSICAL LABORATORY.—At the anniversary meeting of the Royal Society on November 30 last it was announced that the executive committee of the general board of the National Physical Laboratory will shortly be placed in possession of Bushey House, at Kew, the Queen having signified her sanction to an assignment of the lease of that house with 30 acres of surrounding land for purposes of the laboratory work. The Government will increase the building grant by 2,000*l.*, and the adaptation of Bushey House, together with the new buildings, will be proceeded with forthwith. The committee reported that in their opinion two buildings should be erected, and at some distance from one another, to constitute separate physics and engineering laboratories. For particulars concerning the geological nature of the ground at disposal we may refer our readers to the "Note" in our issue of July 29, 1899.

THE SANITARY INSPECTORS' ASSOCIATION:

OVERCROWDING IN DOMESTIC DWELLINGS.

AN extraordinary general meeting of the Sanitary Inspectors' Association was held on Saturday evening at the Carpenters' Hall, London Wall, E.C., Mr. W. H. Grigg, Chairman, presiding.

Mr. F. W. Morley read a paper upon "Overcrowding in Domestic Dwellings." He said that of the many and varied duties of the public health officials the prevention of overcrowding was one of the most important, and such overcrowding was most difficult to detect, and when detected, was difficult satisfactorily and permanently to abate. From whatever point the investigations were commenced, and whatever course were taken in search of a remedy, the conclusion arrived at would be that the great obstacle in the way of an efficient and final remedy was the unsatisfactory state of the land laws; and however elaborate the legislation, and however efficient its application, it would simply be an attempt to achieve the impossible until means were adopted to spread the population over a larger area by rendering the land more cheaply and easily available for building purposes, and by affording cheap, ample, and comfortable means of transit. One outcome of the attempt at a solution was seen in the various blocks of model dwellings which had become a feature in the majority of our large cities. While these dwellings answered to a great extent the purpose for which they were erected, one could not but feel that there was something radically wrong with our social system which rendered it necessary to crowd such a large number of persons upon a given area, when within a comparatively short distance large tracts of land were to be found vacant and of very little use; and there were certain objectionable features in connexion with this method of piling humanity upon humanity's head which should, if possible, be avoided. Another suggestion, which had much to recommend it, was the removal of factories from towns into rural districts, but in order to carry out this with any prospect of success it was absolutely imperative that there should be proper provision for the prompt and economical transport of the raw material to the factories and the manufactured article into the market. The powers conferred upon sanitary authorities to deal with overcrowding would appear to be sufficient if they were fully utilised and vigorously enforced. Section 94 of the Public Health Act, 1891, required that every sanitary authority shall make and enforce such by-laws as were requisite for fixing the number of persons who might occupy a house which was let in lodgings or occupied by persons of more than one family. In view of the roving tendency of many of the working-class families, the efficient application of such by-laws would call for the utmost watchfulness on the part of the official entrusted with their administration, and to attain to anything like efficient supervision would tax to the utmost the energies of a very much larger number of officials than were at present employed; in addition to which the public, whatever their social position, were apt to resent any intrusion into their homes, and to uphold the sentiments expressed in the old adage, "An Englishman's home is his castle;" and therefore a considerable amount of tact and patience was often called for in order to obtain the required information. Again, where overcrowding did actually exist, all kinds of scheming was resorted to in order to evade the law. Another fact against them was that they were dealing with living, reasonable, beings, and therefore they could not move them here and there at their own will; and this demonstrated the great importance of the education of the people in at least the elementary principles of public health. Every one entered the world with an instinctive craving for a decent and healthy surrounding, but whether this was developed and fostered, or to a great extent nullified, depended very largely upon the conditions under which we lived during the earlier years of our lives. Under these circumstances the education of the people in what might be termed the theory of health was capable of giving very material assistance in the solution of the question. To begin with, too much importance cannot be attached to the teaching of hygiene in schools of all classes, and no child's education should be considered complete without the knowledge being instilled that overcrowding had a very detrimental effect upon the general health. To those whose school days had passed, every opportunity should be taken to advise and counsel, and there was no body of individuals who had better opportunities than the sanitary inspectors of imparting information where and when it was most needed. The special training and examination through which the majority of would-be sanitary inspectors had to pass combined to evolve officials whose discretion, tact, and ability might be relied upon, and who might safely be trusted with still larger powers to enable them to deal with many evils which were a menace to the health and well-being of the community. As a case in point, when plans of proposed dwelling-houses were submitted to the Authorities for approval, there should be included a definite statement as to the numbers the proposed buildings were intended to accommodate, and sanction should be given on the express condition that the number should be strictly adhered to; such particulars should be included in the lease, and also fixed in such a position on the premises as to be visible to the occupants, and any one causing such number to be exceeded should be summarily dealt with. The suggestion that directly a given area was declared insanitary, any fresh removals into the said area should be prohibited, was worthy of consideration. There were many other measures of reform which might be enumerated; among others, the extension of time for the repayment of capital borrowed under the Housing of the Working Classes Act to 80, 90, or 100 years, and in the case of compensation the amount should not exceed the actual value of the land, with a reduction in the shape of a penalty for neglecting to keep the property in question in a sanitary condition, thereby removing the inducement to owners to allow it to fall into a dilapidated and otherwise insanitary condition, in order to get the authorities to acquire it by compulsion, and paying heavy compensation for the acquisition. Briefly, in conclusion, the following were some of the methods which appeared to be capable of playing their part in the solution of the question:—The provision of ample means of transit; the removal of factories from town to country; the erection of ample and suitable dwellings; the full use of the powers conferred by the Public Health Act, the Housing of the Working Classes Act, &c.; the teaching of hygiene in public schools; and the taxation of the land in order to create a fund to be utilised in cheapening the cost of the provision of suitable dwellings.

Mr. Warwick moved a vote of thanks to Mr. Morley, and said that overcrowding could not possibly be prevented until every man was paid a fair wage. It was a distressing and disgusting thing that in London there were 1,400 single rooms occupied by families of from four to eleven persons.

Mr. Dee, who seconded the motion, mentioned that he did not know an instance of people who had been displaced from an insanitary area being rehoused upon the same place; they always went and overcrowded another district.

Mr. Baxter said that much of the present state of things was due entirely to public apathy. The small amount of interest which a large section took in matters of vital importance to them was really astonishing.

Mr. West observed that they were not likely to get rid of the overcrowding question until the millennium. The principal way, however, of remedying the present condition of affairs was to educate the people.

The motion was carried.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Alderman W. H. Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Kensington Borough Council 500*l.* for the Silver-street improvement; and Islington Guardians 10,000*l.* for erection of an infirmary at Highgate Hill.

Drainage of Coldharbour: Diversion of the Isle of Dogs Branch Sewer.—The Main Drainage Committee brought up a report containing the following recommendations, which were agreed to:—

"(*a*) That the estimate of 22,330*l.*, submitted by the Finance Committee, in respect of the drainage

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of Coldharbour be approved; and that a further expenditure of 6,045*l.* be sanctioned for the purpose of completing the diversion of the Isle of Dogs branch of the northern low-level sewer, in accordance with the Council's resolution on November 21, 1899.

(*b*) That the proposed new sewer and other incidental work for the drainage of Coldharbour, together with the work of diverting the Isle of Dogs branch sewer, between the junction of Manchester-road with East Ferry-road, Isle of Dogs, and Yabsley-street, with the exception of the portion underneath the southern entrance to the West India Docks and other adjoining dock property, be carried out without the intervention of a contractor, and that the drawings, specification, and estimate of the cost (23,425*l.*, including 1,500*l.* as provision money for extra works) be referred to the Manager of Works for that purpose.

(*c*) That the tender of Messrs. Clay, Henriques, & Co., amounting to 1,401*l.*, for the manufacture, delivery, and erection of nine penstocks required for the drainage of Coldharbour and the diversion of the Isle of Dogs branch of the northern low-level sewer, be accepted; that the solicitor be instructed to prepare the contract; and that the seal of the Council be affixed to the contract when ready."

Mr. Easton asked why it was that it was recommended that the work should be sent to the Works Department at a cost of 23,000*l.*, when the estimate of the engineer was 16,000*l.*

Mr. Ward said that the engineer's estimste was a low one, and the Works Department refused to accept it. Then the work was put to tender, and several tenders were received. The only one which it was possible for the Council to accept on account of the price could not be accepted for reasons which he could not go into.

Improvement Estimates.—The Improvements Committee recommended that the estimates of 120,000*l.*, 13,500*l.*, 7,000*l.*, 15,000*l.*, and 9,100*l.*, amounting in all to 164,600*l.*, in respect of the paving and other works for the following improvements:—Holborn to the Strand street; Southampton-row; Wandsworth-road, Lambeth; Kensington High-street; and Cat and Mutton Bridge, Shoreditch, should be approved.

The recommendation was adopted without discussion.

Colonel Ford asked whether the Improvements Committee had considered the seriously congested state of the Strand in connexion with the construction of the new street from Holborn to the Strand. He would like to know when the Committee had communicated with the Police, and whether the new street would relieve the traffic in the Strand, or cause it to become more congested than now.

Dr. Longstaff said the Committee had considered the question. They had not communicated with the Police, but they believed that the traffic would be relieved when the improvement was carried out.

Rebuilding of Lambeth Bridge.—The Bridges Committee brought up a Report dealing with Lambeth Bridge, and recommended that the bridge be rebuilt.

The Chairman said the Report was not in order, as it had not been submitted to the Finance Committee.

Mr. Crooks (Chairman of the Committee) asked if he could move the second paragraph of the Report, which dealt with the type of the suggested new bridge. If he was in order, he would ask leave to substitute for the recommendation in the paragraph the following words:—"That a design be submitted for a five-arched granite-faced concrete bridge." That would pledge the Council to nothing, but it would enable the Committee to go to the Finance Committee with a design of the bridge for which they asked the money.

The Chairman said he saw no good purpose to be served in moving the paragraph.

Mr. Crooks said he was anxious to get the opinion of the Council as to the class of bridge it desired, and as he understood he was in order, he should move the paragraph. They had only just had an idea of the superior character of the German cement. The Germans had brought in the chemist to assist the engineer, and had discovered a material which must be of great advantage and come into great use in this country. It did seem a little ironical that a great cement-producing country like England should have to go to Germany for the information they had now got. The Committee were practically unanimous that it would be an advantage to London if they had a granite-faced concrete arch as suggested.

Colonel Rotton moved, as an amendment, that a design for a steel five-arched bridge be submitted. They had a magnificent example of such a bridge in Westminster Bridge, and he was anxious that they should have a replica of Westminster Bridge. It was ridiculous to say that they could not in England build their own bridges with their own stuff.

Mr. Verney said that there was a great deal to be said for suiting a bridge to its surroundings. A concrete bridge might be much more suitable to the surroundings of Lambeth than the Gothic style of Westminster Bridge, which was so admirably suited to its own position. Some of the bridges over the Thames were national disgraces, which he hoped the Council would not repeat. There were many people who would like to have a replica of Waterloo Bridge, which was infinitely finer than any other Thames bridge, even including Westminster Bridge.

On the motion of Mr. R. A. Robinson, seconded by Mr. Howell Williams, the further consideration of the matter was adjourned until the Finance Committee had reported on the financial aspect of the reconstruction of the bridge.

Register of Council's Property.—The Corporate Property Committee asked the Council to sanction the preparation, at a cost not to exceed 500*l.*, during the year ending March, 1901, of a complete single register with plans showing all the property, permanent and temporary, handed over by the late Metropolitan Board of Works and other authorities and subsequently sold or leased by the Council, together with an exact record of its utilisation.

An amendment to refer the recommendation back was rejected, and the recommendation was adopted.

Parliamentary Bills.—Mr. Cornwall moved the reception of the Report of the Parliamentary Committee, which dealt with the London County Council (General Powers) Bill, the Tramways and Street Widenings Bill, the Spitalfields Market Bill, and the Thames Piers and River Service Bill. The Committee also proposed, next week, to bring up the Bill for the Purchase of the Water Companies, and the Bill dealing with Sterilisation Clauses. These would be the whole of the Bills to be promoted by the Council in the next Session of Parliament.

The Report was adopted.

Applications under the Metropolis Management and Building Acts Amendment Act, 1878.—The Theatres and Music Halls Committee agreed to applications under the Metropolis Management and Building Acts Amendment Act, 1878, for arrangements at the following places:—Alexandra Theatre, Stoke Newington (Mr. F. Matcham); Camden Theatre, Camden Town (Mr. W. G. R. Sprague); Duchess Theatre, Balham (Mr. W. G. R. Sprague); Gambrinus Restaurant, Glasshouse-street (Mr. R. H. Kerr); Great Queen-street Theatre (Mr. J. Murray); Hanley Hall, Sparsholt-road, Crouch Hill (Mr. J. G. Abraham); Palace Theatre of Varieties, Greenwich (Mr. F. Harper and Mr. E. E. Fetch); London Pavilion (Messrs. Wylson and Long); Paddington Baths (Mr. E. B. B. Newton); Royal Agricultural Hall (Mr. R. Venner); Royal Aquarium (Mr. J. W. Wilkinson).

St. Martin's-lane Theatre.—It was agreed to sanction the plans submitted by Mr. F. Matcham in regard to a theatre to be erected in St. Martin's-lane, on certain conditions.

Government Buildings.—Mr. Burns, M.P., suggested that, in regard to the new Land Registry Office in Lincoln's Inn-fields, a conference between the Architect of the Council, the First Commissioner of Works, and Sir Kenneth Mackenzie should take place with respect to the encroachment of which he complained last week. He believed that harmonious action in this matter was possible, and that the Government would be glad to co-operate.

The Chairman of the Building Act Committee said he would put the suggestion before his Committee.

Tender.—The Highways Committee recommended, and it was agreed, that the tender of Messrs. R. S. Newall & Son, for the supply, for the sum of 236*l.* 12s., of a steel cable, 9,400 ft. in length, for the Streatham cable tramways, be accepted; that the solicitor do prepare the necessary contract to give effect to the tender.

Working Class Dwellings, Clerkenwell.—The Housing of the Working Classes Committee recommended that the two estimates of 500*l.* each submitted by the Finance Committee for preliminary expenses in connexion with the erection of working-class dwellings on the Reid's Brewery site, Clerkenwell, be approved and that the Housing of the Working Classes Committee be authorised to incur expenditure within the amounts of the respective votes. This was agreed to and the Council adjourned.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

At the meeting of the London County Council on Tuesday the following applications under the 1894 Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

Lines of Frontage.

Clapham.—A one-story shop upon part of the forecourt of No. 258, Wandsworth-road, Clapham (Mr. W. H. Choules for Mr. W. Thrower).—Consent.

Dulwich.—An additional porch at the South London Tabernacle, Peckham-road, Camberwell (Mr. J. Wills for Mr. W. H. Powell).—Consent.

Kennington.—That the application of Mr. J. P. Bayly on behalf of the Commanding Officer of the 3rd Middlesex Volunteer Artillery, for an extension of the period within which the erection of a one-story addition to the drill-hall, No. 76, Lower Kennington-lane, Kennington, to abut upon Reedworth-street, was required to be commenced, be granted.—Agreed.

Lewisham.—The retention of a building, to be used as a surgery, at the rear of No. 35, Laleham-road, Lewisham, to abut upon Carswell-street (Mr. H. J. Bate for Dr. G. P. Hulbert).—Consent.

Lewisham.†—A conservatory at the side of Stanstead-lodge, Catford, to abut upon Northwood-road, to an advanced line of frontage, also the erection of a raised landing with a wooden balustrade, in front of such premises (Mr. G. Tolley for Mr. H. Gardner).—Consent.

Peckham.—A one-story shop on part of the forecourt of No. 188, Rye-lane, Peckham (Messrs. Dowton & Druery for Messrs. Cooper & Budd, Limited).—Consent.

Rotherhithe.—That the application of Mr. A. C. Forrester for an extension of the period within which the erection of an addition, with a one-story porch in front, to the Presbyterian church on the west side of Southwark Park-road, Bermondsey, was required to be commenced, be granted.—Agreed.

Woolwich.—Three houses on the south side of Nithdale-road, Plumstead, and one house on the east side of Eglington-road, to abut upon Nithdale-road (Mr. A. E. Habershon for Mr. J. Stevens).—Consent.

Hackney, Central.—A one-story addition to Sussex Cottage, No. 10, Kenninghall-road, Upper Clapton, to abut upon London-road (Mr. S. A. Smith for Mr. M. Smith).—Refused.

Islington, North.—A warehouse building on the north-west side of Windsor-road, Holloway-road, Islington (Mr. R. Midworth for Mr. J. G. Wootton).—Refused.

Lewisham.†—A dwelling-house, with bay-windows, on the south side of Sydenham Park, Sydenham, next No. 50 (Mr. G. Tolley for Mr. E. C. Christmas).—Refused.

Lewisham.—One-story shops on the forecourts of Nos. 112 and 114, Lee-road, Lee (Mr. A. Tyler).—Refused.

Peckham.—Four houses with bay-windows on the south side of Reynolds-road, Pechham Rye, Peckham (Mr. A. Wood).—Refused.

Projections.

Greenwich.—An iron and glass shelter over the entrance to Morton's Theatre, London-street, Greenwich (Mr. A. Roberts for Mr. A. Carlton).—Refused.

Marylebone, West.—The re-erection of the balcony at the first floor level in front of No. 42, Montagu-square, St. Marylebone (Mr. F. W. Hunt for the Honourable Miss Powys).—Refused.

Width of Way.

City of London.—Buildings on the site of Nos. 20, 22, 24, and 26, Copthall-avenue, London-wall, City, at less than the prescribed distance from the centre of the street (Mr. R. B. Marsh for the City of London Real Property Company, Limited).—Consent.

Haggerston.—An addition to the rear of Nos. 59 to 62, Kingsland-road, Shoreditch, at less than the prescribed distance from the centre of Union-street (Messrs. Ford, Son, & Burrows for Messrs. J. Carter & Sons, Limited).—Consent.

Westminster.—A variation from the plan approved for the rebuilding of No. 20, Great Chapel-street, Westminster, at less than the prescribed distance from the centre of Dacre-street, so far as relates to the erection to a greater height of a portion of the building (Mr. P. H. Nowell).—Consent.

Rotherhithe.—A warehouse building on the south side of St. Thomas-street, Rotherhithe, at less than

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the prescribed distance from the centres of Great Maze Pond and Maze Pond-terrace (Mr. P. Currey for Messrs. Tebbitt Brothers).—Consent.

St. George, Hanover-square.—A one-story building on the north side of Hay Hill, St. George, Hanover-square, at less than the prescribed distance from the centre of South Bruton-mews (Mr. B. Slade for Mr. W. M. Pegge).—Refused.

Deviation from Certified Plan.

St. George, Hanover-square. — Certain deviations from the plan certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed rebuilding of No. 1, Berkeley-square, St. George, Hanover-square, at the corner of Hay Hill (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

Space in Rear.

Greenwich.—A modification of the provisions of Section 41 (i.) (vi.) with regard to open spaces about buildings, so far as relates to the proposed erection of a dwelling-house on the east side of Horn-lane, Woolwich-road, Greenwich, at the corner of a right-of-way leading to the rear of houses on the north side of Woolwich-road, with an irregular space at the rear (Mr. H. Congdon).—Consent.

Lines of Frontage and Width of Way.

Finsbury, East.—The rebuilding of No. 55, Cow-cross-street, Holborn (Mr. E. W. Mountford for Mr. H. Pocock)—Consent.

St. George, Hanover-square—A porch, bay window, and balcony to No. 1, Berkeley-square, St. George, Hanover-square (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

Woolwich.—Nine dwelling-houses on the west side of Red Lion-lane, Shooter's Hill, Plumstead, such dwelling-houses and the forecourt fences in front thereof to be within the prescribed distance from the centre of Red Lion-lane (Mr. A. E. Parnell for Mr. J. Sanford).—Refused.

Width of Way and Space at Rear.

Hampstead.—Residential flats on the west side of Grove-place and the south side of Christchurch-road, Hampstead (Mr. W. P. Horton for H. Marnham).—Consent.

Lines of Frontage, Space at Rear, and Width of Way.

Lambeth, North.—Buildings on the site of Nos. 136 to 146 (even numbers only), Kennington-road, Lambeth, with projecting porches, balconies, and four-story bay-windows, also the erection of a building on the site of Nos. 67 and 68, Walnut-tree Walk (Messrs. Waring & Nicholson for the Trustees of the Lambeth Walcot Charity Estate).—Consent.

Chelsea.—A block of residential flats on the south-west side of Park Walk, Chelsea, at the corner of Chapel-street (Mr. C. W. Stephens for the Metropolitan Industrial Dwellings Company).—Refused.

Lewisham.—A workshop and scenic studio at the rear of No. 25, Upper Winchester-road, Catford, to abut upon Blythe Hill-lane (Mr. S. J. Smith for Mr. H. Mapleson).—Refused.

Lines of Frontage and Construction of Buildings.

Peckham.†—A screen wall on the forecourt of No. 18, Rye-lane, Peckham (Messrs. Williams & Co. for Miss P. Revett)—Consent.

Hampstead.—A greenhouse, forcing-house, heating-chamber, and verandah in the garden at the rear of No. 27, Arkwright-road, Hampstead, to abut upon Frognal (Mr. A. R. Henderson for Mr. J. Mackay)—Refused.

Formation of Streets.

Woolwich.—That an order be issued to Mr. F. E. Windsor sanctioning the formation or laying out of a new street for carriage traffic to form a continuation of Francis-street into Flaxton-road, The Slade, Plumstead (for Mr. H. N. Grenside). That the name Francis-street (in continuation) be approved for the new street.—Agreed.

Wandsworth.—That an order be issued to Messrs. Turtle & Appleton sanctioning the formation or laying-out of two new streets for carriage traffic in continuation of Huntsmoor-road and Podmore-road respectively, East Hill, Wandsworth. That the names Huntsmoor-road (in continuation) and Podmore-road (in continuation) be approved for the new streets.—Agreed.

Cubical Extent.

Hammersmith.—The retention on the east side of Fulham Palace-road, Hammersmith, of a building to exceed in extent 250,000, but not 450,000, cubic feet, and to be used only for the purposes of a tobacco factory and offices. (Mr. H. W. Peck for Messrs. A. I. Jones & Co., Limited).—Consent.

The recommendations marked † are contrary to the views of the Local Authorities.

"THE STUDENT'S COLUMN"—Our Student's Column article ("Lessons in Electrical Engineering") is unavoidably held over until next week.

EPISCOPAL CHURCH, NIDDRIE, EDINBURGH.—The memorial stone of Niddrie Episcopal Church was laid on the 30th ult. Mr. John Robertson, of Inverness, is the architect.

Correspondence.

To the Editor of THE BUILDER.

SAXON CHURCHES.

SIR,—I, in common with the ever-increasing army of appreciative amateurs in regard to our oldest British architecture, express extreme gratitude to you for publishing, and to Professor Baldwin Brown for writing, the delightful articles just regretfully closed.

I am writing to convey a suggestion, if you will permit me, and I feel sure it is one that Professor Brown will be able and probably willing to comply with, and yet such as you by your generosity could easily place within the reach of the whole of us. It is this: To publish in a given number or numbers of the *Builder* a complete list, divided into the various districts, of all the churches, with a suggestion of the nearest available place to get at to reach them. The mere mention of a town in the following form would do:—

"Worth, Sussex. Station: Three Bridges."

T. H. HOLLING, M.R.I.A.S.

*** If Professor Baldwin Brown is willing to take the trouble to make out such a list, we shall of course be happy to publish it.—ED.

BOOKS RECEIVED.

WORCESTER: THE CATHEDRAL AND SEE. By Edward F. Strange. (Geo. Bell & Sons.)

THE CHURCHES OF ROUEN. By the Rev. Thomas Perkins. (Geo. Bell & Sons)

GODALMING AND ITS SURROUNDINGS. By T. F. W. Hamilton. (The St. Bride's Press.)

WEEK-ENDS IN DICKENS LAND. An illustrated handbook. By Duncan Moul. (The St. Bride's Press.)

THE "PRACTICAL ENGINEER" ELECTRICAL POCKET-BOOK, 1901. (Technical Publishing Co., Manchester.)

GENERAL BUILDING NEWS.

ST. STEPHEN'S CHURCH, WESTBOURNE PARK.—The chancel of this church has been extended, the pulpit has been moved into a better position, the organ rebuilt in the south chancel aisle, and the north chancel aisle converted into a morning chapel, and a sanctuary added. The glass of the two memorial windows in the south wall of the south chancel aisle has been refixed in the apse of the chapel, and that from the end window in the tower window. The old vestry, which had to serve both for clergy and choir, has been lengthened, and is now the priest's vestry, and a new one has been built for the choir, with an entrance into the north transept. A new porch has been built outside the doorway to the south chancel aisle, and screens provided in the present south porch and tower. The entrance doors have been made to open outwards instead of inwards. The font, which formerly blocked the main passage, has been moved into the south aisle. The gallery staircase, which was dangerous, has been rebuilt, and proper landings provided in lieu of the winders, and the doors made to open outwards. The chancel roof and roof of the apse to the chapel have been ceiled inside with boarding and divided into panels with moulded ribs. The whole of the church will be lighted by electric light. The new work is faced externally with Kentish ragstone to match the old work, and the new external masonry is all in Doulting stone. The internal masonry is in Bath stone. The steps and paving in the new part of the chancel are marble. The aisle roofs have been stripped and reslated, and the building generally repaired and the walls repointed. The works, excepting the reredos and altar (which have been executed by Mr. Pippet, of Solihull), have been carried out by Mr. W. Potter, of Croydon, from the designs and under the superintendence of Messrs. W. & C. A. Bassett Smith, of Adelphi. The electric lighting has been carried out by Messrs. Hayward Tyler, of London.

RESTORATION OF ST. MARY'S CHURCH, USK, MONMOUTHSHIRE.—St. Mary's Church, Usk, has just been partly restored. The walls have been stripped of the plaster which covered them, and the Norman stonework has been revealed. An organ, which was, until recently, in Llandaff Cathedral, has been rebuilt in the church by Messrs. Vowels, of Bristol. The work has included a new oak ceiling, and has cost about 1,200*l.* The restoration, which will eventually include the tower and screen, has been carried out under the direction of Mr. G. E. Halliday, of Cardiff. Messrs. George Couzens & Co. were the contractors.

PRESBYTERIAN CHURCH, WEST HARTLEPOOL.—A new Presbyterian church, with a hall, classrooms, and caretaker's house, has just been completed from designs by Messrs. Badenoch & Bruce, architects, of Newcastle-on-Tyne. The buildings are of brick with stone dressings, the principal front being faced with red pressed Commondale bricks. The block facing Sandringham has entrance-hall, staircase with lavatory accommodation, secretary's room, library, and a large infant classroom on ground floor; session-room, ladies' room, lavatories, and access to hall gallery on the first floor. The stairs are fireproof. The hall is placed behind the front block. It is about 51 ft. long by 39 ft. wide, and 25 ft. high to ceiling, having a gallery at one end. The roof is open-timbered, and is of selected pitch-pine. Behind the hall a corridor leads to a kitchen for tea meetings, with heating chamber under, and a back exit to Angus-street. The lighting is by electricity, with supplementary gas jets for emergencies. The general contractor is Mr. William Pearson, of West Hartlepool, the heating apparatus is by Messrs. Dinning & Cooke, the electric lighting by Messrs. Thomas G. Usher & Co., and the lead glazing by Messrs. Atkinson Bros., all of Newcastle-on-Tyne.

BOARD SCHOOLS, LONG EATON, DERBYSHIRE.—The new buildings, erected at a cost of about 7,000*l.* to augment the accommodation at the Derby-road Board Schools, Long Eaton, were opened on the 27th ult. Land having been purchased adjoining the existing schools in Derby-road, the new block of buildings, to accommodate 360 scholars, has been erected, besides a swimming bath, kitchen for cookery classes, and suite of rooms for the local pupil teachers' centre. The new buildings comprise six classrooms, each to accommodate sixty, and a room capable of accommodating 120, which can be converted into two classrooms by means of sliding doors. The swimming bath is 50 ft. by 24 ft., and the depth (for children) 4 ft. 6 in., rising to 3 ft. 2 in. at the shallow end. The depth is capable of being increased for adults by 18 or 20 inches. Messrs. Youngman & Son, of Long Eaton, were the contractors, the architect being Mr. E. R. Ridgway, also of Long Eaton.

SCHOOL BOARD OFFICES, GRIMSBY.—The foundation-stone of the new School Board Offices, which are being erected in Eleanor-street, near to the Higher Grade School, was laid on the 29th ult. The work is to be carried out, under the supervision of the architect, Mr. H. C. Scaping, by Messrs. Hewins & Goodhand. The structure will be composed of two stories, the ground floor being taken up with general offices, the clerk's private office, manual instruction-room and a drawing-room in connexion with the class in ironwork. The board-room will occupy the second floor, together with a members' retiring-room, while the caretaker's house will adjoin the main building.

BOARD SCHOOL, CHESTERFIELD.—On the 29th ult. the foundation stones of a new Board School were laid at Chesterfield. The new school is being erected in Old-road, to meet the growing requirements of the West Ward. Its frontage will be towards Old-road, and it will accommodate 500 infants. The building will be 132 ft. long by 69 ft. wide, and will have a central hall 80 ft. by 25 ft., surrounded by classrooms. The cost of the school, with the caretaker's house, will be 5,671*l.* Mr. W. Rhodes is the builder, and Mr. W. C. Jackson, the architect.

ENLARGEMENT OF INFECTIOUS DISEASES HOSPITAL, LANGLEY PARK, DURHAM.—This hospital is to be enlarged, at a cost of 2,000*l.* Plans have been prepared by Mr. George T. Wilson, of Blackhill.

CASUAL WARDS, SELLY OAK, WORCESTERSHIRE.—The casual wards which have been erected in Oak Tree-lane, Selly Oak, in connexion with the King's Norton workhouse, were opened on the 28th ult. The wards are on the cellular system; twenty-five for men and twelve for women. The cost has been about 6,000*l.* Mr. Cooper Whitwell was the architect, and Messrs. B. Whitehouse & Sons were the contractors.

NEW WARDS, LEEDS WORKHOUSE INFIRMARY.—The new imbecile wards at the Leeds Union Workhouse, Beckett-street, were opened on the 29th ult. The buildings which have just been opened consist of a detached pile erected near to the northern boundary of the workhouse grounds. They are of red brick, and have been built from the designs of Mr. J. Mitchell Bottomley, architect, Leeds. There are three distinct blocks, connected with one another by covered corridors. The centre block is for administrative purposes, and is a single story high. The main entrance and exits are in it, also the receiving wards, the padded rooms, the waiting-room, the dining-room, kitchen, and officials' apartments. The flanking blocks are each two stories high, for the reception of the male and female patients respectively. The connecting corridors are of sufficient width, and are broken by bay windows to allow of their utilisation as day rooms. In case of fire the buildings are provided with outside iron staircases. A sum of 10,500*l.* has been spent on the scheme, exclusive of the furnishing, which has cost an additional 1,500*l.* Mr. W. Airey was the contractor for the brick and wood work.

ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.—Our report of the third meeting of the Discussion Section of the Architectural Association on the 30th ult., when Mr. F. G. W. Buss read a paper entitled, "Is the Quantity Surveyor a Necessity?" is unavoidably held over until next week.

A PORTRAIT OF SIR CHARLES BARRY.—The trustees of the National Portrait Gallery have lately received a portrait of Sir Charles Barry, R.A., painted by J. P. Knight, R.A. The portrait is a gift to the gallery from his son, the Right Reverend Dr. Barry, Rector of St. James's, Piccadilly, and formerly Bishop of Sydney.

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SANITARY AND ENGINEERING NEWS.

Conisborough and Denaby Sewerage Scheme.—A Local Government Board inquiry has been held by Mr. A. E. Sandford Fawcett, C.E., at Conisborough, into an application by the Doncaster Rural District Council for sanction to a loan of 10,000*l.* for works of main sewerage and sewage disposal for the towns of New Conisborough and Denaby Main. The scheme, which was prepared by Messrs. D. Balfour & Son, of London and Newcastle, consists of the laying of sewers of 21, 18, 15, 12, and 9 inches diameter, at varying depths, with manholes, ventilators, automatic flushing-chambers, &c. The whole of the sewers will discharge into a storage tank of 80,000 gallons capacity, from which the sewage will be pumped by engines and pumps in duplicate to the highest part of the disposal land. It will then be treated in two of Ducat's self-acting aerating bacterial filters, the effluent from which will pass on to 8 acres of land, which consists of loam overlying sand and sandstone rubble. The effluent will finally discharge into the River Don. The Inspector went over the whole of the locality and examined the existing work at Old Conisborough, including the site of the proposed cast-iron siphon, which will do away with the pumping of 80 per cent. of the sewage.

Water Supply, Wadebridge, Cornwall.—The concrete reservoir which has been constructed on the top of White Rock Hill, Dunveth, in connexion with the new water supply for Wadebridge, was opened on the 28th ult. The reservoir has a capacity of 220,000 gallons. Provision has been made for flushing the sewers of the town by the construction of a concrete tank, fed by overflow water, and discharging, automatically, when full, 5,000 gallons of water. The engineer of the scheme was Mr. G. H. Harris, of Wadebridge. The cost was about 6,000*l.*

MISCELLANEOUS.

Penrhyn Quarries.—The quarries were opened for work on the 5th inst., but so far the men do not seem to be disposed to return.

Electric Lighting Scheme, Mexborough, Yorks.—On the 20th ult., at the Mexborough Market Hall, Mr. F. H. Tulloch held a Local Government Board inquiry into an application by the Mexborough Urban District Council for sanction to borrow 13,400*l.* for purposes of electric lighting, and 4,600*l.* for the provision of a refuse destructor. The engineer, Mr. Waring, explained the electric lighting scheme, and Mr. G. F. Carter, surveyor, gave details of the refuse destructor. The site proposed is near the junction of Oxford-street and Station-lane.

Memorial Tablet, Marischal College, Aberdeen.—A bronze tablet in memory of Professor William Macgillivray, the naturalist, was unveiled on the 20th ult. in the natural history classroom, Marischal College, Aberdeen. The tablet is 3 ft. 6 in. by 2 ft. 6 in., and was designed by Mr. Ashbee, of London, and executed by the Associated Guild of Handicraft.

London County Council Parliamentary Bills.—The Council have prepared six measures to be introduced in the course of the ensuing Session. In respect of Metropolitan improvements they seek for powers, subject to the Vestries of Fulham and Chelsea consenting to the proposed tramway from Battersea Bridge to Putney Bridge, and agreeing to contribute between them one-third of the net cost of the widenings, to widen New King's-road and World's End-passage, King's-road; to widen Richmond-road, subject to a similar consent by the Vestry of Hammersmith to the proposed tramway from Uxbridge-road to Shepherd's Bush-road; to widen Scrubb's-lane, Brook Green-road, and Fulham Palace-road, subject to a consent by the Fulham and Hammersmith Vestries to the proposed tramway from Harlesden to Putney Bridge, and to contribute between them one-third of the net cost of the street widenings; to widen Strathterrace and Bolingbroke-grove for the proposed tramway from St. John's-hill to Trinity-road, subject to a contribution by the Battersea Vestry of one-fourth of the cost; to widen Red Lion-street, South-street, Garratt-lane, Defoe-road, and High-street, Tooting, for the proposed tramway from York-road to High-street, Tooting, if the Wandsworth District Board will contribute one-third of the net cost of the widenings, such contribution not to exceed 91,316*l.*; and to widen various thoroughfares along the route of the proposed tramway from Camberwell Green to Devonshire-road, Forest-hill, subject to a contribution of one-third of the net cost by the Lewisham District Board and the Vestries of Camberwell and Lambeth. Another Bill provides for a large number of new tramway lines, with the necessary widenings of streets, &c., in the County and the City of London, on both sides of the river, including a double line from Cheyne-walk (Battersea Bridge) along the Chelsea Embankment, Commercial-road, Buckingham Palace-road, Victoria-street, and Victoria Embankment to Blackfriars Bridge—the tramways to be laid on a gauge of 4 ft. 8½ in., and animal or electrical power to be employed. They propose to take over from the Thames Conservancy Board the piers, landing-places, &c., on the river's side between Chiswick Eyot and the artillery practice ground at Plumstead, to provide additional piers and so on, and to obtain authority for the Corporation or the Bridge House Estates trustees to contribute or subscribe to the outlay and maintenance involved. They promote a Bill for the acquisition of the Spitalfields Market area bounded by Lamb-street (north), Commercial-street (east), Brushfield-street (south), and Crispin-street (west)—another measure to that same intent will be introduced by the Corporation; and the Council also put forward their customary Bill for the purchase of the undertakings of the eight water companies who supply London, together with that of the Staines Reservoirs Joint Committee established under the Staines Reservoirs Act, 1896.

Marconi's Wireless Telegraphy.—We are informed that the whole process of wireless telegraphy will be demonstrated to the public in operation at the Manufacturers' Exhibition in aid of Essex disabled soldiers, to be opened at the Shire Hall, Chelmsford, of December 12, 13, and 14, where wireless messages will be sent and received at intervals of a few minutes during the time the Exhibition is open.

Electric Lighting in Leeds.—The Lighting Committee of the Leeds Corporation propose to make extensions of their electrical works. On the 28th ult. they decided to recommend the City Council to accept tenders amounting to 72,572*l.* for extending the existing works at Aire-street on the adjacent Britannia Mills site, which has already been cleared and prepared for such a development. In due course tenders will be invited for machinery.

The Harvey Steel Companies.—It is proposed to amalgamate the Harvey Steel Companies into one. There are at present four Harvey Steel Companies: one in this country, one in France, one in New Jersey (United States), and the Harvey Continental (Limited), whose territory includes all outside of Great Britain, Germany, France, and the United States. The proposal was announced at the eighth ordinary meeting of the Great Britain Company, on the 20th ult.

Court of Common Council.—On the 20th ult., at a meeting of the Court of Common Council at Guildhall, Sir Robert Rogers, chairman of the Improvements and Finance Committee, replying to Mr. Deputy Baddeley, said every effort would be made in carrying out the improvements in Cripplegate to maintain the ancient gateway leading to Cripplegate Church. But it was not contemplated to leave the entire north side of the church open to the public view. The Streets Committee brought up a report recommending that, under the Act of last Session, the Corporation should take over the possession and management of the garden space in the centre of Finsbury-circus from March 1 next, which was agreed to. It was decided to inform the London County Council that the Corporation would be prepared to join them in any action which might be mutually agreed to with a view to protect the interests of London gas consumers in the direction indicated by the resolutions passed at the conferences on the London gas supply at Guildhall and Spring-gardens last month. It was resolved that the statue of Sir Rowland Hill in front of the Royal Exchange should be taken over and maintained by the Corporation. In regard to the proposed improvement in Leadenhall-street, between Billiter-street and Aldgate, the Court resolved to intimate to the London County Council that it was desirable, in the interests of economy, that immediately it became known that premises were to be rebuilt or that leases were falling in notices should be served or negotiations commenced by the Corporation for the ground required, and that the Council should be asked for an assurance that if the work was carried out as indicated they would be prepared to contribute half the net cost of the improvement, from time to time as it proceeded. On the motion of Mr. A. C. Morton the committee were requested to inquire and report as to the desirability of widening the Fleet-street end of Fetter-lane to the extent of 40 ft.——A report was brought up from the Bridge House Estates Committee on the widening of London Bridge. They stated that they had considered two methods of widening the bridge—one by means of cast iron cantilevers and balustrade, and the other with granite corbelling or cantilevers and an open granite balustrade. Both designs, which were by Mr. Murray, City Surveyor, and Mr. E. W. Cruttwell, had in common the retention of the present four lines for vehicles, the lighting of the bridge from the middle of the roadway, and the expansion of the structure from 53 ft. to 65 ft. This would give a width of 34 ft. for vehicular traffic, 2 ft. 6 in. for central lighting, and 14 ft. to each footway instead of 9 ft. 6 in. as at present. The committee, having consulted Sir Benjamin Baker, were of opinion that the granite widening, though costly, was in thorough harmony with the character of the bridge, and was more likely to receive the sanction of Parliament than any design involving the introduction of cast iron. They therefore recommended that the granite design should be adopted, and the necessary Parliamentary authority be sought to carry out the same at an estimated cost not exceeding 100,000*l.* Mr. Turner, chairman of the Bridge House Estates Committee, in moving the adoption of the report, mentioned that the committee had had before them the question of the alteration of the gradient of Southwark Bridge, so as to assist the traffic of London Bridge, but they were not in a position to report upon that subject yet. Mr. Bowater moved as an amendment that the matter be referred back to the committee for further consideration and report. Mr. Wallace commented upon the need which existed for altering the approaches to Southwark Bridge so as to assist the traffic. On a show of hands the amendment was negatived, and the report was then carried.

Technical Education.—The President of the Board of Education has appointed a Committee consisting of Sir William de W. Abney, K.C.B., F.R.S. (Chairman), Sir Philip Magnus, Sir Swire Smith, Mr. G. R. Redgrave, Mr. W. Bousfield, and Mr. W. Vibart Dixon, with Mr. A. E. Cooper, Board of Education, South Kensington, as Secretary, to consider the best means for co-ordinating the technological work of the Board of Education with that at present carried on by other educational organisations.

Plans for the New Asylum for Cardiff.—A special meeting of the Cardiff Corporation was held on the 20th ult., his Worship the Mayor (Mr. T. Andrews) presiding. When the minutes of the Asylums Committee came up, Alderman Trounce drew attention to the correspondence with reference to the retirement of Mr. Kirkland from the plans competition. The Committee had decided at one meeting that they would not pay Mr. Kirkland the sum of 100*l.*, and at a subsequent meeting they decided to pay the money. That, on the face of it, was not satisfactory.—Mr. F. J. Veall replied that the matter had been fully considered by the Committee. They felt, on the one hand, that it would be unfair to allow Mr. Kirkland to compete after knowing that he was one of Mr. Hine's assistants. Besides that, he had a legal claim upon the Committee.—Mr. Morgan Thomas asked what explanation Mr. Hine gave of the fact that he did not communicate with the committee when he saw that Mr. Kirkland was one of the selected competitors. He thought that Mr. Kirkland should not be paid a single penny, because he knew that he was in Mr. Hine's employ.—Mr. Veall replied that they were not the keepers of Mr. Hine's conscience. Mr. Hine did not regard the matter in the same light as the committee did, and his position was supported by the President of the Institute of Architects. There should have been a clause in the conditions preventing such a thing.—Mr. A. M. Ingledew proposed that the minutes be referred back. Either Mr. Kirkland was disqualified and not entitled to the 100*l.*, or he was entitled to go on with the competition.—Alderman Trounce seconded.—Mr. S. A. Brain thought that no purpose could be served by referring the matter back. Mr. Hine had assured them that he did not know that Mr. Kirkland was a competitor until after he had made his award.—Alderman Carey explained that Mr. Hine knew that Mr. Kirkland was one of the six selected on the day after he made his award, but it was a week before the committee knew anything about it, and then they learned it from an outside source. It would have been nothing but fair if Mr. Hine had communicated with the committee immediately he found that one of his assistants had been selected. The committee, on the other hand, felt that they had to protect the fifty competitors, but if they rejected Mr. Kirkland upon the lines of the first resolution Mr. Hine would have withdrawn from the assessorship, and they would have had to clear the whole matter two or three months in order to begin again, and do all the work afresh. After further discussion, Mr. Ingledew withdrew his amendment, and the minutes were passed.—*Western Mail.*

LEGAL.

THE WORKMEN'S COMPENSATION ACT.

At Leeds County Court, on the 28th ult., before his Honour Judge Greenhow, an action was brought by Thomas Weir, labourer, 5, Madras-street, Leeds, against Henry Lax, contractor, and builder, of 102, Roundhay-road, for compensation for injuries received while in his employment on July 4.

Mr. A. Willey represented the plaintiff, and Mr. Child appeared for the respondent.

Mr. Willey, in stating the case for the plaintiff, said that the only serious point to be decided was whether the man could be described as coming within the terms of that section of the Act which said that a man to be entitled to compensation must be employed in, on, or about a building 30 ft. high which was being constructed by means of scaffolding, or was being pulled down, &c. The facts in the case were that the plaintiff was in the defendant's employ, and on the day in question was excavating cellars to a house immediately adjoining some buildings already partially constructed. Mr. Lax had erected a number of buildings, some of which were completed and some partially erected, and the plaintiff was digging out the cellars of buildings immediately adjoining these. While so employed the earth fell in, and his leg was broken and he was otherwise injured. He submitted that the whole work was one job, and that in consequence the plaintiff was entitled to claim that he was engaged in, on, or about these buildings.

The plaintiff having given evidence, and stated

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that his weekly wage was 26s. 9½d., though he was paid by the hour.

Mr. Child submitted that the case did not come within the section, because the man was clearly neither in nor on the buildings. He was simply digging the soil on an entirely new plot of land, upon which no building whatever had been erected.

His Honour: There is no need to be engaged in the work of building. If you were reading a brief in the building, so long as you were employed there by the builder, you could recover damages if you were injured. This man was digging a foundation.

Mr. Lax gave evidence, and admitted that some of the adjacent buildings might have been 30 ft. high, but between any building of that height and the point where the plaintiff was injured there was a road. All the buildings in question were erected by himself.

After a lengthy argument, his Honour said his difficulty was over the word employment. He was inclined to think that if a man was liable to be ordered to any part of the work he was still employed about the building, in whatever particular part of it he might be engaged. Eventually his Honour gave judgment for the plaintiff on the ground that, though he was not working on the whole building, he was employed upon it, being liable at any moment to be sent to any part of it, and, moreover, that he was working in sufficiently close proximity to it to be said to be engaged "about" the building.—*Leeds Mercury.*

INJUNCTION AGAINST A DISTRICT COUNCIL TO RESTRAIN VIBRATION AND NOISE.

THE case of Hawkes *v.* the Leyton Urban District Council came before the Court of Appeal, composed of the Lord Chief Justice and Lords Justices Rigby and Vaughan Williams, on the 27th and 29th ult., on the appeal of the defendants from an order of Mr. Justice Buckley in the Chancery Division, who had granted the plaintiff an injunction restraining the defendants, their servants, and agents from carrying on their electric supply works at Leytonstone so as to cause a nuisance by vibration and noise to the plaintiff as owner and occupier of premises in Cathall-road, Leytonstone. The defendants admitted that there had been noise and vibration, but pleaded that since alterations at the works the nuisance no longer existed. The plaintiff, however, alleged that the noise and vibration caused by the engines was still sufficient to establish a case of nuisance, and Mr. Justice Buckley, being of the same opinion, granted an injunction, which the defendants now sought to have discharged.

Mr. H. Terrell, Q.C. (with him Mr. Dibden), in support of the appeal, said that the defendants as the Local Authority had, under the Electric Lighting Act, the duty cast upon them of establishing electric light work for the neighbourhood of Leyton, and they had established very considerable works, the whole of the streets of Leytonstone being now lighted by electricity. The demand for the light was very great. In the first instance the defendants worked their machinery by means of two gas-engines, but as the demand for the electric light increased the defendants had ultimately eight engines at work. With all these engines, however, defendants were not able to cope properly with the inordinate amount of light required, and they accordingly erected a steam-engine as a sort of stand by. In the working of gas-engines something occasionally went wrong and there ensued what was called "back-firing," which, explained counsel, was an explosion at the wrong side of the piston. At times, especially on Saturday nights, when the electric light requirements where very great, this back-firing took place, and defendants were unable to take off the engine at once as the supply would have been insufficient. The plaintiff's premises were some 200 ft. away from the works. The plaintiff was a horse dealer and had a residence there as well as some stables. The learned counsel said that his case was that it was only occasionally that there was an explosion and that therefore no injunction ought to have been granted; and, further, that under all the circumstances the injunction was far too wide and that it ought to have been limited to the use of particular gas-engines, so as to obviate the nuisance caused by back-firing. It was also part of his case that alterations had now been erected which would do away with the noise and vibration complained of. When the action was commenced the defendants were in course of erecting steam plant, which, to a great extent would obviate noise and vibration; but in the court below he (counsel) pointed out to the learned Judge that as the explosions were only intermittent and not continuous the case was not one for an injunction in the very wide terms in which it was granted. The injunction as it stood would apply to any machinery employed by the defendants, steam or otherwise, and whatever they did hereafter the plaintiff might turn round upon them and attack them on a motion to commit. At the present time two additional steam-engines were actually at work, and two more were on the premises and would be set to work in the course of a few weeks.

In answer to the Lord Chief Justice, the learned counsel said it was proposed to work the steam-engines as the main plant, but the gas-engines would be worked as a sort of auxiliary plant. Of course, in the event of back-firing occurring, they would at once be able to take off the engine. He was perfectly willing to let the injunction go, if it was limited to noise and vibration caused by the back-firing of the gas-engine, but in no case ought the injunction to be continued in the very wide terms in which it was granted. His main point, however, was that where there was merely temporary and not a continuing noise, it was not the practice of the Court of Chancery to grant an injunction.

The Lord Chief Justice: You cannot contend that electric lighting stations must be a nuisance. They are all over the place, and no doubt have cured their nuisances. You must make out that there is not a nuisance to justify us interfering.

Mr. Terrell: I say it was only temporary and occasional, and due to extraordinary circumstances. That is the whole point.

Continuing, the learned counsel contended that, at any rate, the injunction certainly ought to be limited to nuisance by gas-engines, otherwise if the defendants should substitute steam-engines for gas-engines, and the plaintiff should allege that a nuisance was caused by the steam-engines, and should move to commit the defendants, an entirely new cause of action would then be tried on affidavit instead of in the ordinary way, by the evidence of witnesses examined in Court.

Mr. Astbury, Q.C. (with him Mr. A'Beckett Terrell), for the plaintiffs, said that if this limitation of the order had been suggested before Mr. Justice Buckley he should not have objected.

In the result their lordships directed that the injunction should be limited to nuisance caused by the use of gas-engines, and directed that the defendants should pay the cost of the appeal, they not having asked Mr. Justice Buckley to make the order in the limited form.

MEESON *v.* LONDON SCHOOL BOARD.

THIS case was heard at the North London Police-court, November 2 and 30, before Mr. Fordham. The defendants had caused steam pipes to be fitted up at Upton House Infirmary, and the District Surveyor claimed a fee in respect of these as not being at low pressure. The pipe passed from the boiler-house through the bathroom to a coil in a passage, on each side of which there was a stop valve. In the bathroom there was a branch to a cylinder with a stop valve. The boiler could be worked to a pressure of 18 lbs. or 20 lbs. on the square inch. There was not a free blow-off. The Engineer of the School Board considered that the dividing-line between high and low pressure would be about 80 lbs., whilst the District Surveyor thought it would be about 5 lbs. on the square inch. The magistrate ordered the payment of the fee claimed and costs.

ANCIENT LIGHT DISPUTE IN FINSBURY.

IMPORTANT ACTION AGAINST A BUILDER.

THE case of the Home and Colonial Stores *v.* Colls came before Mr. Justice Joyce in the Chancery Division on the 3rd, 4th, and 5th insts.

Mr. Swinfen Eady, Q.C. (with him Mr. Hughes, Q.C., and Mr. Vernon) in opening the case said this was an action for an injunction to restrain defendant from obstructing the plaintiffs' ancient lights. There had been a motion by the plaintiffs for an interim injunction, and the action had been set down for trial without pleadings. The plaintiffs were an incorporated company having a large number of shops in different parts of the country, and the premises now in question were the plaintiffs' head offices in Worship-street, City, from which this large concern was managed. The plaintiffs had there something like 120 clerks. The plaintiffs' building was at the corner of Paul-street and Worship-street, Finsbury, and the only part here concerned was the Worship-street frontage. The plaintiffs were lessees of the premises for twenty-eight years from the Ecclesiastical Commissioners. The defendant was a builder and also lessee of premises which were to be erected on the opposite side of the road. According to the plans of the defendant's building, such building was to rise to a height of 42 ft., and that, the plaintiffs said, would obstruct their lights. This they would prove by expert evidence. On the site of the defendant's proposed building there had formerly stood premises 19 ft. 6 in. in height in occupation of job-masters. From this building a tarpaulin had been raised to a height of 36 ft. from the pavement—that was to say, 6 ft. less than the defendant intended to build—and the effect of this had been to darken considerably the plaintiffs' offices.

In answer to his lordship, Mr. Reginald Bray, Q.C., for the defendant said his client admitted that under his building contract he was bound to raise the building to a height of 42 ft.

Mr. Robert Willey, F.R.I.B.A., examined, said that as soon as he heard that it was proposed to build a much higher building than the one which stood on the site, he arranged to have a tarpaulin put up to a height of 30 ft. from the pavement. That was put up in the early part of November last year, and remained up for several days. He had inspected the plaintiffs' premises before the tarpaulin was up and while it was up. The erection of the tarpaulin made a serious diminution of light to the plaintiff's premises in the ground floor, being the southern half of the clerks' office, and on the first floor, and the directors' and other offices facing the Worship-street front. In the summer of the present year he heard that Mr. Colls proposed to erect a building of the height of 42 ft. In his opinion the effect of such a building would produce a substantial diminution of the light which the plaintiffs' premises at the present time enjoyed.

Mr. Hughes: In your opinion, would the diminution of light to which you refer interfere with the plaintiffs carrying on their business in the way they had hitherto carried it on?—That is my opinion.

Cross-examined by Mr. Bray:

To what height do you say the defendant can build on that land without causing a substantial diminution of light to the plaintiffs' premises?—I should say something like 25 ft. or 26 ft.

The witness added that that would leave the plaintiffs a very good—an exceptionally good—amount of light for London. He did not suggest that the defendant's proposed building would seriously injure the light to the top floor of the plaintiffs' premises, but it would be injured to a slight extent. He thought, however, that certain windows on the first floor would be much injured. There was a great deal of diffused light all over the street—40 ft. was not a narrow street. He thought that the light to the first floor windows of the plaintiffs' building would be much diminished by the defendant's proposed building, and that the light to the windows of the ground floor would be substantially or materially diminished.

Mr. Benjamin Tabberer, F.R.I.B.A., examined by Mr. Hughes, said he was District Surveyor of Greenwich. He had inspected the plaintiffs' premises on September 28 last. He saw the site of the defendant's proposed building. Assuming that the old building on the site was 19 ft. 6 in. high and the defendant proposed to put up a building 42 ft. high from the pavement, it would seriously diminish the light to the plaintiffs' ground-floor windows. It would certainly render the rooms darker and the plaintiffs would have to use more artificial light in order to carry on their business efficiently. The basement, or pavement lights, would also be materially darkened. The first-floor windows would also be affected to a certain extent, but not to such a prejudicial extent as the others.

Cross-examined by Mr. Bray:

Dealing with the first floor windows the witness said that assuming the measurements to be correct, 65 deg. of light was left to the plaintiffs' windows. Sixty-five deg. was a very fair light for rooms of that depth. He might call it a very good light if he were dealing with a proposed purchaser.

Supposing the defendant's house was built, would the selling or letting value of the plaintiffs' premises be injured in the market in the smallest degree?—That I could not say.

Cross-examination continued:

In ordinary cases in adjusting differences the 45 deg. rule was a good one, but it was not applicable to the present case on account of the depth of the plaintiffs' rooms. If the defendant's proposed building were erected, taking a line from the middle of the plaintiffs' first floor window, there would be an angle of 51 deg. of light left and apparently 47 deg. from the bottom. The upper light was more valuable than the bottom light, because it penetrated further into the room.

Professor Roger Smith also gave evidence in support of the plaintiffs' case.

Mr. Bray, in opening the case for the defendant, submitted that the case was substantially the same as that of Warren *v.* Brown, decided by Mr. Justice Wright in August last. In that case Mr. Justice Wright had held that the plaintiff was not entitled to an injunction to prevent obstruction of light, inasmuch as he had been left with sufficient light for the ordinary purposes of inhabitancy or business. Mr. Justice Wright held that the plaintiff was not entitled to an injunction for obstruction of light when it left him enough for ordinary purposes, although not enough for extraordinary purposes. He (counsel) quite agreed that the 45 deg. rule only applied in what might be called ordinary cases, but if ever there was a case in which that rule ought to be applied it was the present. Mr. Colls, the defendant, was a builder of great experience. He came first to look at the site in question in July or August last. He had had considerable experience in questions affecting light and air. As he was about to covenant to build to a particular height it was necessary for him to consider carefully his position with regard to ancient lights. Mr. Colls and his manager Mr. Elliott both formed the clear opinion that if they confined their building to a height of 42 ft. it would afford ample light for the plaintiffs and no action could be brought against Mr. Colls.

His Lordship: Most architects come and say they can build to 45 deg.

Mr. Bray: Well, in ordinary cases 45 deg. between architects forms a very useful rule, but when you get outside ordinary cases you cannot apply it.

The learned counsel, continuing, said that Mr. Elliott had seen Mr. Willey, the plaintiffs' architect,

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and went over the plans of the proposed building with him. Mr. Willey asked Mr. Elliott what compensation the defendant was prepared to pay if he were allowed to build to the height of 42 ft., but the latter replied that he was not prepared to discuss that matter at all. Mr. Willey then said he could not consent to the defendant building higher than between 24 ft. or 25 ft., and afterwards the matter was placed in the hands of the solicitors.

Mr. Bray said that if his lordship, after having heard the evidence, felt any doubt or difficulty on the plans, he should ask his lordship to call in an independent surveyor to report to him on the matter. That was very often done, and the defendant had a strong opinion that the advice of an independent surveyor would be in his favour.

Mr. Robert Vigers, examined by Mr. Bray, said he was an architect, and had a very large experience in light and air cases all over London. He inspected the plaintiffs' premises on November 26 last. He formed the opinion without going into the plaintiffs' premises that there would be at least 45 deg. of light left to them after the defendant's building was raised, and in his opinion that was quite sufficient. In his opinion the defendant's proposed building would not affect the light coming to the clerks' room in the plaintiffs' premises to any material extent. The defendant's building must reduce the light coming to the plaintiffs' building to some extent, but he came to the conclusion that there was no damage to the property. He did not think that the warehouse or the basement windows would be damaged at all. Witness did not go up to the first floor, as he thought that there was no necessity if he was right as to the ground floor windows.

Cross-examined by Mr. Eady: He came to the conclusion that the plaintiffs would have, after the defendant's proposed building was erected, more than 45 deg. of light left. In his opinion anything beyond 45 deg. was a good, sufficient light.

Mr. Colls, examined by Mr. Nutter, said he was the defendant in the action, and was a builder and contractor in a large way of business, employing about 1,000 men. He intended building a warehouse on the site in question. Witness stated that in his opinion his proposed building would not materially affect the light of the plaintiff's premises.

Mr. Elliott, the defendant's manager, stated in his evidence that part of his duty was to inspect sites for building and to report upon them. He saw the site before it was taken, and had considered the question of lights. He came to the conclusion that a building 42 ft. high would not damage the plaintiff's premises. Messrs. Edward I'Anson, F.R.I.B.A., and Chas. Riley also gave evidence in support of the defendant's case.

At the close of the defendant's case Mr. Bray asked his lordship to send an independent surveyor to the *locus in quo* for the purpose of reporting to his lordship on the alleged obstruction of light by the proposed building.

His Lordship: To report to me as to a building which is not even begun yet?

Mr. Bray replied that it was often done in such cases.

His Lordship: What do you want the surveyor to do? As at present advised I have no doubt about the facts in this case, but I must say that I am impressed very much by the case decided by Mr. Justice Wrignt. I do not feel any doubt that there will be an actual diminution of light on the plaintiff's ground floor.

Mr. Bray said he would agree that that was so. He could not contest that.

His Lordship: It is obvious. It does not, however, follow from that that the plaintiffs are entitled to an injunction.

Mr. Swinfen Eady said that that was a legal question which they would have to discuss. He submitted, however, that there was no necessity for an independent surveyor reporting to his lordship on the matter.

His Lordship said he did not think such a report was necessary. There was no difficulty about the facts in the case. The difficulty was the law.

Mr. Bray said he would not press the matter further.

His Lordship: How can you make out that the plaintiffs have "sufficient" light according to Mr. Justice Wright's decision, whatever "sufficient" may mean in that case? In reference to that, I want you to deal with the facts as we know them about the electric light being used.

Mr. Bray submitted that the case the plaintiff made with regard to the depth of their premises ought to be entirely ignored. As a matter of law there could be no greater burden cast upon the servient tenement because premises were deeper than usual, just in the same way as it could not lessen the burden if the premises were only 3 ft. or 4 ft. deep. He submitted, as a consequence, that a man could not have his lights greater because he used his premises for an extraordinary purpose. His contention was that if a man put clerks in a room 52 ft. deep, with no back lights at all, he was using the premises for an extraordinary purpose. He submitted that the bottom of Mr. Justice Wright's decision was that a man was entitled to a certain amount of light passing through each square foot of his windows, and if a defendant built so as to diminish that quantity of light it was actionable. Then the question was, what is that quantity of light? That quantity of light was described "as sufficient for ordinary business purposes." You must take an ordinary room with an ordinary window, and if there was sufficient light for business purposes which would allow clerks to enter items in books and so on, that was the *quantum* of light which the plaintiff was entitled to have. That must have been what Mr. Justice Wright decided, because his lordship would recollect he found in Warren *v.* Brown that there was a material diminution of light on the ground floor of the plaintiff's premises.

His Lordship: Yes, the order in that case was made on the 10th of the month and an appeal was lodged on the 12th. I am not surprised. The decision is startling.

Mr. Bray: Yes, it is a very important point, and I am not submitting it is free from difficulty. Mr. Justice Wright had put before himself the question as to what was the *quantum* of light which a person entitled to ancient lights was entitled to, and the answer was "sufficient for ordinary business purposes." If Mr. Justice Wright was correct on the facts in that case, the present is a much stronger one, because the present plaintiffs would have admittedly more light than an angle of 45 degs. Again, in the case of Warren *v.* Brown, the road was only 10 ft. wide, and in the present case it is 40 ft. or 41 ft., which admitted a much greater quantity of diffused light. The learned counsel submitted that the plaintiffs had made out no case for an injunction.

Mr. Swinfen Eady replied on the whole case on behalf of the plaintiffs, submitting that the plaintiffs had made out a substantial case for an injunction. The learned counsel said that his answer to the question as to the amount of light a person was entitled to was "the same as he had hitherto enjoyed."

At the conclusion of the arguments of counsel, his lordship reserved judgment.

POINT AFFECTING ARCHITECTS.

THE case of Metchim & Son *v.* the Hotel Cecil, Limited, came before Mr. Justice Kennedy and a special jury in the Queen's Bench Division on the 5th inst.—an action brought by the plaintiffs, a firm of printers in Westminster, for 123*l.* 17*s.*, the balance of an account for work and labour done and goods supplied for and to the defendants. The facts were shortly these:—In 1896 the defendants appointed Messrs. Perry & Reed, of John-street, Adelphi, their architects, who prepared plans and made out bills of quantities in connexion with the building of the Hotel Cecil. Numbers of extra copies of their estimates and specifications were sent to the plaintiffs to be lithographed, and down to May 3, 1897, their bill was paid by the defendants. In January, March, and May of 1897 the architects ordered the plaintiffs to lithograph fifteen copies of an estimate and eleven copies of a plan prepared by them for the hotel. The work was done for 97*l.*, and an account sent to Messrs. Perry & Reed, who were debited with that amount in the plaintiffs' books. On July 21, 1898, Messrs. Perry & Reed ordered the plaintiffs to lithograph twenty copies of bills of quantities connected with the building of the north block of the Hotel Cecil. That was also done, and the account for 26*l.* 17*s.* was also sent by the plaintiffs to the architects, who were debited with that amount in the plaintiffs' books. In October, 1898, a dispute arose between Messrs. Perry & Reed and the defendants, and Messrs. Perry & Reed ceased to be their architects. The plaintiffs sent in their account to the defendants in October, 1899, but they declined to pay it, on the ground that the cost of all copies of plans and estimates was included in the architects' fees and commission, and should be paid by them.

After hearing evidence, the jury returned a verdict for the plaintiffs for the amount claimed, and judgment was entered accordingly.

Mr. Roger Wallace, Q.C., Mr. Eldridge, and Mr. Metchim appeared for the plaintiffs; and Mr. Rawlinson, Q.C., and Mr. Ashton for the defendants.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

15,828.—A PACKING FOR JOINTS: *F. A. Thoenes.*—The packing consists of asbestos or other cord wound into a spiral ring, with, it may be, the addition of metal wire strands, the ring being embedded in india-rubber or fixed with a solution of rubber; for the winding process a core or flanged disc is employed.

15,889.—BALL-AND-FLOAT VALVES: *F. Wangelin.*—In the case of water-supply valves for closet flushing-tanks, cisterns, and so on, after the kind specified in No. 10,138 of 1896, the closing of the valve—the two chambers that constitute the cistern being at the time full—is brought about by means of a projection upon the pivoted lever, at whose one end is an adjustable weight and at the other a small water-tight container. When the two chambers of the cistern are empty, the descent of the container allows the valve to become opened, the flow of water through its outlet into one chamber is prevented from pouring into the other chamber by means of a non-return valve until it flows over the partition that is placed between them. The appliance comprises an adjustable seating for the valve, which is grooved in order that a screw-driver may be inserted therein.

15,907.—WINDOW FRAMES: *H. Simon.*—In the corners of the frame are fashioned, with a hollow cutter, right-angled slots or recesses for metal angle-plates or pieces which join together the rails and bars of the frame; to the cutter is attached a cross-piece, having a handle, which can be detached when the cutter needs to be sharpened.

15,922.—A FIRE-ALARM APPARATUS: *F. Gray.*—By this contrivance, which can be used alike with wet and dry systems of sprinkling which combine alarms with automatical sprinklers, an indication is given when the sprinklers are in action, or when some one has tampered with the main water-supply valve; when the pressure varies, by either excess or defect, from a certain determined amount, a pressure gauge will close an electrical bell circuit, by means of the movement to one side or the other of a gap which is cut in the edge of a disc clamped upon the pressure-gauge's spindle. If the gap stands opposite the spring contacts no current will pass to the bell, but when the gap is moved aside the circuit becomes closed and is so maintained by the disc's contact with the springs. The gauge, with its bell, connected to the distributing pipes of the sprinklers, and another gauge is attached to the main water-supply sliding valve, which puts the latter gauge into communication with the distribution pipes when it has become closed and, by thereupon changing the pressure on the gauge, causes the alarm to sound. Similarly, any alteration of the amount of pressure will start the other valve when the sprinklers have been opened.

15,947.—APPLIANCES FOR WINDOWS: *W. Taylor.*—Hinge or pivot pins are fixed on to the frame, and eyes which are secured to the casement or sash slide upon the pins. For purposes of cleaning it the casement can be turned into a recess made in the window-head, or it can be lifted into the recess when ventilation is desired. Over the top of the window is a door, or flap, which controls the admission of air, and will become closed when the window is lowered on to the sill, whilst the entrance of water is obviated by means of vertical grooves that are cut in the abutting stiles of the frame and the window. When the casement has been closed a locking-pin, which is pivoted on to a spring lever mounted upon the casement stile, engages with a hole cut in the frame.

15,904.—A METHOD OF VENTILATING: *F. H. Coady and F. F. Coady.*—The inventors devise a fireproof and waterproof ceiling, made of metal or some other material, for use in kitchens, bath-rooms, &c., in the centre of the ceiling which is inclined downwards to its edges are an opening with radial grooves, and a flange with which the ceiling can be secured to the walls; the aperture at the centre is placed in communication with a ventilating-shaft, and pipes are provided for carrying off the water that collects in the grooves.

15,992.—LOCKS AND BOLTS FOR SAFES: *G. H. Steinforth.*—A key or handle serves to turn a bolt which is in the form of a segment of a ring into engagement with the safe's side-plate, the ends of the bolt—which is attached to or made in one piece with a pivoted plate—will lie flush with the lock-plate when they are turned back; the bolt is designed in this especial form so that it shall not be forced backwards by illegitimate means, such as the drilling of holes in the side-plates and the use of a punch, and in order to prevent any forcing outwards of the side-plates; the lock which secures the bolt when shot has a key that engages with a pivoted lever and will draw the latch-bolt out; a further turning of the key lifts the tumblers and so draws the locking-bolt backwards.

16,000.—DOVETAILING, FOR CABINET WORK: *M. Robinson.*—A head, which is affixed to the driving spindle, and a socket whereof each has a hole of the same eccentricity constitute a holder for rotatory cutters employed in cabinet dovetailing work, the cutter is held in the hole of the socket and the socket in the hole of the head, for making the cutter run truly, or for varying the size of the dovetail required, an adjustment can be effected of the respective eccentricities of the cutter and the socket.

16,006.—A FLUSHING CONTRIVANCE: *S. Getting.*—The inlet valve of the tank which is cylinder-shaped is connected by means of a joint or hinge to a rod that is hooked at its upper end on to the end of the rocking lever, the rod moving in a guide-bracket, a pawl mounted upon the float arm will engage with a recess formed in the middle portion of the rod when the valve for discharge is lifted, and will thereby support it in that position until it becomes freed through the fall of the float.

16,009.—A TOOL FOR MOULDING STONE: *J. Collins and E. Collins.*—A capping piece, washers and bolts secure the cutter and two back irons which are fashioned with the required profile of recess made in the holder, the cutter, whose cutting edges may be upon one side or upon both sides, abuts against a filling-piece which is placed between the back irons.

16,050.—MANUFACTURE OF PORTLAND CEMENT: *C. von Forell.*—The cement is composed of granulated calcareous materials, for instance, limestone, marl, chalk, and so on, mixed with granulated blast-furnace slag, which are first rendered friable

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by being heated to a clear red heat, and are then ground to powder and burned. Portland cement will be formed by grinding the clinker thus made.

16,071.—KEYS FOR LOCKS: *C. T. Schweizer.*—The barrel and the key-bits are formed separately, the latter being cut out of sheet-metal strips that have been rolled or drawn so as to present the necessary sections.

16,088.—A HOLDER FOR FRENCH WINDOWS, CASEMENTS, DOORS, &C.: *H. F. A. Lohmann.*—The appliance for retaining doors and windows in their position when opened comprises a bar whereof the end is flattened out so as to constitute a spring, the bar being pivoted on to the window-sill or other suitable place, and having an eye which is to be engaged by a guide-rail upon the door or window; when the door has been opened a stud upon the end of the bar will spring into a recess, and will hold the door in that position until the door is liberated by the pulling of a knob.

16,090.—A MATERIAL FOR DOORS, SHUTTERS, &C.: *F. M. Leaver*—Wood-pulp, paper sheets, or similar substances are stamped or pressed to the shape of the door or shutter, and have raised or sunken panels; they are then fixed together with glue or cement upon the opposite sides of a wooden frame, or are glued on to the frame, the panels being added afterwards.

16,123—FASTENINGS FOR WINDOWS: *W. T. Head and N. P. Neilsen.*—In the window frame (or in the sashes) are mounted spring catches for engagement with notched plates secured to the sashes (or to the window frame). The catches will retain the sashes when the latter are closed and prevent them from being opened more when they have been once opened. Cranked handles or keys that work upon spindles serve to liberate the catches from within, and pivoted levers, when turned by arms projecting from the spindles, will withdraw the catch or bolt against the spring's action.

16,124.—A CONTRIVANCE FOR USE WITH HOISTING MACHINES, &C.: *E. Brucksch.*—The inventor's object is to obviate the running twice successively in the same direction of hoisting and similar machines. He causes the reversing lever to be controlled in such a manner that the workman can move it only upwards in its guide, projections from the lever's side press against corresponding projections from a disc wherein are slots cut diameter-wise, which engage with two pins upon two bolts, one of which blocks the further motion upwards of the lever after the lever has been moved once upwards and then downwards; but when the lever has been moved downwards and then upwards its further motion downwards becomes similarly blocked. The disc must be turned by the hand in order to move the lever twice in the same direction.

16,126.—A METHOD OF MOULDING BRICKS: *G. L. Rolfe.*—A shoot and a hopper feed the clay to the moulds, the clay is then pressed with plungers against a platen joined by rods to a cross-shaft so that cams, levers, and rods may force it over the mould table from which, however, the platen is kept free by means of cam studs that act upon the levers which sustain the shaft, separate mechanism is provided for the plungers; cam levers and links pivoted on to the plungers expel the bricks from the moulds, when the moulding has been done cams that move upon sliding connecting-rods come into play for moving the platen clear from the table, and as the platen crosses over the table its under surface is cleaned with a wiper; the mould box is made so that it can be detached, and vertical screws, whose yokes hold up the plunger shaft's ends when the cross-head is lowered, regulate the amount of feed to the moulds, a lever and pins that project from one side of the reciprocated hopper working the shoot's cutting-off slide.

16,221.—AN APPLIANCE FOR LAVATORY BASINS: *Peck Brothers & Co.*—A disc is secured to the lower end of a spindle upon which the plug-valve is mounted, when a handle near the basin's rim is turned its rotation is communicated by means of a universal joint to a shaft (beneath the basin) at whose remoter end are a disc and an eccentrical pin. The pin lifts and depresses the plug-valve by means of its action upon the disc at the end of the plug-valve's spindle.

16,225.—CONDUITS FOR ELECTRICAL CONDUCTORS: *W. H. Nichols & Henley's Telegraph Works Company.*—In order that the sections may lie flatly upon their bed of concrete the conduits, which are made of earthenware, are fashioned with a rectangular section, with socket joints around their tops and sides only.

MEETINGS.

FRIDAY, DECEMBER 7.

Architectural Association.—Mr. A. Wallace Rimington on "Colour in Architecture seen through an Artist's Glasses." 7.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. F. K. Peach on "Dock Gates." 8 p.m.

Architectural Association of Ireland (Technical Demonstrations. III.).—Messrs. Alston and Hudman on "Timber." 2 p.m., at 29, Rogerson's Quay.

Glasgow Architectural Craftsmen's Society.—Mr. T. S. Fraser on "Some Principles of Design." 8 p.m.

SATURDAY, DECEMBER 8.

British Association of Waterworks Engineers.—Half-yearly Meeting at the Geological Society's Rooms, Burlington House, W. Presentation of Report from the "Water Boards" Committee on "The Control of Water Undertakings and Sources of Water Supply," and discussion. A paper will be subsequently read, entitled "The Protection of Underground Water," by Mr. Wm. Matthews, M.Inst.C.E. 11 a.m.

Institution of Junior Engineers.—Visit to the Electric Generating Station of the London United Tramways Company, 88, High-road, Chiswick. 3 p.m.

MONDAY, DECEMBER 10.

Surveyors' Institution.—Mr. R. E. Middleton on "The Future of the London Water Supply." 8 p.m.

Society of Arts (Cantor Lectures).—Professor J. A. Fleming, D.Sc., on "Electric Oscillations and Electric Waves." III. 8 p.m.

Clerks of Works Association (Carpenters' Hall).—Paper by Mr. Lewen Sharp. 7.30 p.m.

Society of Engineers.—Annual general meeting. 7.30 p.m.

Bristol Society of Architects.—Mr. G. Atwood Slater on "Architecture Critically and Poetically Considered." 8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. E. T. Hall on "The Leeds Infectious Hospitals." 6.30 p.m.

TUESDAY, DECEMBER 11.

Institution of Civil Engineers.—Papers to be read and discussed:—1, "The Signalling on the Waterloo and City Railway"; and 2, "Note on the Signalling of Outlying Siding Connexions," by Mr. Alfred Weeks Szlumper; and 3, "Signalling on the Liverpool Overhead Railway," by Mr. S. B. Cottrell. 8 p.m.

WEDNESDAY, DECEMBER 12.

Society of Arts.—Professor F. Clowes, D.Sc., on "The Treatment of London Sewage." 8 p.m.

Society of Engineers.—Annual dinner.

Institute of Sanitary Engineers (Incorporated).—Half-yearly general meeting at 5 p.m.; annual dinner at 6 p.m. (Holborn Restaurant).

Institution of Civil Engineers.—Students' visit to the Engine Works of Messrs. James Simpson & Co. Assemble at the Works, 101, Grosvenor-road, Pimlico, S.W. 2.30 p.m.

Edinburgh Architectural Association.—Mr. G. S. Aitken, F.S.A., on "Bothwell Castle." Illustrated by limelight views. 8 p.m.

Northern Architectural Association.—7.30 p.m.

THURSDAY, DECEMBER 13.

Institution of Electrical Engineers.—8 p.m.

FRIDAY, DECEMBER 14.

Architectural Association (Discussion Section.)—Mr. H. V. Crawfurth-Smith on "The Churchyard and its Accessories." Mr. G. H. Fellowes Prynne will attend as special visitor. 7 p.m.

Institution of Junior Engineers (Westminster Palace Hotel).—Mr. J. H. Davy James on "The Metallurgy of Tin." 8 p.m.

Institution of Mechanical Engineers.—Mr. H. A. Humphrey on "Power-Gas and Large Gas-Engines for Central Stations." 8 p.m.

Architectural Association of Ireland (Technical Demonstrations).—Mr. Thomas Hudman on "Timber," at the Dublin Timber Company, Limited, Lower Ernestreet. 4.30 p.m.

SATURDAY, DECEMBER 15.

Dundee Institute of Architecture.—Visit to new additions at West Green Asylum.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 21.—By GERMAN & GERMAN (at Ashby-de-la-Zouch).

Ashby-de-la-Zouch, &c., Leicester.—The Breedon Estate, about 381 acres, f. (in numerous lots) £22,536

November 24.—By FRANCIS PITTIS & SON (at Newport).

Arreton, Isle of Wight.—Stile House, and ½ acre, f. 400

Vale Cottage, also house and blacksmith's shop adjoining, area 3 a. 2 r. 19 p., f. 1,075

Two enclosures of land, 2 a. 2 r. 3 p., f. 250

Blackwater House and 69 a. 2 r. 22 p., f. 3,000

Two freehold cottages 385

November 26.—By TOOTH & TOOTH.

Oxford-st.—No. 480, a profit rental of 100*l.* for 6½ yrs. 540

Pall Mall.—21, Suffolk-st., u.t. 19½ yrs., g.r. 52*l.* 14s. 3d., r. 200*l.* 1,720

Hyde Pk.—16, Cambridge-st., u.t. 19½ yrs., g.r. 10*l.*, r. 100*l.* 1,060

26, Cambridge-st., u.t. 22½ yrs., g.r. 10*l.*, r. 105*l.* 1,100

Fitzroy-sq.—23, Southampton-st., u.t. 23½ yrs., g.r. 6*l.* 16s. 6d., r. 75*l.* 650

By MAY & PHILPOT.

Camberwell.—148 and 150, Wells-st., f. 810

By WEATHERALL & GREEN.

Thornton Heath.—Brigstock-rd., The Railway Telegraph Hotel, f.g.r. 30*l.*, reversion in 62 yrs. 1,200

By T. V. PRICE (at Builth Wells).

Gwenddwr, Brecon.—Bedwhir Farm, 61 a., f. 1,300

By J. H. BETHELL (at Ilford).

Romford, Essex.—Kensington-rd., &c., 36 plots of building land, f. (in lots) 1,231

November 27.—By DRIBENHAM, TEWSON, & CO.

New Bond-st.—No. 164, Corporation Lease, g.r. 9*l.*, fine 42*l.*, r. 915*l.* 22,700

Hoxton.—84, 86, and 88, Hoxton-st., f., r. 160*l.* .. 3,775

57, Red Lion-st., f., r. 5*l.* 230

30, Red Lion-st., f., r. 161*l.* 4s. 1,360

89, 91, and 95, Kingsland-rd., f., r. 135*l.* 3,080

Kingsland-rd., The Model Arms b.-h., f., r. 65*l.* 1,420

Hoxton-st., The Red Lion p.-h., f.g.r. 100*l.*, reversion in 91½ yrs. 3,000

Hoxton-st., f.g.r. 50*l.*, reversion in 90½ yrs. 1,300

Red Lion-st., f.g.r.'s 155*l.*, reversion in 43½ yrs. 3,800

Red Lion-st., f.g.r. 42*l.*, reversion in 88½ yrs. .. 1,600

Red Lion-st., f.g.r. 15*l.*, reversion in 90½ yrs. .. 375

By NOKES & NOKES.

Holloway.—181 and 183, Fairbridge-rd., u.t. 66½ yrs., g.r. 12*l.* 505

Caledonian road.—2, Lavina-grove, f., r. 33*l.* 500

By RUTLEY, SON, & VINE.

Camden Town.—48, Werrington-st., u.t. 44 yrs., g.r. 6*l.* 465

Kentish Town.—2, Leverton-place, u.t. 41 yrs., g.r. 6*l.*, r. 45*l.* £320

By SIBLEY, COOKES, & BURRELL.

Peckham.—55 and 57, Lower Park-rd., f., r. 55*l.* 965

67 and 69, Lower Park-rd., f., r. 40*l.* 720

By A. C. LOVEYS (at Moretonhampstead).

Moretonhampstead, Devon.—The Leigh Estate, 167 a. 2 r. 39 p., f. 2,100

By A. ROBERTSON (at Camberwell).

Bermondsey.—12 and 14, Catlin-st., u.t. 47 yrs., g.r. 10*l.* 530

133 and 135, Southwark Park-rd., u.t. 22 yrs., g.r. 7*l.* 390

7, 8, and 9, New-pl., u.t. 33 and 40 yrs., g.r. 8*l.* 10s. 465

Rotherhithe.—18, St. Mary Church-st., f. 155

Camberwell.—154, Boyson-rd., u.t. 51 yrs., g.r. 6*l.* 10s. 475

334 and 336, Albany-rd., f., r. 70*l.* 1,260

By MONTAGUE HARRIS (at Abergavenny)

Longtown, Hereford.—Old Court Estate, 185 a. 1 r. 17 p., f. 2,280

By FLEURET, SONS, & ADAMS (at Masons' Hall Tavern).

Carshalton.—Mill-lane, the Lord Palmerston b.-h., f., r. 35*l.* 2,500

Bethnal Green.—Venice-st., the Bee Hive b.-h. and cottage adjoining, f., r. 100*l.* 3,120

Limehouse.—Maroon-st., the Waterman's Arms b.-h., c., r. 40*l.* 2,590

November 28.—By BURLEY & BRACKENBURY.

Ealing.—13 and 16, High-st., c., r. 75*l.* 2,170

1, Sunnyside-rd., f., e.r. 40*l.* 560

By HOBSON, RICHARDS, & CO.

New Malden, Surrey.—Lime-grove, The Lodge and 1¼ acres, f. 1,700

Thornton Heath, Surrey.—Bensham Manor-rd., f.g.r. 16*l.* 10s., reversion in 63 yrs. 410

By G. PEARCE & SONS.

Hoxton.—12, 14, and 16, Brunswick-place, u.t. 34 yrs., g.r. 81*l.*, r. 129*l.* 250

Craven-st., a rent charge of 26*l.*, for 17 yrs. 270

Haggerston.—41 and 43, Dunston-st., u.t. 18 yrs., g.r. 7*l.* 350

12, 14, and 16, Stean-st., u.t. 18 yrs., g.r. 9*l.* ... 525

Notting Hill.—Bramley-rd., &c., l.g.r. 36*l.* 10s., u.t. 63 yrs., g.r. 6*d.* 705

Holloway.—Fonthill Mews, f.g.r.'s 148*l.*, reversion in 67 yrs. 2,960

724, Holloway-d., f., e.r. 85*l.* 1,580

By PERCY W. SLARK & CO.

Tottenham.—54, Park-lane, u.t. 78 yrs., g.r. 8*l.*, r. 20*l.* 200

Notting Hill.—36, Bosworth-rd., u.t. 66 yrs., g.r. 7*l.* 200

By R. TIDEY & SON.

De Beauvoir Town.—160, Hereford-rd., u.t. 49½ yrs., g.r. 13*l.* 250

By TURTLE & APPLETON.

Wandsworth.—12 and 70, Harbut-rd., u.t. 78 yrs., g.r. 13*l.* 10s. 730

By C. P. WHITELEY.

Barnes.—High-st., St. Ann's and 5 a. 0 r. 5 p., f. 6,350

By DOUGLAS YOUNG & CO.

Camberwell.—10 and 12, Luxor-st., u.t. 64 yrs., g.r. 14*l.*, r. 74*l.* 640

Brixton.—7 and 9, Branksome-rd., u.t. 67 yrs., g.r. 12*l.*, r. 66*l.* 580

Dulwich.—Thurlow Park-rd., St. Leonard's and Blythwood, u.t. 80 yrs., g.r. 13*l.* 5s., r. 96*l.* ... 930

Clapham.—83, Sandmere-rd., u.t. 80 yrs., g.r. 7*l.*, r. 42*l.* 370

Peckham.—4, Barforth-rd., u.t. 75 yrs., g.r. 6*l.*, r. 36*l.* 340

By J. M. LLEDER & SON (at Swansea).

Llangyfelach, Glamorgan.—Blaen-Sciach Farm, 21 a. 1 r. 27 p., f. (together with mines and minerals underlying same) 1,925

By HENRY HENDRIKS (at Birmingham).

Birmingham.—Inkerman-st., f.g.r.'s 29*l.* 7s. (reversion in 84 yrs.) 890

115, Hurst-st., f., r. 170*l.* 4,200

Edgbaston-st., The Old Crown p.-h., f., r. 120*l.* 3,150

Claybrook-st., &c., 33 houses, also timber yard, warehouse, &c., u.t. 41 yrs., g.r. 81*l.* 12s. 5,525

Pershore-st., Art Metal Works, u.t. 38 yrs., g.r. 19*l.* 2s. 1,125

15, 16, and 17, Dean-st. (including a reversion), u.t. 65 yrs., g.r. 25*l.* 940

6 to 14, Dean-st., u.t. 16 and 23 yrs., g.r. 31*l.* 11s. 925

5 and 45, Upper Dean-st., u.t. 26 and 28 yrs., g.r. 13*l.* 2s. 6d. 830

Upper Dean-st., The Coach and Horses p.-h. and six houses adjoining, u.t. 26 and 28 yrs., g.r. nil 1,150

By BALCH & BALCH (at Camden Town).

Camden Town.—112, Torriano-avenue, u.t. 43 yrs, g.r. 6*l.* 365

Holloway.—33, Hargrave Park, u.t. 50 yrs., g.r. 8*l.* 8s., r. 38*l.* 385

53 and 55, Thorpedale-rd., u.t. 70 yrs., g.r. 11*l.*, r. 72*l.* 670

74, Parkhurst-rd., u.t. 31 yrs., g.r. 10*l.*, e.r. 65*l.* 555

Hampstead.—31, Ulysses-rd., u.t. 84 yrs., g.r. 5*l.* 19s., r. 34*l.* 400

Kentish Town.—25, Woodsome-rd., u.t. 60 yrs., g.r. 6*l.* 10s., r. 38*l.* 510

November 29.—By P. J. DIXON & SON.

St. Pancras.—2, Stibbington-st., u.t. 40 yrs., g.r. 17*l.* 10s. 330

Bethnal Green.—11 and 13, Vyner-st., f. 750

By FRANCIS & CO.

Clapham.—38, Jeffreys-rd., u.t. 41 yrs., g.r. 15*l.*, e.r. 50*l.* 315

By GENDLE & PRICE.

Croydon.—81, Gloucester-rd., f., r. 40*l.* 430

By HIGGINS & SON.

Hampstead.—18, Albion-rd., u.t. 44 yrs., g.r. 10*l.*, r. 65*l.* 645

St. John's Wood.—23, Charlbert-st., u.t. 27 yrs., g.r. 10*l.*, e.r. 45*l.* 260

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Municipal Buildings	South Shields Town Council	200*l.*, 100*l.* and 50*l.*	Dec. 31
*Public Offices	Hindley U.D.C.	50*l.*, 25*l.* and 10*l.*	Jan. 18

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Sewerage Works, Gordon-road, &c.	Barking (Essex) U.D.C.	C. F. Dawson, Surveyor, Public Offices, Barking	Dec. 11
Sewerage Works	Bedlingtonshire U.D.C.	C. D. Forster, 24, Grainger-street West, Newcastle-on-Tyne	do.
Road Widening, Crabble-road	Dover Town Council	H. E. Stilgoe, Civil Engineer, Town Hall	do.
Sewer, Richmond Hill-road	Aberdeen Town Council	W. Dyack, Burgh Surveyor, Town House	do.
Three Houses and Shop, Featherstone, Yorks		W. H. Fearnley, Architect, Station-lane, Featherstone	do.
Schools	Barking (Essex) School Board	C. J. Dawson, Architect, School Board Offices, Barking	do.
Repairs at Workhouse	Belfast Guardians	Young & Mackenzie, Engineers, Belfast	do.
*Road Making, &c., Works	Willesden District Council	Engineer, Public Offices, Dyne-road, Kilburn, N.W.	do.
*Making-up Roads	Wandsworth Borough Council	Council Offices, East Hill, Wandsworth	Dec. 12
Six Houses, Whitehead, Ireland		A. E. Wilson, 22, Waring-street, Belfast	do.
Church, Maestilo		D. Jenkins, Architect, Llandilo, Wales	do.
Cast-iron Pipes (270 tons)	Ayr Magistrates & Council	J. Young, Civil Engineer, Town Buildings, Ayr	do.
Club Premises	Hull & East Riding Club Co., Ltd.	B. S. Jacobs, Architect, Bowlalley-lane, Hull	do.
Street Works	Wallsend (Northd.) U.D.C.	G. Hollings, Surveyor, Council Offices	do.
Passage Works	Levenshulme U.D.C.	J. Jepson, Surveyor, Guardian Chambers, Tiviot Dale, Stockport	do.
Boiler House, Lingfield, near Bradford		Milnes & France, Architects, 99, Swan-arcade, Bradford	do.
Sewers, London-road	Bath R.D.C.	R. H. Sheppard, Surveyor, 3, North-parade, Bath	do.
Twelve Cottages, Omagh Asylum Estate, Omagh	Committee	D. Donnelly, Architect, Omagh	do.
Warehouse, Baildon Holmes, Shipley	Yorks Woolcombers' Assoc., Ltd.	Walker & Collinson, Architects, Swan-arcade, Bradford	do.
Culvert, Baxton Burn	Benfieldside U.D.C.	J. Dixon, Surveyor, Bank Buildings, Shotley Bridge	do.
Workmen's Dwellings	Wolverhampton Corporation	J. W. Bradley, Borough Engineer, Town Hall	do.
Sewerage Works	Twickenham U.D.C.	F. W. Pearce, Surveyor, Town Hall, Twickenham	Dec. 13
*Brick Wall	Hackney Borough Council	Borough Engineer, Town Hall, Hackney, N.E.	do.
Granite Kerbing, Cubes, &c.	Leicester Corporation	E. G. Mawbey, Civil Engineer, Town Hall	do.
Chimney Shaft at Electricity Works	Dublin Corporation	S. Harty, Civil Engineer, City Hall	do.
Sewerage Works, Gurnard	Isle of Wight R.D.C.	H. E. Stratton, 30, Pyle-street, Newport	do.
Promenade Extension	Gravesend Town Council	Borough Surveyor, Town Hall	do.
Street Works, Foundry-place, Porth	Rhondda U.D.C.	W. J. Jones, Surveyor, Pentre, Glam	do.
Well, Pentre, Glam	do.	W. W. Hood, Civil Engineer, Llwynypia, Glam	do.
*Making-up Roads	Hackney Borough Council	Borough Engineer, Town Hall, Hackney, N.E.	do.
Sewer, Belmont	Durham R.D.C.	G. Gregson, Surveyor, Western Hill, Durham	Dec. 14
Paving Works, Ashton	Preston (Lancs) Corporation	Borough Surveyor, Town Hall	do.
Eight Houses, Lidget Green, Bradford	Great Horton Indus. Soc., Ltd.	J. Drake & Son, Architects, Queensbury, Yorks	do.
Building Work at School, Skene, Aberdeen		Jenkins & Marr, Civil Engineers, 16, Bridge-street, Aberdeen	Dec. 15
Infirmary	Donegal Guardians	E. J. Toye, Architect, Strand, Londonderry	do.
Road Stone, Newcastle		County Surveyor, Moot Hall, Newcastle-on-Tyne	do.
Cottage Homes, Peewit-lane, Great Hampton	Evesham Guardians	H. S. Harvey, Architect, Evesham	do.
*Sand, Ballast, &c.	Guy's Hospital	Superintendent Guy's Hospital, S.E.	do.
*Sewer	Hendon U.D.C.	Engineer, Public Offices, The Burroughs, Hendon, N.W.	Dec. 17
Sewerage Works	Dudley Corporation	J. Gammage, Borough Engineer, Town Hall	do.
Destructor Buildings	Mexborough (Yorks) U.D.C.	G. F. Carter, Civil Engineer, Council Offices, Mexborough	do.
Engine House, &c., Donnington	Newbury R.D.C.	S. J. L. Vincent, Civil Engineer, Market Place, Newbury	do.
Police Station, Sandside, Ulverston	Standing Joint Committee	H. Littler, Architect, County Offices, Preston	do.
Road Making	Burnham-on-Crouch U.D.C.	E. Dilliway, High-street, Burnham	do.
Street, Jack Royd Estate, Wheatley		G. Buckley & Son, Surveyors, Town-chambers, Halifax	do.
Sewerage Works	Baildon (Yorks) U.D.C.	Beesley, Son & Nichols, Engineers, 11, Victoria-street, S.W.	do.
Sewerage Works, Westbury-on-Trym	Barton Regis R.D.C.	A. P. J. Cotterell, Civil Engineer, 28, Baldwin-street, Bristol	do.
Shops, Church-street, Lancaster	Lancaster and Skerton Co-op. Soc.	Austin & Paley, Architects, Castle Park, Lancaster	do.
Shops, &c., New-street	do.	do.	do.
Surveyor's Materials	Horsham (Sussex) County Council	W. B. Purser, Civil Engineer, 31, Bedford-road, Horsham	Dec. 19
Chapel, Butterwick, near Boston	Committee	W. Martin, Ivy Cottage, Butterwick	do.
Additions to St. Luke's Church, Great Bridge, Staffs	Skenfrith (Abergavenny) Sch. Bd.	J. Pearson, Market Place, Great Bridge	do.
Alterations to Schools	Kent County Lunatic Asylum	J. H. Farquhar, Abergavenny	Dec. 20
*Making-up Roads, &c.	Belfast Corporation	See Advertisement	Dec. 21
Abattoir, Stewart-street	Winwick County Asylum	City Surveyor, Municipal Offices	do.
*Wiring, &c	Llandudno U.D.C.	Clerk, County Offices, Preston	Dec. 29
Extension of Promenade	do.	E. Paley Stephenson, Engineer, Church Walks, Llandudno	Dec. 31
Cast-iron Pipes, &c. (200 tons)	Acton District Council	do.	do.
*Road Materials	Wilts Standing Joint Committee	Surveyor, Council Offices, 242, High-street, Acton	Jan. 8
*Police Station at Cricklade, Wilts	Messrs. Baker & Elliott, Limited	See Advertisement	Jan. 10
Granite Paving Cubes (1,000 tons), Liverpool		C. J. Wills, 71, Mosley-street, Manchester	No date
Factory, Percy-street, Cardiff		Jones & Co., Architects, 18, St. Mary-street, Cardiff	do.
Villa, Pembury-road, Westcliffe, Southend-on-Sea		E. Wright, Architect, Southend	do.
Six Houses, Grange-avenue, Leeds		J. C. Spivey, Architect, Bank-street-chambers, Leeds	do.
Two Houses, Church-road, Gorleston		W. T. Bulley, 58, Church-road, Gorleston	do.
Additions to the Sun Hotel, Coniston		J. W. Grundy & Sons, Architects, Brogden-street, Ulverston	do.
Store Premises, South-street, Farnham	Messrs. Case & Co.	Hickley & Co., Architects, Station-road, Aldershot	do.
House, Farnborough		do.	do.
Club Premises, Crompton, Lancs		F. W. Dixon, Architect, Union-street, Oldham	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Application to be in
*Inspector of Works	Itchen U.D.C.	3*l.* per week	Dec. 10
*Clerk of Works	Walthamstow School Board	3*l.* 10*s.* per week	Dec. 14
*Engineer	Sheffield Corporation	250*l.* per annum	Dec. 15
*Surveyor	Felixstowe & Walton U.D.C.	200*l.* per annum	Dec. 18
*Building Inspector	Willesden District Council	150*l.* per annum	Jan. 1

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv.* *Contracts, pp. iv, vi, viii, x, & xxi.* *Public Appointments, pp. xviii, xix, & xxi.*

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 16 0	per 1,000	alongside, in river
Rough Stocks and Grizzles	1 12 0	,,	,, ,,
Smooth Bright Facing Stocks..	2 18 0	,,	,, ,,
Shippers	2 6 0	,,	,, ,,
Flettons.....	1 10 6	,,	at railway depôt.
Red Wire Cuts ..	1 15 6	,,	,, ,,
Best Fareham Red	3 11 6	,,	,, ,,
Best Red pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,, ,,
Do., Bullnose	4 12 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 6	,,	,, ,,
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	16 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.		
Thames and Pit Sand	8 0	per yard,	delivered.
Thames Ballast	6 9	,,	,,
Best Portland Cement	35 0	per ton	,,
Best Ground Blue Lias Lime..	24 6	,,	,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube, deld. rly. depôt	
Bath ,, ...	1 7	,,	,,
Farleigh Down Bath ..	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,, ...	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale ,,	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York in blocks ..	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super. at rly. depôt.	
,, ,, 6 in. Rubbed Ditto..	3 0	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 3 in. self-faced Ditto	0 9½	,,	,,

SLATES.

in. in.	£ s. d.		
20 X 10 best blue Bangor ..	11 5 0	per 1000 of 1500 at ry. dep	
,, best seconds ,,	10 15 0	,,	,,
16 X 8 best ,,	6 2 6	,,	,,
20 X 10 best blue Portmadoc ..	10 18 0	,,	,,
16 X 8 best blue Portmadoc	6 0 0	,,	,,
20 X 10 best Eureka unfading green.....	11 2 6	,,	,,
16 X 8 ,, ,,	6 15 0	,,	,,
20 X 10 Permanent green	10 0 0	,,	,,
16 X 8 ,, ,,	5 12 6	,,	,,

TILES.

	s. d.		
Best plain red roofing tiles..	41 6	per 1,000	at rly. depôt
Hip and valley tiles....	3 7	per doz.	,, ,,
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles....	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles.....	4 0	per doz.	,, ,,
Valley tiles.....	3 9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50 9	per 1,000	,, ,,
Hip tiles.....	4 1	per doz.	,, ,,
Valley tiles.....	3 8	,,	,, ,,

PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0	,, ,, ,,
Fir timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens.....	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens.....	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens.....	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in. ..	14 0 0	15 0 0
Battens.....	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	11 0 0	12 0 0
Pitch pine: deals.....	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	9 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,, ...	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
½ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 0 3	0 0 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	8 7 6	9 7 6
Compound Girders ,, ,,	10 5 0	11 10 0
Angles, Tees and Channels, ordinary sections	11 2 6	13 2 6
Flitch Plates	11 0 0	11 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	9 15 0	- - -
Staffordshire Crown Bars, good merchant quality	10 5 0	10 10 0
Staffordsbire "Marked Bars" ..	12 0 0	- - -
Mild Steel Bars.....	10 10 0	11 0 0
Hoop Iron, basis price.....	10 10 0	11 0 0
,, ,, galvanised	16 10 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 0 0	- - -
,, ,, to 24 g.	12 0 0	- - -
,, ,, to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	13 5 0	- - -
,, ,, 22 g. and 24 g.	14 5 0	- - -
,, ,, 26 g.....	16 0 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	17 10 0	- - -
,, ,, 22 g. and 24 g.	18 0 0	- - -
,, ,, 26 g.	19 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 10 0	- - -
,, ,, 22 g. and 24 g.	14 0 0	- - -
Cut nails, 3 in. to 6 in..... (Under 3 in. usual trade extras.)	11 10 0	- - -

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	19 17 6	- - -
Pipe in coils	20 7 6	- - -
Soil Pipe..	23 7 6	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	27 0 0	- - -
Silesian.....	26 10 0	- - -
COPPER—		
Strong Sheet..... per lb.	0 1 1	- - -
Thin ..... ,,	0 1 3	- - -
Copper nails ..... ,,	0 1 3	- - -
BRASS—		
Strong Sheet..... ,,	0 0 11	- - -
Thin ,, ... ,,	0 1 1	- - -
TIN—English Ingots ..... ,,	0 1 5	- - -
SOLDER—Plumbers' ..... ,,	0 0 7½	- - -
Tinmen's ..... ,,	0 0 9½	- - -
Blowpipe ..... ,,	0 0 11	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d.	per ft.	delivered.
,, fourths	2¾d.	,,	,,
21 oz. thirds	3½d.	,,	,,
,, ,, fourths.....	3d.	,,	,,
26 oz. thirds	4½d.	,,	,,
,, ,, fourths	4d.	,,	,,
32 oz. thirds	5½d.	,,	,,
,, ,, fourths	5d.	,,	,,
Fluted sheet, 15 oz.	3½d.	,,	,,
,, ,, 21 ,, ...	4½d.	,,	,,
⅛ Hartley's Rolled Plate.....	3d.	,,	,,
⅜ ,, ,, ,, ...	3½d.	,,	,,
½ ,, ,, ,, ...	4d.	,,	,,

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes..... per gallon	0 2 11	
,, ,, ,, in barrels ..... ,,	0 3 0	
,, ,, ,, in drums ..... ,,	0 3 2	
Boiled ,, ,, in pipes..... ,,	0 3 2	
,, ,, ,, in barrels ..... ,,	0 3 3	
,, ,, ,, in drums ..... ,,	0 3 5	
Turpentine, in barrels ..... ,,	0 2 9	
,, in drums..... ,,	0 2 11	
Genuine Ground English White Lead ...per ton	28 0 0	
Red Lead, Dry..... ,,	25 0 0	
Best Linseed Oil Putty.....per cwt.	0 9 6	
Stockholm Tar ..... per barrel	1 10 0	

VARNISHES, &c.

	per gallon. £ s. d
Fine Elastic Copal Varnish for outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
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Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
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* Denotes *accepted.* † Denotes *provisionally accepted.*

BRACKLEY.—For additions to banking premises for the Bucks and Oxon Union Bank, Limited. Mr. Charles P. Ayres, architect, Watford, Herts:—

Booth.....	£2,027	Matthews	£1,765
Waterman	1,899	Orchard & Son, Banbury*	1,743
Hawkins	1,837		
Webster & Cannon..	1,798		

[*See also next page.*

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BURNLEY. — For the execution of street works (twenty-five streets), Read, for the Rural District Council. Mr. S. Edmondson, C.E., 18, Nicholas-street, Burnley:—

Sett Paving.

James Green, Burnley* £1,625 10 8

Tar Paving.

Wm. Shepherd, Rochdale* £2,057 19 0

GT. THURLOW (Suffolk).—For two pairs of cottages at Bull Hill, for the Hon. W. F. D. Smith, M.P. Mr. Charles P. Ayres, architect, Watford, Herts:—

Smith & Son	£2,575	Mason & Son, Haverhill*	£1,930
Dupont & Co.	2,049		
S. Wiles	1,935		

HAMPRESTON (Dorset).—For the erection of a Church school, Hampreston, Wimborne, Dorset, for the Right Hon. Lord Wimborne. Mr. Walter Andrew, architect and surveyor, Parkstone:—

Froud	£889 15	A. & F. Wilson	£800 0
Baker & Pearcey	885 0	Burt & Vick, Poole*	785 0
W. J. Cross	810 0		

HUNDON (Suffolk).—For two pairs of cottages at Hundon Hall Farm, for the Hon. W. F. D. Smith, M.P. Mr. Charles P. Ayres, architect, Watford, Herts:—

Smith & Son	£1,825	Mason & Son, Haverhill*	£1,635
S. Wiles	1,640		

LONDON.—For the erection of offices in Grinstead-road, Deptford, for Messrs. Braby & Co., Limited. Mr. John James Downes, architect, 199, Lewisham High-road. Quantities by Mr. Henry Theobald, 6, South-street, Finsbury:—

Falkner & Co.	£6,983	H. L. Holloway	£6,434
Woodward & Co.	6,495	Thos. Sayers	5,910
J. & A. Oldman	6,479	Thos. D. Leng	5,720
Josolyn & Young	6,464	Jerrard & Sons	5,478
Johnson & Co., Ltd.	6,450		

NORTHWICK.—For the construction of sewers for the Rural District Council. Messrs. Bancroft & Son, C.E., 88, Mosley-street, Manchester:—

J. Taylor	£1,594 16 0	J. Dale	£1,059 4 10
T. Rowland	1,212 19 5	Beckett & Co.	927 1 5
Read & Son	1,208 15 0	S. Hutton, Bowdon*	909 7 3
S. Johnson	1,208 2 10		
Etheridge & Clark	1,090 4 3		

OSWESTRY.—For the execution of road works, Stewart-road, for the Town Council. Mr. G. William Lacy, C.E., Guildhall, Oswestry:—

W. Fellon	£396 10	J. Vaughan	£333 16
W. H. Thomas	375 0		

[Borough Surveyor's estimate, £281. Work to be done by the Borough Surveyor.]

PARKSTONE.—For alterations and additions to Sandecotes School, Parkstone, for the Right Hon. Lord Wimborne. Mr. Walter Andrew, architect and surveyor, Parkstone:—

T. C. Rigler	£370 1	Baker & Pearcey	£291 15
W. J. Cross	365 0	A. & F. Wilson, Parkstone*	284 0
Burt & Vick	325 0		
—Huxtable	298 0		

RHYL.—For the erection of a refuse-destructor and electric-light station buildings, for the Urban District Council. Mr. A. A. Goodall, surveyor, Clwyd-street, Rhyl. Quantities by Messrs. D. Howorth & Son, 22, Lord-street, Liverpool:—

Haigh & Co.	£7,990	Thornton & Sons, 38, Wellington-road, Toxeth Park, Liverpool*	£6,225
Lawrence, Marr, & Co.	6,490		

SOUTHEND.—For additions, &c., to Westward Ho! Westcliff-parade, for Mrs. Hocker. Messrs. Greenhalgh & Brockbank, architects, Bank-chambers, Southend:—

		Porch.
Davey Bros., Queen's-road Works	£4,449	£39 0
Golding, Princes-street	4,286	72 0
Woodwiss, Princes-street	4,151	51 5
Gillett, Queen's-road	4,070	62 0
Shelbourne & Co., Elmer-avenue	4,050	50 0
West, Chelmsford	3,600	53 0
Davis & Leaney, Lancaster-gardens	3,525	46 0
Stubbs, Milton-street	3,525	53 15
Dupont & Co., Southchurch-road*	3,499	44 0

STAINES.—For rebuilding The Cabin, Staines. Messrs. Foulsham & Herbert Riches, architects, 3, Crooked-lane, King William-street, E.C., and Bromley-by-Bow, E. Quantities supplied:—

Dorey & Co.	£2,573	Courtney & Fairbairn	£2,352
W. Slark	2,540	W. H. Pearce	2,340
Adamson & Sons	2,520	Sheffield Bros.*	2,295
F. Grant	2,400		

WATFORD (Herts).—For new stabling, &c., George street, for Messrs. W. E. Pearkes & Sons. Mr. C. P. Ayres, architect, Watford:—

C. Eames	£955 0	Reed & Saw, Watford*	£940 9
H. B. Watkins	945 0		

WATFORD (Herts).—For additions to the Watford Fields School for the Watford School Board. Mr. C. P. Ayres, architect, Watford:—

Ridgway & Sons	£4,170	W. King	£3,750
Reed & Saw	3,995	P. Banyard	3,670
C. Eames	3,963	Webster & Cannon	3,599
G. Wiggs	3,950	Dupont & Co.	3,545
Clifford & Gough	3,840	C. Brightman, Watford‡	3,485
G. & J. Waterman	3,824	R. L. Tonge	3,450
J. L. Tyler	3,799		

‡ Accepted subject to the approval of the Board of Education.

WATFORD (Herts).—For new warehouse, George-street, for Messrs. W. E. Pearkes & Sons. Mr. C. P. Ayres, architect, Watford:—

C. Eames	£718 0	Clifford & Gough, Watford*	£517 0
Reed & Saw	547 18		

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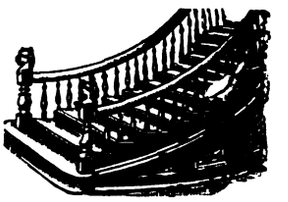

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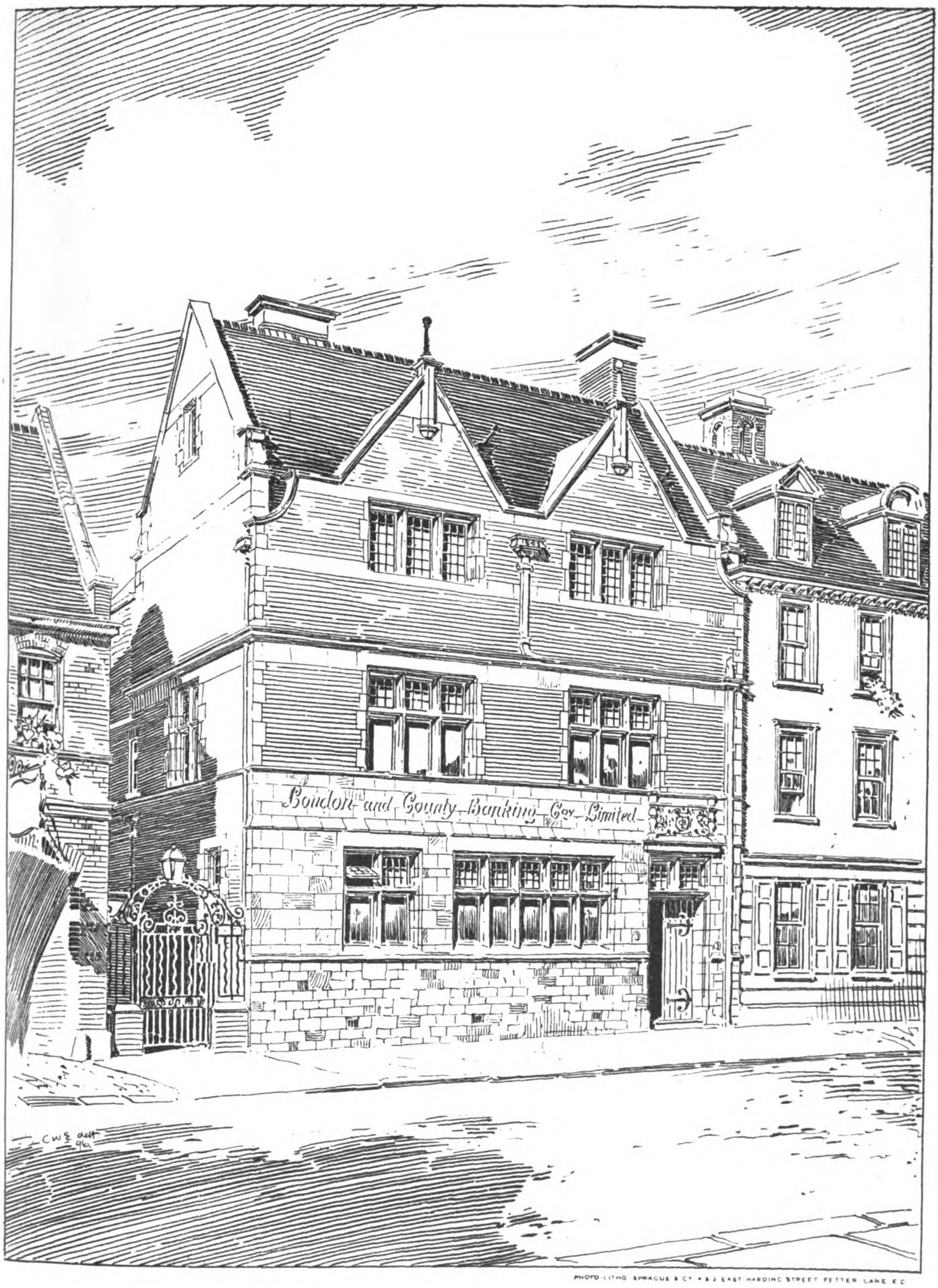

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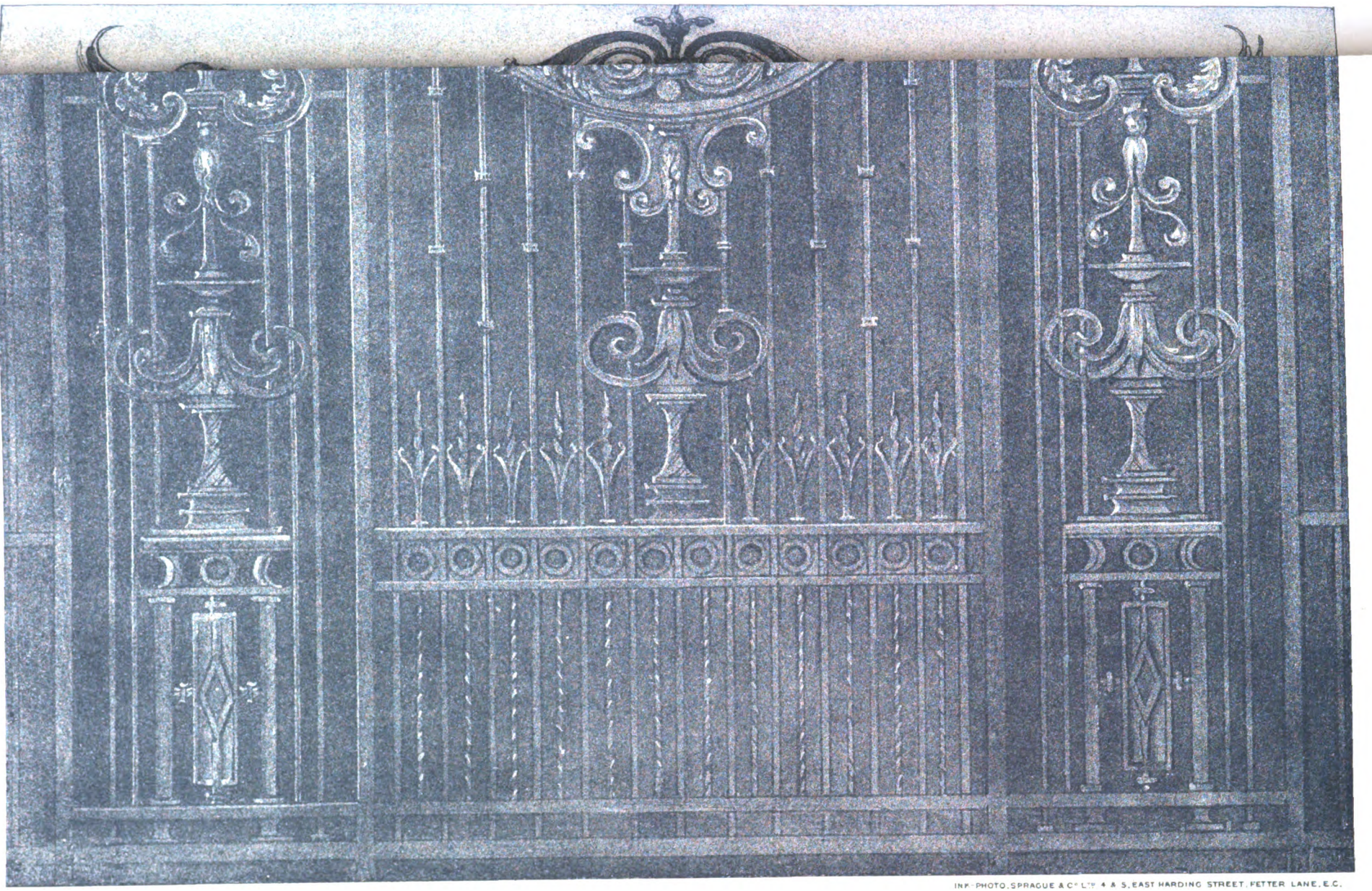

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The Builder.

VOL. LXXIX., No. 3019. DECEMBER 1, 1900.

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Entrance Gates and Lodge to Mansion, Suffolk.—Mr. A. N. Prentice, A.R.I.B.A., Architect ..... *Double Page Ink-Photo.*
Design for Proposed Church of St. Edward, Barnsley.—By Mr. H. C. Trimnell, A.R.I.B.A. ..... *Single Page Photo-Litho.*
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The Control of Water Supply.

THE half-yearly meeting of the British Association of Waterworks Engineers was held in the apartments of the Geological Society, at Burlington House, on Saturday last, December 8, Mr. C. H. Priestley, C.E., President, in the chair. The "Water Boards" Committee brought up their Report on "The Control of Water Undertakings and Sources of Water Supply," which was discussed at some length. The following were the principal points touched upon in the Report. It was contended that the present system of control over undertakings for public water supply is unsatisfactory; that the general control is shared by four independent public authorities—viz., the two Houses of Parliament, the Local Government Board, and the Board of Trade; that the decisions of Parliament are often contradictory as between the two Houses, as well as between successive sessions; and that rural districts are often unable, for financial and other reasons, either to secure proper water supplies or to protect their natural rights in them.

Now there can be no question that there is a great deal of truth in these contentions; at the same time there is no prospect whatever, as far as we can see, of any material alteration of the existing state of affairs being carried into effect at present. Waterworks engineers must remember that, whilst it would be, no doubt, exceedingly satisfactory from their point of view to place the control of the water supplies of the country in the hands of some central authority, there are the political and financial aspects of the question to be satisfied, and it may be questioned whether any one authority would be able to deal with them without power being given to levy on the rates, which are already much sub-divided amongst different local authorities. If financed on Imperial lines, Parliament would, of course, still retain control. In regard to that part of the contention which deals with the want of continuity between one Parliamentary Session and the next, we may remark that legislation on this ground is already contemplated, and this anomaly will, doubtless, shortly disappear.

The next matter brought up seems to us to be much more practicable; it embodied a suggestion that the existing powers for enforcing a proper water supply are inadequate. It is a striking and undeniable fact that many small towns and rural districts in this country are still without any public water supply, and are entirely dependent upon private wells, which are, moreover, under little or no supervision, and are liable to serious contamination. The cause of this is, mainly, the ignorance of rural populations as to the blessings of a really good water supply. What has sufficed for their great-grandfathers is good enough for them, they say. We have often heard this argument urged even by those whose education should have taught them better. It matters not to such people how far their ignorance in this respect may lead to the propagation of disease in more enlightened centres, where a good supply is being distributed at great cost. Selfishness and unwillingness have failed to supply the money for the carrying out of the most elementary type of water supply in some of these rural districts—a few hundred pounds even being begrudged. And we quite agree with this section of the "Water Board's" report when it urges that the present powers of enforcing a proper water supply are inadequate, whilst they are also anomalous.

Another suggestion was that the areas allotted to existing Local Authorities are altogether independent of the sources of water supply, and the trouble and expense of forming "United Districts" and "Joint Water Boards" are unnecessarily great. Whilst we agree with this suggestion, it seems to us to be very difficult to adopt all that is contained or implied in it. The fact that the boundaries of urban and rural Sanitary Authorities have been fixed without regard to the question of water supply is well known, and has often been debated. Still, without creating special Boards, to include several contiguous areas, we do not see how the problem is to be successfully dealt with; there are other local matters—taxation, drainage, and lighting amongst them—which must also claim attention, and the areas have been allotted, so that an all-round satisfactory result has been contemplated. It does not seem feasible that every little Local Authority should always have entire control of its own supply, when that supply is obtained from the area belonging to another Authority. Some combination between adjacent towns and villages appears to us to be a better solution of the problem than extremely local authority under a great central government; and if the expense of maintaining a combined water board be great, it in most cases follows precedent, where conflicting interests have to be focussed. Nevertheless, we are not in entire disagreement with the "Water Board's" suggestion in so far as it applies to supplying the wants of large cities which are so unfavourably situated as to be compelled to seek their supply outside their natural watershed limits.

We most heartily endorse the next contention, that the law relating to underground water is inequitable, and a standing danger to many public water supplies. This fact is now acknowledged by all who have given any attention to the subject, and have watched the legal decisions on the question in recent years. That the law relating to the pollution of water requires revision, in spite of the recommendations of Royal Commissions having to some extent been carried into effect during the past few years, is also patent to everybody, and we sincerely trust that the waterworks engineers will be able to influence a change in this direction. Continuous, not spasmodic, supervision is wanted very badly in several parts of the country. Another proposition

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brought forward was that the provisions for preventing water waste are insufficient; and the board strongly recommended the collection and publication of official returns relating to existing undertakings, with which we are in thorough agreement. This country is far behind some others in regard to the latter point. The board contented itself with indicating what requires in their view some alteration, but they rightly remark that the remedy is beyond their power. Nevertheless, they have framed some very useful rules for guidance in connexion with the collection of water statistics and other similar matters.

The only other communication laid before the meeting was a suggestive paper by Mr. Wm. Matthews on "The Protection of Underground Water Supplies," in which the sanitary aspect of the question was carefully considered.

THE POSSIBILITY OF A COLOUR-ART.

BY THE EDITOR.

IN the course of the discussion on the interesting paper read by Mr. Wallace Rimington last week at the Architectural Association, on the subject of "Colour in Architecture," the possibility of a scientific treatment of colour analogous to what is supposed to be the scientific treatment of musical sounds, was referred to more than once; and Mr. J. D. Crace, one of the speakers in the discussion, has returned to the subject in a letter printed in another column of this issue. However purely speculative the subject may be thought to be, and at the present moment undoubtedly is, it is a very interesting one, especially in view of the promise or prophecy which it seems to afford of a possible new art which might be developed in the future; an art in which combinations of colour should be played with as combinations of sound are now played with by the musician. The idea is not entirely chimerical; it is worth thinking about, at all events, merely as a question of æsthetic interest. But there are two points in regard to which there seems to be rather a confusion of ideas as to the resemblance between the artistic use of colour and sound.

In the first place, it seems to be overlooked that there is this radical distinction at present between the use of colour and sound in art—that music is complete in itself, whereas colour, as at present used, is always thought of as applied to something which might exist apart from the colour. Mr. Rimington, and other speakers at the Architectural Association, advocated the greater use of colour in architecture, and cited instances of buildings of which different portions were executed with differently coloured materials, and commented on the effect thus produced. But all the architectural forms of those buildings could have existed without any of this colour; just as the design of every picture might be drawn out in monochrome, without any colour at all, as it is, in fact, in an engraving; and yet all the intellectual meaning of the picture is there. Colour, as we now use it, is therefore applied to heighten the interest or beauty of something which might exist and be intelligible without it. But the sounds of music are not so applied to anything else; they are themselves the artistic creation; we do not apply music to a building or a wall-surface. We may set music to words, and thus heighten the expression of the words; but that is hardly even an analogous idea, as a great deal of the finest music is quite independent of words, or even of ideas which could be expressed in words. Something more like an analogy is found in the case of the arrangement of orchestral music for a single instrument, such as the pianoforte. A pianoforte arrangement of one of Beethoven's symphonies, for instance, where all the elements of the music are heard, but without the variety of tone-colouring imparted to it by the many different instruments of the orchestra, is to the original composition something like what an engraving of Titian's "Bacchus and Ariadne" is to the original picture; the idea and the forms are there, but not the colouring. That is a pretty close analogy, and one easily apprehended; but it is only an æsthetic analogy, not a scientific or physical one. If people mean anything at all when they imagine an art of colour which shall be analogous to the art of music, they must mean an art in which colours themselves, their combination and succession, shall be played with to produce an abstract colour design, just as the combination and succession of sounds is played with to produce an abstract design in sound, which we call "music," and which is complete in itself, and not dependent on its use in relation to anything else. And it is important to remember that it is not only the combination but the *succession* of colours which must be taken into account in forming a scheme for any art of colour analogous to our present art of sound. Music does not consist in the mere combination of sounds, but in their succession according to a general design of movement; and any similar art carried out in colour must include the means of flashing on the eye a succession of colours according to a preconceived and elaborated scheme, capable of being defined beforehand in some manner, as music is defined beforehand by the written marks or "notes" on the paper.

It is quite possible that some such art as this may be elaborated at some future time, and that people may have colour-symphonies in abstract colour, just as we now have music-symphonies in abstract sound. But such an art would probably take as long to develop and bring to perfection as the art of music has taken; for it is impossible for people to create imaginative works of art in any medium until they have become familiar with the medium, and have got past the experimental stage with it.

But in comparing such an imagined art of colour with the present art of music, there is another prevalent misconception to be cleared away. In what is at present called harmony of colour there is no scientifically defined system, as there is of harmony in music; and the reason is that we have not yet formed any scale (*scala*—ladder) of colour; *i.e.*, selected colours at fixed intervals of vibration. Artists use colour now just as an actor or an orator use the natural tones of the voice, with whatever shades of inflection agree best with the expression of feeling. But the whole art of music is only rendered possible by the selection of certain sounds at fixed intervals from each other—intervals fixed by the numerical relation of the vibrations — and ignoring all the others. To exemplify: the note which forms middle C on the piano gives 256 vibrations per second (standard pitch), and the D next above it 288; we intercalate one "semitone" between them, but what becomes of all the thirty other tones between 256 and 288? The answer is, that they are all there, but that the normal human ear is not delicate enough to deal with or distinguish such minute differences of pitch, or to construct an art of music on so complicated a basis. It was not till certain tones were pitched upon and selected, to the exclusion of others (on grounds party physical and partly æsthetic), to form the materials for making music, that any art of music or any written musical composition was possible. This the Greeks did for us, and it is not the least of the many debts we owe them.*

Now, any art of abstract colour such as we have been imagining, carried out on lines analogous to the art of music, must be preceded by the formation of a scale of colour; that is, the adoption of certain gradations of colour which can be accepted by every one as harmonising with each other in certain relations; the position of which can be physically defined, as the notes in the scale of music can; and which can be capable of representation by written signs of some kind. Then we may have abstract compositions in colour, as we now have abstract compositions in sound: but only then.

H. HEATHCOTE STATHAM.

THE STUDENTS' DESIGNS AT THE ROYAL ACADEMY.

THE President of the Royal Academy expressed himself as especially well satisfied with the students' competition designs of this year, and in respect to some branches of work, the sculpture and the landscape especially, he had good reason for this satisfaction; but we cannot find that the branch of design with which we are most concerned seems to be more flourishing than usual.

The Travelling Studentship of 60*l.* has been awarded to Mr. Henry Tanner, the subject being "A Portion of a Street Front;" for which, however, there were only three competitors. Of these the first in order (No. 186) is totally without architectural charm, but it has the merit that the large openings in the ground-floor, for shops, are treated with arches which would have a structural function in the building, and would carry the upper portion without assistance. No. 187 is the most original of the three in regard to detail and general feeling, but the wide "flat arches" over the ground-floor openings are merely an architectural pretence, and must inevitably be supplemented by girders behind the masonry front. In No. 188, the prize design, the author has not pretended to build arches over the shop windows, but frankly treats them as large openings crossed by girders. The details of this design are commonplace enough for the most part, except that the sculpture figures in the centre are well sketched in, but the design as a whole has the merit of unity and harmony of proportion, and is certainly the

* The modern European scale differs slightly from the Greek scale, for reasons which cannot be gone into here; but the Greek scale is the basis of it.

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most pleasing and satisfactory of the three. The detail elevations are well executed. If we begin to question what kind of place such a set of drawings would take at the Ecole des Beaux-Arts, it might perhaps be answered that our Academy students are encouraged to aim at simplicity and unassuming character in architectural design, and that undoubtedly the Ecole students are not. There are other merits possible in architecture, however, besides simplicity.

In the "Set of architectural designs" competition (Upper School) the prize is given to Mr. Bernard Webb for a design for a town house, which is what might be called ostentatiously plain and quite devoid of dignity, though not without character. The aim of architectural students at present seems to be to see how little detail you can put into a design, which is no doubt better than overloading it with ornament; but this rage for simplicity is getting pretty nearly to the point of leaving a design with no architectural quality at all except what is afforded by the plan. And in this instance the plan is not so good as that of No. 193; the entrance is badly managed, with a porch cut off from the hall by a partition; a very unarchitectural expedient; the entrance of No. 193 is much better arranged; in other respects there is not much to choose between the two plans. The two designs for the end of a school hall, in the same class, have a good deal of merit. Among the set of drawings of an architectural design (Lower School) the prize is given inevitably to Mr. Fulton for much the finest drawing there, a design for a bishop's tomb or monument; but it must be observed that it depends for its success much more on the manner in which the sculpture is designed and drawn than on purely architectural quality. Among various designs for a Country Parsonage in this class, about equal in merit, three have no points of the compass shown on the plan, a matter of the greatest importance in house planning; that the students are not (apparently) compelled to show this, and taught its importance, implies considerable neglect on the part of their instructors or visitors. The designs for a Gatehouse and Bridge, in the same class, are all of pretty much the same degree of merit; none of them show any noticeable architectural conception.

In the very useful competition instituted of late years for a plan of a building only, the subject this year has been a Bank and manager's residence in one block, with light from streets on two contiguous sides. The prize has been awarded to Mr. Rutherford for a plan which shows a very effective arrangement of the residential rooms on the first floor, with a loggia round two sides of a centre space giving ceiling light to the bank room below; but there is a curious and to our thinking most important mistake in omitting to give the manager any internal communication with the bank, to get to which he would have to leave his own entrance door and go out into the street and round the corner to the bank entrance. This may be hygienic for the manager, as compelling him to go out into the open air on the way to his work, but it is certainly not convenient, and we have never been in a banking residence of this kind in which the manager had not an internal door of communication with the bank. Nor do we like the vestibule to the bank entrance, formed by an internal partition projecting into the bank floor; again an un-architectural way of providing a vestibule. We do not feel at all sure that this prize has been rightly awarded. No. 219 has a good deal of merit in the planning of the ground floor. There has been, we are glad to observe, a larger competition than usual for this prize and the average of merit of the plans is high. Among the other architectural drawings Mr. A. C. Bossom has produced an admirable set of measured drawings of St. Mary, Woolnoth, and Mr. G. T. Smith has received the silver medal for perspective for an excellent drawing of the three centre bays of the Banqueting House. For the perspective drawing in outline open to painters and sculptors only there is, as on some (or most) previous occasions, no competition, which is much to be regretted, since by such a competition future painters might learn something at least of perspective, in regard to which too many of them are sadly ill-furnished, as many a painting of a building shows. Nor is there any competition for the silver medal for original design in ornament.

The competition for a bas-relief containing figures and ornament is also a fiasco, none of the three works sent in having been considered good enough to merit the award of the medal; a decision in which we cannot but concur. The principal sculpture subject, "Samson bound by the Philistines," has however elicited a good competition; there is a good deal of energy, and also good composition, in several of the groups. In the competition for the best four figures from the life there is a very high average of merit, and it is difficult to choose between the sets.

The competition for decorative painting for a public building is the one which, among the painting competitions, is most closely allied with architecture; and it is also interesting that the prize has this year been won by a lady—Miss Chaplin. The subject given was the beautiful and suggestive one, "A Procession of the Hours"; and the prize design is the best in the main, as being more completely a procession than some of the others, and the best in colour and in the drawing and design of the cartoon figure. The influence of Burne-Jones is traceable in the design of the figures in the general drawing, of which some of the heads are much too small. No. 129 runs the prize one pretty close, and we think the figures better designed, as figures, though the composition as a whole is not so harmonious in line and colour. We seem to have seen better results from this competition in some former years.

In the competition for a monochrome sketch for a figure picture—the subject being "Joseph sold to the Ishmaelites," the prize design. by Mr. G. Murray, may be said to be first and the rest nowhere; at least the second prize, a rather misty work showing a good motive in composition, is far behind it. No. 20 has the same kind of merit—a well conceived composition of lines. In general, one is struck almost painfully with the common-place (almost vulgar) character of the ideas and suggestions of these numerous sketches for pictures; they certainly do not promise much in the way either of invention or of dignity of style. The competition for the Creswick prize, on the other hand (won by Mr. Ernest Board), is very gratifying; competitors are more numerous than usual, and the poisonous greens which we too often see in students' landscape painting are much less prominent than we have generally found them. We feel doubtful about the award of the prize; it has been partly won, no doubt, by the author's conscientious study of foreground detail; but that, after all, is not the essential of landscape, and No. 16 is to our thinking a broader, finer, and more matured work. But the general level of the work in this competition is very promising.

NOTES.

The Workmen's Compensation Act.

THE decision on Monday last of the House of Lords in the case of Hoddinot *v.* Newton, Chambers, & Co. appears to have decided two most important points in the Workmen's Compensation Act, 1897, which will in this respect prevent further litigation. These two points can be very shortly and plainly stated. In Section 7 occur the words, "being constructed." The House of Lords have now laid it down that this phrase is not to be limited; it does not only mean being constructed at one time, consecutively; it may refer to acts which, separated by long intervals, are yet constructive. In other words, it covers what is not included in the words "repair" or "demolition." The second point seems once for all to end the shocking state of confusion as to the word scaffolding, and incidentally it may be remarked that a gentle reproof is conveyed to the Court of Appeal for not deciding in all cases which have come before them whether a particular erection was or was not a scaffolding. In future, any erection which would by ordinary people be called a scaffolding must be regarded as such within the meaning of the Act. In other words, in all those cases which have come before the Court of Appeal on this point the thing under discussion was a scaffolding. There is another important observation to be made on this decision of the final Court of Appeal. It shows that this Act is to be construed broadly and liberally. Any one who will take the trouble to read the judgment in this case will see the difference between a liberal and a narrow construction of the Act.

The Interpretation of Contracts.

A CASE of much importance has been decided by the Court of Appeal, throwing, as it does, not a little light on the interpretation of certain contracts. The case was that of Steward & Co. *v.* the Admiralty, and arose out of a contract by the former to supply material for the Portland new breakwater. There was, first of all, a tender issued by the Admiralty. Steward & Co. tendered "approximate amount two million tons." The Admiralty replied that their tender was accepted "for the supply for the new breakwater of about 2,000,000 tons, or such quantity *as may be required*, of cap and roach stone." Two years later the Admiralty, having entered into a contract for the completion of the breakwater by an independent firm, informed Steward & Co. that no more stone would be required, though they had then taken only some 200,000 tons. It was contended by the Admiralty that the words "as may be required" gave them a right to take only so much material as they wished. Steward & Co.

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on the other hand, said that these words were merely a qualification of the contract quantity, and did no more than give the Admiralty a right to take a little more or a little less than the two million tons. This was also the view both of Mr. Justice Day and of the Court of Appeal. In other words, the phrase "as may be required" was held to be equivalent to "approximately." To some extent, of course, the interpretation was governed by the intention of the parties, as shown in the correspondence, and there may be cases in which the recent decision is not applicable. But it seems, nevertheless, to establish something in the nature of a principle that when in a contract a specific amount of material is offered and accepted, words which have in some respects a contradictory force will be regarded as qualifying the governing amount only. This is obviously the business interpretation, otherwise a merchant or contractor might make arrangements for the supply of a large quantity of material, and then have it thrown on his hands.

Lithographing Plans and Bills of Quantities.

IT is somewhat unfortunate that the cases which are of most importance to architects and surveyors are so often only decisions given by juries. Thus the recent case of Metchim *v.* The Hotel Cecil has not the same importance as if it had been given by the Court instead of the jury. It was a claim against the building owner for the cost of lithographing plans and bills of quantities, the defence being that as to the former the expense was included in the architect's fee, and as to the latter that it was included in the quantity surveyor's fee. Mr. Justice Kennedy, in his summing-up to the jury, asked them to say if the architect, who also took out the quantities, had authority, express or implied, to order this work to be done at the expense of the building owner. The jury decided that he had. This, of course, is plain sense, but the case must not be pressed too far, for if the contract were not of sufficient importance to justify the lithographing of plans and bills of quantities, a jury might very well say that the architect or the surveyor, as the case may be, had not authority to pledge the employer's credit for the purpose.

Supplying Gas under High Pressure.

A GREAT economy in the distribution of gas may be effected by forcing the gas through the mains under high pressure. Hitherto illuminating gas has always been supplied to the public at a very low pressure, amounting only to a small fraction of a pound per square inch; but during the last twelve months carburetted water gas, which is now so largely used in London, has been distributed at Royersford, near Philadelphia, under a pressure of 20 lbs. At the recent Gas Congress in Paris, Mr. F. H. Shelton, by whom this novel practice in gas distribution has been adopted, read a most interesting paper on the subject, and showed that the supply of gas under high pressure is both practicable and economical. The loss of gas by leakage is not excessive, and the illuminating power of the gas is not appreciably affected. Mr. Shelton is now supplying gas at high pressure through thirty-four miles of pipe, and has several additional miles of high-pressure gas-mains in course of construction. Before entering the consumer's meter the gas pressure may readily be reduced to any desired point, but possibly many new uses will be found for gas if it can be regularly obtained under high pressure. For incandescent gas-lighting, several devices for increasing to a smaller extent the normal gas pressure have long been before the public under such names as the "Hydro-Press" and the "Intensified" gas light; but the cost of the apparatus for increasing the pressure in these cases is necessarily high, and the mantles employed are too speedily destroyed to render this form of lighting an economical substitute for ordinary lighting under existing circumstances.

English Domestic Architecture.

ON Thursday last week, before the members of the Camera Club, an interesting lecture was given by Mr. G. A. T. Middleton on "English Domestic Architecture." The lecture, which was illustrated by a large number of excellent lantern views of the buildings referred to, would have been better described as "A Comparison of some English, French, and German Works of Domestic Architecture," as examples of the domestic work of both France and Germany were illustrated and described as well as many well-known English examples, though probably no one regretted the wide field the lecturer covered. The development of the house from the castle was the starting point of the lecturer, who traced the change in England from the castle to the manor house, and in France and Germany from the castle to the château. Formal English work, plaster and rough cast, and the half timber work of this country and France and Germany were also parts of the subject dealt with. Perhaps the most interesting remarks of the lecturer related to the half-timber work of Germany, in which country, he said, many very picturesque buildings of that class were being pulled down—not in any spirit of vandalism, but on sanitary grounds, *i.e.* because of the sewage-soaked character of the ground on which the buildings stand. One of the lantern views showed the framework of a modern half-timber German building in course of construction, the timbers being used constructionally, and not merely ornamentally; the timber work being substantial enough to take a filling of plaster or even brickwork.

Cantor Lectures.

IN his third Cantor Lecture on Monday night Dr. Fleming discussed the medium in which electro-magnetic effects take place, and gave a very lucid account of Maxwell's theory of the propagation of electric waves. According to this theory, if we know the electrical and magnetic constants of a transparent substance, then we ought to be able to predict its optical refractive index. Now, until quite recently several substances, including glass and water, were supposed to be exceptions to Maxwell's law. Professor Dewar's discovery, however, of a method of producing large quantities of liquid air enabled Dr. Fleming to determine the electrical constants of those substances at very low temperatures, and his results prove that Maxwell's law is true within the limits of experimental error. The lecturer described exactly how the dielectric constant of a medium, was determined, and gave diagrams showing the extraordinary way in which this constant varied with the temperature. Water, for example, at ordinary temperatures has a constant of 80, but ice at the temperature of liquid air has a constant of only 2·4. He gave a short résumé of the theories of the electro-magnetic medium. In the first theory it was supposed to be a very attenuated form of gas filling all space, but this has been abandoned because it fails to explain the polarisation of light. The second theory was the elastic solid theory, namely, that the ether was a jelly-like substance which existed in the interior of solid bodies as well as in a vacuum, and offered no resistance to the motion of solids through it. This fails to explain the astronomical aberration of light by which the apparent position of a star is always microscopically displaced from its true position in the direction in which the earth is moving. The third theory, recently elaborated by Dr. Larmor, is the theory of a rotational ether, an ether that offers no resistance to linear displacement, but a great resistance to rotation in any direction. He imagines that an electric current consists in a flow of positive and negative "electrons" in opposite directions. It follows that the colder a substance is the more readily can the electrons flow, as they will not be impeded by the vibrations of the molecules, a result which Dr. Fleming has verified experimentally at very low temperatures. According to Dr. Larmor, all matter is solidified electricity. This theory seems a highly artificial one, but as it explains several otherwise inexplicable phenomena, and may probably enable us to arrive at new effects, its study is justified.

London Sewage.

DR. FRANK CLOWES, the Chemist to the London County Council, read a paper upon "The Treatment of London Sewage" before the Society of Arts on Wednesday last. The paper was disappointing, owing to the fact that Dr. Clowes did not give particulars as to the relative costs of the chemical and bacterial methods of treatment, nor details as to the size, &c., of the beds of coke employed by the L.C.C. for the bacterial experiments. Dr. Clowes stated that he did not feel free to give these figures. He showed that from a scientific point of view the results of the bacterial treatment were superior to those obtained by the chemical treatment adopted by the London County Council, and remarked that the effluent after bacterial treatment was well aërated, was able to support fish life, and was not liable to putrefaction; whereas the chemical effluent was not well aërated, was prejudicial to fish life, and was liable to become offensive in a comparatively short period. Dr. Rideal and Professor Frankland took part in the discussion, and both spoke in favour of bacterial treatment, but Dr. Rideal considered that differential treatment should be adopted for the different organisms in sewage. He was glad to hear that Dr. Clowes now admitted that the straw, hair, chaff, &c., which existed in sewage should not be allowed to go on to the coke beds, as the coke soon became choked. He also pointed out that Dr. Houston had shown that certain pathogenic organisms were not destroyed by the bacterial treatment.

The Electric Arc Speaks.

A MOST interesting paper by Mr. Duddell, illustrated by many remarkable experiments,

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was read this week to the Institution of Electrical Engineers. It illustrates very strikingly what a remarkable phenomenon the direct current arc is. Mrs. Ayrton a year or two ago demonstrated many properties of the direct current arc, but no one had then any idea that it was an excellent telephone receiver. Mr. Duddell showed that, by simply shunting the arc with a condenser and an inductive coil which he used for his receiving circuit the arc spoke words distinctly, and could easily be heard at a distance of 12 ft. The discovery is due to Herr Simon, but Mr. Duddell has greatly improved on the original arrangements. The arc acts equally well as a telephone transmitter, any sound made in its neighbourhood being heard in a telephone receiver connected to it. Mr. Duddell showed by means of his oscillograph that when an arc is humming, not only is there a small and rapid fluctuation of the current, but there is also a fluctuation in the electric pressure and in the light emitted by the arc. This is a remarkable result, as no one would have expected that a minute pulsation of the current whose period is about the five-hundredth part of a second could have produced a corresponding fluctuation in the light sent out. The most striking experiment shown by Mr. Duddell was the obtaining of a musical note from the direct current arc by the very simple expedient of shunting it with a condenser. He proved that this was caused by the arc causing an alternating current to flow in the condenser circuit. By varying the lengths or the distance apart of the coils of the wires connecting the condenser to the carbons, he showed that the note emitted altered, and by means of a key-board played a tune on the arc. He also discovered that the ordinary method of preventing a metal switch from arcing by shunting it with a condenser was dangerous when it was used to break the current in an inductive circuit. The prevention of the arc-ing causes a dangerous rise of pressure which may break down the insulation of the cables. He suggests that some of the breakdowns in alternating current electric mains attributed to resonance effects may be really due to the sudden suppression of the arc between metal contacts, and concludes that arc-ing at the switch contacts should be encouraged to a certain extent.

The Bute House Estate, Petersham.

THE Bishop of Rochester has recently opened the Church Room, which has been erected after Mr. J. Kelly's plans and designs, at a cost of about 10,000*l.*, for Mrs. Warde, of Petersham House, who has presented it to the parish in memory of her relative, Miss Ellen Walker. The Church Room, with its spacious hall, institute, and gymnasium, stands within the grounds, covering some twenty acres, of Bute House (near the parish church) which Mrs. Warde bought two years ago, with the intention of preventing their conversion for building purposes, and of setting apart most of the land for the benefit of the parishioners. The house had been a residence of the Earls of Bute, and members of that family were buried in the church. It is stated that Mrs. Warde will also defray the cost of the new church of which the erection has been begun upon the estate.

A Bit of Old St. Dunstan's.

MR. ARTHUR HAWLEY writes: — "Whilst digging a trench for the reception of electric cables in Fleet-street the workmen have recently come across some masonry some 3 ft. below the roadway in front of the Church of St. Dunstan's in the West. This masonry is composed of granite and flint, cemented together with coarse, yellowish plaster, and, being as firm as solid rock, has had to be broken away piece by piece. It is more than probable that it forms part of what formerly were the foundations of the old Church of St. Dunstan's in the West, which is said to have stood some 30 ft. to the south of the site of the present church. The date of the building of the old church is not known, but that it was in existence prior to the year 1327 is certain from the fact that Richard De Barking, Abbot of the Convent of Westminster in that year, granted the Rectory of St. Dunstan's in the West to King Henry III. Maitland's "History of London" (1760), Vol. II., contains a plate of the old church which shows it to have been a low-roofed building with a small tower at the north-west corner. At the south-west corner was the famous clock with the two giants standing ready to strike the hours, the work of one named Thomas Harrys, which was set up in 1671. This clock was one of the great London sights during the last century. Hutton, writing in 1708, says "that the figures were more admired on Sundays by the populace than the most eloquent preacher in the pulpit within."

Mr. Maclean's Gallery.

A COLLECTION of water-colour drawings by Mr. Claude Spero are on view at Mr. Maclean's Gallery in the Haymarket; they are chiefly views in Italy, but are on the whole of more topographical than artistic interest. Two only, Nos. 8 and 66, views at Figaret, present a powerful artistic effect, in the contrast between hills in light and in shadow.

LETTER FROM PARIS.

THE clearing away of the exhibits from the interior of the Exhibition has been very rapid, only a few of the heavy exhibits requiring some time to dismount and pack remain. Nothing has, however, been done as regards the demolishing of any of the buildings, large or small, with the exception of some of the small private undertakings. It has not yet altogether been decided as to which of the buildings will be left standing; this question is, at the present moment, a matter of serious discussion. A committee was formed a few weeks ago for the purpose of looking into the question of maintaining for some little time the various pavilions of the Rue des Nations, and transforming the interiors into small museums to be left open to the public. It is, however, most probable that this scheme will fall through; for one reason, on account of the difficulties of acquiring the various buildings from the nations to whom they belong or the contractors who supplied the materials; and, again, these buildings, nearly all of which are constructed of timber and plaster or cement, would not properly resist the rigours of the winter and make a good appearance next year, except after very considerable expense for repairs. It is said that the German Government has offered to hand over its official building to the authorities, and it is known that the representatives of the several nations have been asked to consider the price for which they would hand over the buildings, whilst the various firms which supplied the interior and exterior fittings have been approached with inquiries as to the prices they require for their materials. The great discussion falls on the question of the Galerie des Machines; should it be left as it is or pulled down? M. Bouvard and others much desire the destruction of this building, which they say hides from view the fine façade by Gabriel of the Ecole Militaire. The general public and the Press are very much against the idea; the building is an admirable example of iron construction, it is a most useful hall for the annual horse and horticultural shows, and in the opinion of the greater number of artists it is much to be preferred for the annual Salons to the new Grand Palais of the Champs Elysées. One scheme proposes the maintaining of the Galerie des Machines for the Salons, and the transferring of the pictures and sculpture now exhibited at the Luxembourg to the Grand Palais, where they would be much more worthily housed than in the present ugly hall annexed to the Palais du Luxembourg. The rest of the Grand Palais could be advantageously utilised to receive a portion of the interesting collection of casts now at the Trocadero, and very much confined and impossible to develop for want of space; portions of the collections of the Louvre Museum hardly fitted to that building would find fresh development if placed in the Grand Palais. The Grand Palais will, as soon as all the pictures have been moved out, be given over to the electricians for fitting with electric light, for up to the present there have been no means of lighting the interior.

The two artistic societies have for the present taken possession of the Grand Palais. The Old Salon will be installed in the part of the palace situated on the Avenue Nicholas II.; the New Salon will occupy the part opposite the Avenue D'Antin. The central hall will be a neutral territory, where the two rival societies will both exhibit their sculpture. But this combination, which is perhaps a first step towards the much desired fusion of the two societies, is threatened in the future by the scheme, seriously entertained by the Department of Instruction Publique to transfer to the Grand Palais the contents of the Luxembourg Museum.

The Exhibition year has enabled us to appreciate the value of the metropolitan railway, which the Municipal Council are now actively pushing on towards completion. The circular line from the Etoile to the Place de la Nation has already been undertaken, and the letting of the contracts for the circular line on the left bank will soon take place. There is also talk of a line under the principal interior boulevards, crossing the Seine twice. M. Chagnaud, the author of this latter project, proposes to adopt a central platform the whole length of the line, with stopping places every two or three hundred mètres. The Municipal Council is considering this project.

A scheme is being prepared for the construction of a moving platform under Paris, nine miles in length, under the Grands Boulevards, the Avenue de l'Opera, and some of the principal streets. Three moving platforms are proposed, the third platform to go at the speed of thirteen miles per hour.

The serious increase of epidemics of typhoid fever in various quarters of Paris has drawn urgent attention to the water supply, and the Municipal Council is taking strong measures by the formation of a Commission whose duties will be the strict supervision of the water engineering work and of the supply of drinking water to the town. Well known doctors and specialists are making careful examination of the various sources of supply and are reporting thereon, and at the last meeting of the Commission the following proposals were adopted:—To render effective and lasting the control of the Commission over the water supplies; to establish a sufficient zone of protection around the various sources of the supply, while over the surface of each zone, say a surface of sixty superficial miles, a constant and rigorous medical supervision shall be made, and on the appearance of any case of typhoid fever in one or the other zones special measures for the disinfection of the locality or localities shall be adopted during the continuation of the epidemic. To supervise the whole course of the supply from the first source as far as Paris, and at once eliminate any supply found to be suspect. To protect the supply from its origin to its arrival at Paris by means of proper sanitary measures as regards the streets and drainage of the localities through which the supply passes, so as to render the supply free from any chance of contamination. To purify the water on its approach to the town by means of filters or other apparatus, and for this purpose to con-

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tinue the researches after means of sterilisation. To separate in the shortest time possible the various supplies.

The reconstruction and rearrangement of the interior of the Théâtre Français has been a much longer matter than was estimated, and it is very doubtful whether the work will be completed for the end of the year, as was lately promised. The indemnities amounting to over twenty thousand pounds to be paid to the shopkeepers who occupied the ground floor of the theatre, have recently been settled. It was found to be absolutely necessary, in the interest of the public safety and the proper arrangement of ready exits from the theatre in case of a panic, to do away with the shops which for many years past have been carrying on business under the porticos. In the auditorium, the arrangement of which is pretty much as it was before, a large ceiling painting by M. Jambon has been put up. In the foyer they have been enabled to repair sufficiently the ceiling painted by Dubufe, but the decorative panels which surround it have been altered. In the meantime, the Gobelins manufactory is completing five tapestries, which are to be placed in the foyer and the gallery of busts.

The Palace of Cardinal de Rohan in the Rue Vieille du Temple, which has held the printing works and offices of the Imprimerie Nationale since 1808, is now found to be too small for the rapidly increasing necessities of the Imprimerie. It has therefore been decided to give this public institution a building of its own, and this building will probably form the subject for an interesting competition shortly.

The campaign led by the Parisian Press in regard to the extreme danger of destruction by fire of the invaluable contents of the Louvre Museum, owing to the close proximity of the crowded offices of the Minister of the Colonies in the Pavillon de Flore, has at length proved successful, for it has been decided to construct, at a distance of about 60 ft. from the wall dividing the new Salle de Rubens from the public offices, a thick and solid wall going from the basement to the roof of the official buildings. The space between this wall and that of the museum will be left entirely empty, and will thus form a zone of protection in case of fire taking place owing to any carelessness in the public offices of the Ministry.

In consequence of the recent trouble at the Ecole des Beaux-Arts and the complaints of the students, the General Council of the Ecole has decided that in future, in the students' competitions, the names of the competitors should not appear on the drawings, but should be replaced by a number corresponding with one on a sealed envelope which should contain the name. This decision has given much satisfaction to the students. At the Ecole the competition in decorative composition in three arts has been decided. The first medal for painting has been awarded to M. Rapin, pupil of M. Gérôme; in sculpture to M. Georges Colin, pupil of M. Thomas; and in architecture to M. Storez, pupil of M. Ginain and of M. Scellier de Gisors. At the Ecole des Beaux-Arts has also been decided the competition opened by a subscription committee for a monument to the memory of Colonel de Villebois-Mareuil. This competition has brought out some fine designs, among which we may mention as quite the best that of M. Raoul Verlet (the architectural portion by M. Deglane). This is the one which is to be carried out. M. Deglane, we may add, has been occupied since the close of the Exhibition with the completion of the decoration for the principal façade for the Grand Palais, which is to be surmounted by two quadrigas in repoussé bronze, after the models of M. Récipon. One of these quadrigas, driven by Apollo, is trampling on Discord; the other, driven by Fame, gallops its four horses over the body of Time.

The interior decoration of the Hôtel de Ville, commenced in 1889, is not yet completed, but probably will be by the end of next year. The decoration of the two grand staircases by M. Olivier Merson is nearly finished. M. François Flameng is completing the figure of Music intended for the Salon des Arts. A landscape by M. de Vuillefroy, which will complete the series of decorative landscapes on the grand staircases, is in course of execution; and M. Formigé will shortly submit to the committee a decorative scheme for the Salon des Cariatides, the pictorial part of which will be executed by M. Merson. M. Cheret is completing the decoration entrusted to him in the room next to the Salle des Fêtes, and which will be framed in white and gilt woodwork. Lastly, M. Denys Puech has finished the model for the relief intended for the Salon Diplomatique, which will ordinarily serve as the office of the Prefect of the Seine. This relief, which will be executed in white marble, represents the apotheosis of the City of Paris, seated aloft in the composition, and extending a protecting arm over figures symbolising Progress, Science, and Labour. A panoramic view of the capital forms the background.

Two interesting exhibitions should be noticed—one that of the pictures of Claude Monet in the Durand Ruel Gallery; the other, in the Georges Petit Gallery, includes a certain number of portraits by M. de Krumhaar. We may mention also the annual exhibition of ceramic work by M. Lachenal, also in the Georges Petit Gallery. In addition to work similar to that of preceding years are some new experiments of great originality, especially what M. Lachenal calls "Ligno-céramique"—that is to say, inlays of faience in different parts of wooden furniture. This application of ceramic work to furniture deserves attention.

The "Société Internationale de Peinture et de Sculpture" has organised its eighteenth exhibition in the Georges Petit Galleries. It includes some remarkable pictures by Mdlle. Delasalle, of the Via Appia at Rome, and St. Peters on a procession day. The Société Moderne des Beaux-Arts has opened, in the same gallery, its annual exhibition, among the contents of which may be mentioned the seapieces of M. Auburtin, views of Paris by M. Houbron, and some admirable portraits by M. Prouvé.

We have to record the death of a painter of *genre* and landscape, who had at one time a certain reputation, M. Emile Vernet Lecomte, who has died at the age of eighty. He was a pupil of Cogniet, and had received medals in the Salons of 1846 and 1863, and the Legion of Honour in 1864. He was connected with the family of Horace Vernet.

The death is also announced, at the age of seventy-three, of M. Eugène Barthélemy, late Architect of the Diocese of Rouen, Honorary President of the Société des Architectes de la Seine Inférieure, Chevalier de l'Ordre Pontifical de Grégoire le Grand, &c. M. Eugène Barthélemy, who was born at Rouen, and pupil of his father in that town, gave an energetic impulse to the study of the architecture of the Middle Ages in Normandy, and the conscientious restoration of nearly all the religious buildings of Rouen and numerous churches in the neighbourhood was undertaken by this architect.

THE ARCHITECTURAL ASSOCIATION:

COLOUR IN ARCHITECTURE.

AN ordinary fortnightly meeting of this Association was held on Friday, last week, in the Meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, W., Mr. W. H. Seth-Smith, President, in the chair.

Messrs. F. Baker and C. J. Goodwin having been elected members of the Association, and some nominations having been read,

Mr. A. Wallace Rimington read the following paper, entitled "Colour in Architecture Seen Through an Artist's Glasses":—

"Gentlemen,—When your Committee did me the honour of asking me to read this paper, I confess I accepted the proposal with some little hesitation. There were several reasons for this, the foremost of which was that, as a painter who has only studied architecture non-professionally, I felt some diffidence in addressing an architectural society upon an architectural subject; but as on the one or two occasions on which I have joined in your discussions I have always been received with much courtesy and forbearance on your part, and as I have a great love for architecture, and have painted and sketched architectural subjects all over Europe for a good many years past, I thought perhaps I might venture to make some few remarks to you upon colour in architecture from a painter's standpoint. Perhaps two further excuses for doing so might be found in the fact that most artists have to make a special study of colour, and that it seems to me the whole question of colour in art is at this moment of special importance.

We live at a time when from various causes the colour sense of civilised Europe has seriously deteriorated, and when, although there is some slight revival or new development of the feeling for colour amongst the cultivated few, it is, perhaps, becoming more and more weakened or obliterated amongst the great majority.

Taking a general view of Europe, and, excepting this partial revival, it is difficult to avoid the conclusion that in decoration, in costume, and in the thousand small objects of everyday life colour tends to disappear, and, speaking broadly, where it remains, to become more crude and less harmonious. And this, I am afraid, also applies to some extent to the fine arts. There are a few good colourists amongst the artists of most countries; but, on the whole, good and powerful colour is becoming rarer in the great picture exhibitions of Europe, and those who have a keen and cultivated appreciation of it are confining their attention more and more to the old masters and to that very small modern school which attempts to carry on their colour traditions. Perhaps it may be said that I am over-stating the case; but, if so, it is from no desire to do so, but because the conviction is forced upon me after a good deal of observation and in spite of the wish that it were possible to endorse the popular opinion as to a general advance of the feeling for colour in the decorative arts.

Compare the present condition of things with regard to colour with what it was in the later Middle Ages or in the full tide of the early Renaissance. Do we not go back to the remaining art fragments of these colour periods and study them with care and reverence, while we are almost hopeless of excelling them in refinement and strength? Does not the glass of Fairford and Trinity Chapel, of Chartres and Bourges, excite our admiring envy, and can we altogether reach the colour harmonies of the working handicraftsman who produced the enamels of Limoges, or the mosaics of St. Mark's, Ravenna, Monreale, and Cefalu*? Do not the early frescoes which are to be found in French and Italian† churches show a widespread feeling for good colour through the long periods in which they were produced, which is absent at the present day? If further circumstantial evidence were necessary, one might enlarge upon the significant fact that it is in the out-of-the-way and little modernised parts of Europe that a pronounced colour sense still lingers amongst the people, like the few remaining leaves of orange and crimson of a once gorgeous autumn.

It is not, however, necessary to press the contention. Even assuming that the opinion is too pessimistic, it is better to see clearly the artistic dangers of our time rather than to underrate them.

We shall at least lose nothing by being on our guard against the decay of the colour sense, and we shall gain much by doing all in our power to stimulate and develop it, and whether we compare our present feeling in Europe for colour with what it was in the past or not, it is at least certain that it contrasts most unfavourably with what it has been for centuries past, and still is, in the East. There is, therefore, much room for improvement: and consideration of the whole question would seem not unadvisable.

And further, in view of the part which colour plays in the economy of Nature, and the fact that it is probable that it has some considerable influence not only upon our minds but upon our health, quite apart from its capabilities of giving æsthetic pleasure and pain, it can scarcely be denied that there are still vast opportunities for widening its use and making it a greater influence in our daily lives and the art with which we are surrounded.

And in architecture, as the oldest and possibly the greatest of all the arts, the study of colour cannot, of course, be neglected.

Whether we like it or not, it must come into play more or less in every building. All materials possess colour of some kind, and this colour directly affects the impression produced by a building. Moreover, the good effect of any architectural work, fine in respect of proportion, line, and detail, may be completely destroyed by a vulgar colour scheme, with bad division of its colour masses or inartistic colour accentuation of unimportant parts; whereas, on the other hand, harmonious and refined colour may, as we all know, add immensely to its interest and dignity.

* For example: Church of the Jacobins at Toulouse, Cathedral of Amiens, St. Savin at Vienne, Cathedral of Chartres, Church of Montoise, and many others.

† San Francesco at Assisi, as a single instance.

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And now, before proceeding to the more practical part of this paper, there is one more proposition which I am sure most of you will agree with, namely, that the whole question of colour is surrounded with great and special difficulties. The condition of public opinion in England and in most European countries with regard to colour is almost chaotic, and although something is at last being done in America,* hardly any attempt is made to promote study of colour as that necessary part of every cultivated man's education which some of us think it ought to be. Notwithstanding this, almost every one professes some taste in colour, and most people pronounce decided though divergent opinions about harmonies of colour and would consider it an insult if it were implied that they were not quite right about them, even though they might frankly confess to nearly total ignorance of, let us say, electrical science or musical composition. Colour is, however, quite as difficult to deal with as musical sound, and probably much more so. It is not easier to strike an absolutely true colour note than to sing a musical one, and the colour scale has a longer and more subtly-graduated range in point of ether waves than the musical one of air vibrations. The colourist has to stop his intervals upon a string a hundred times as long as that of the violinist, and he has often to strike a chord of colour with many more notes in it than a musical one, though if he be a great colourist he will produce it with unerring feeling and truth. Every good picture is, in fact, a series of such chords, carefully selected and combined, and perhaps we may venture to assert that every building ought also to be, even though its colour harmonies may be simpler.

This much at least we may say with some degree of certainty, namely, that every good architectural building ought to have some of the elements of a good picture about it, and that one of these elements is harmonious and interesting colour, and if so, then I would submit to you that it may perhaps be worth while for the architect to consider architectural design in the light of some of the more or less defined principles which guide the artist.

Upon the wider subject of these general principles I do not propose to enter to-night, but did time permit I should like to have included some general defence of such guiding canons in art and trace their development. I must, however, confine myself to saying that there is a certain broad general agreement as to them. *Pace* a few extremists of the naturalistic school; all art has developed from what has preceded it, modified more or less, and sometimes very largely, by the study of nature. The artist, both from experience of what other painters have observed and selected from nature, and from nature herself arrives at some understanding of her laws. He studies other art works, and picks up a secret here and there from the pages of nature's great open book, and thus gradually learns something of how in her most beautiful effects she harmonises and emphasises her form and colour just as he discovers how she produces some of her effects of light and shade. Gradually also he learns that, when his picture is bad and out of harmony, it is because he has broken some one of those laws, the necessity for the observance of which I think can even be traced into his own personal mode of artistic expression. Perhaps he is, to some extent, unconscious of this, and, like Turner, has not the power of putting his experience into words, but every painter, even though he may disown it, works more or less by the light of principles as well as mere feeling.

As the appeal has been made to nature it may, perhaps, be objected that art is art because it is not nature. But all art is, as a matter of fact, founded upon nature, and it would at least seem probable that, as we live surrounded by nature's laws and nature's pictures, what is out of harmony with them is probably bad both for our eyes and our intellects. The Creator can scarcely have intended us to live in opposition to them.

In two previous papers read elsewhere, I have attempted to project the light of some of the more or less universally accepted canons or principles of composition in painting upon architectural design, and to-night I propose to refer very briefly to some of those connected with colour, and to submit the proposition to you that they also are in a greater or less degree applicable to your great art.

In dealing with the subject I find myself, however, in somewhat the same position that Ruskin did when he wrote 'The Seven Lamps of Architecture,' and had great difficulty to prevent their turning into thirteen; but as our time is very limited, I must confine myself to a very few detached ones.

Let us, then, take as our first example that great open secret of nature in regard to good colour which is perhaps more neglected and less understood in these days than any other. I mean the natural law which, in any given coloured object under normal lighting causes the richest colour to be in the half-tones. The power of any colour-producing surface to absorb the vibrations which it abstracts from white light is limited. Thus, where white light falls most strongly upon an object, there its colour-producing powers will after a certain degree of illumination be most weakened, or, in other words, the balance of coloured rays which it gives off will be most diluted. On the other hand, when the light is less strong there will be less dilution and the colour richer. Take, for instance, this piece of drapery. I think even under this artificial light it is quite evident that the richest colour is in its folds, or half tones, and the weaker in its high lights, though these have the same colour-absorbing power and receive more light. In the deeper folds the colour is also still further increased by reverberation, like sound, in a reverberating space. In other words, the natural law is that the colour should be strongest in the half tones.

Now, although, strange to say, the uneducated eye seldom appreciates this law, the great masters in painting, almost without any exception, have observed it most carefully, or, if you refuse to allow that they thought it out, at any rate they felt its action most strongly. Some of the early painters, whose colour is universally admitted to be of the most exquisite kind, combining strength with subtlety, and truth with decorativeness of the highest description, especially did so. Such painters, for instance, as Botticelli, Benozzi Gozzoli, Fillipo Lippi, the Bellini, Perugino, and Titian even went as far sometimes as almost to bleach the high lights of their drapery, and curiously enough, without taking special note of this, one is almost unconscious of the fact, which, instead of weakening their colour schemes, strengthens them.

Turning from the early to the later schools, whatever rank we may give Rubens in other respects, he was at any rate a splendid colourist. Here is what he says in his own words with regard to flesh painting: 'Paint your high lights white. Place next to it yellow; then red, using darker red as it passes into the shadows, then, with the brush filled with cool grey, pass gently over the whole until they are tempered and sweetened to the tone you wish.' Finally, to step back at one stride from Rubens to early classic art in the few fragments of Greek painting that are left to us, the high lights are almost invariably but 'faintly stained.'* I think some of the pictures which are upon the walls, and which have been kindly lent me by some of my brother artists, will serve also to show this principle. On the other hand, the bad painter, and especially the bad modern painter of the French and German schools, nearly always puts his very strongest colour into the high lights, and his half-tones look, in consequence, poor and thin, while not infrequently vulgarity sets its seal upon his work.

There are, of course, exceptions to every law, but in the main this great colour principle of Nature might, I think, be shown to be of value in every form of art into which colour enters. And, turning from painting to architecture, I cannot help thinking that the better recognttion of it ought also to be of assistance.

Though it may not have been definitely worked out in the minds of some of the architects in the Middle Ages and the Early Renaissance, it would seem more than probable that it influenced some of their work. Perhaps some of the brick and marble architecture of Italy and Spain show this. But whether this is so or not is a matter of relatively small importance, for in architecture, as in all else, progress, building upon selected precedent, ought surely to be more striven for than imitation.

To take one or two examples of how the observance of the principle might reasonably affect architectural design; in exteriors, in which varied colour enters, it would indicate the undesirability of putting a weaker colour into a cornice immediately under the eaves of a building, into the under-cut portion of a projecting moulding, or into any hollowed or shadowed surfaces, rather than into those exposed to the full strength of the light, conversely if it were desired to strengthen the general colour effect it would be well to enrich the former with relatively strong and warm colour.

One is often struck, from the painter's standpoint, by the way in which a building of warm-toned material has been made unbearable to the artist by the shivering coldness of its painted woodwork, just where the eye, accustomed to Nature's methods, would expect additional warmth and richness.

Examples of the advantage of keeping recessed mouldings warm and full in colour may easily be found in the mixed brick and terra-cotta architecture of Italy, especially of such districts as those of Pavia, Milan, Bolognia, and Brescia. In the church of Chiaravalle warmth and richness of colour are throughout introduced into the shadowed mouldings and cool coloured materials are always avoided in them; and the same thing applies to the exquisite little campanile of San Gottardo at Milan. Numberless other instances might be adduced, but I would rather suggest practical experiment than precedent. I am not contending either that the general colour or portions of the colour of a building should not, if it is desired, be pale or cool, but merely that the relative paleness or coolness of its parts should, if the colour be varied at all, be in the right place. A white-washed cottage is often delightful, but the violent contrast of much modern white woodwork is detestable, coming, as it often does, just where it is not wanted. So, too, the cold grey frieze or decorated coving of stucco or cement, which is sometimes to be found under the eaves of a red brick building, is often most injurious to its colour scheme. It is cool colour in the wrong place, and it is, I think, especially to be avoided in our sunless climate, where there is no assistance to be obtained from shadows full of rich reflections, and where colour is so much needed in our buildings. We may also draw the further deduction that if the architect uses the richest colour at his command in his high lights, it will not merely be wasted but actually injurious. Experiment will, I think, prove the main contention. We must remember also that colour is so potent that it may completely overpower the light and shade of a design. It surely cannot then be right to use colour in such a way as to lessen the effect of the carefully planned light and shade which the architect has given by his mouldings and other projections and recessings, and observance of this law of colour will help to prevent our doing so.

In addition, it is a significant fact that the experience of the painter shows that by working thus in harmony with the principles of nature it is much easier to deal with strong colour and yet make it look refined. If an example were required to prove this, I might instance Albertinelli Visitazione at Florence, of which I have placed a small colour study upon the walls.

The next principles to which I propose to refer are the twin ones of 'inter-contrast' and 'quality.' 'Inter-contrast' may be described as that interweaving of divergent colours which tends to make them appear pure and luminous. 'Quality,' which is a vague term to which various meanings are attached, may be roughly defined for our purpose as texture.

In painting, the appreciation of and the careful striving after these characteristics of good colour by an artist have much to do with his position as a colourist. For a second-rate and insensitive colourist there is none of that exquisite vibratory or living quality which makes it uncertain whether the tendency of a given colour is in one direction or another, and renders it difficult to analyse it.

In the work of a great painter there is hardly any quiescent or absolutely flat colour. It is all full of palpitating life, and is composed of slightly differing and opposing tendencies and woof and weft of hue towards the warm and cool end of the scale. Take, for instance, the dark toned sea in this picture by Mr. Colin Hunter. Here its broken quality shows a slight tendency towards green, there towards violet or purple. Perhaps there is a broken

* See "Instruction in Colour for Public Schools." L. Prang. "Class Book of Colour." M. Maycock. "Colour Work for Schools." H. P. Chace.

* Fuseli

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red tone under it which tells through: perhaps there are particles of orange which do the work of rendering it luminous and transparent. Take what looks like a nearly plain blue sky which yet is full of light and not a mere surface covered with a coat of paint. Examine it and you will find that warm and cool colours, separate or only partially overlaid, telling through each other, give it its chief charm a suggestion of that exquisite quality which Longfellow suggests when he speaks of

'The tender azure of a sky
Just washed by April rains.'

The physical and optical reasons for this are not far to seek. The retina is excited by the juxtaposition of colours of a slightly complementary tendency in small quantities just as it is by larger adjacent masses. The mind also is stimulated by the introduction of an element of mystery into the resultant tint which gives those possibilities for the imagination without which no art work is quite satisfying.

I need not pursue this part of the subject further. I would rather appeal again to nature and assert for her that no colour of hers is ever without this characteristic in greater or less degree, and that where it is especially present there her colour is of the loveliest kind, as, for instance, in the shimmering atmospheric tints, and in substances like mother-of-pearl and opal. In a word, experience suffices to show that inter-contrast is essential to give colour its full power and interest. It is the art principle of 'exchange' or colour balance—upon which I shall touch shortly—carried much further, and is of vital importance. And not only are inter-minglement and inter-contrast of much value, but also in many cases what, as I have said, the painter calls 'quality,' or texture. All nature's colours are full of this, and though it is sometimes so subtle as not to be easily observed, and the resultant colour-tint seems almost flat, it is nevertheless omnipresent, and it exists, of course, side by side with inter-minglement of colour tones.

It is obvious that these two sister principles are also very applicable to colour in architecture. One sometimes sees a building or part of a building which is interesting in its forms and detail, and at the first glance is not absolutely bad in colour, and yet one feels it is monotonous and unsatisfactory, and that it would be impossible to sit down and paint it. One asks oneself 'why,' and one discovers it is because its colour surfaces are dead and uninteresting, and because there is no play of intermingled colour and no 'quality' in them.

There are many ways in which this dull monotony might have been avoided, at little or, perhaps, no extra expense, by better commingle-ment of material, by rougher and less machine-made surfaces, or by saving the cost of a little carved detail and putting it into the colour scheme. It is, moreover, not only a question of good colour and quality, but also of contrast. In a picture it is essential that different kinds of things should be painted with a different touch; that some should be expressed with smooth sweeps of the brush, others by roughness and loading of the pigment. Variety of handling is necessary to avoid monotony. And as texture so much affects colour, the architect also can by using varied and contrasting surfaces make the colour of his stone, brick, metal, or other material more pleasing to the eye.

If this applies to exteriors, how much more to interiors. There the architect has endless opportunities for producing colour which shall be real colour and of educating the colour sense of his clients. Paint, distemper, and other stains, gilding, coloured materials of all kinds, give him a palette almost as rich and varied as that of the artist.

Much of our modern colour decoration, ignoring as it does these two delightful characteristics of good colour, viz., quality and inter-contrast, is crude and offensive, or severely cold and inartistic, and though it is not of course contended that relatively plain and flat surfaces of colour should never be used, even when they are employed they may be made more luminous or interesting by some attention to these principles.

'Inter-contrast' and 'quality' may perfectly well exist even in what appears at a little distance to be a relatively flat surface; and, of course, this has to some extent been recognised in modern decorative work of the best kind. Apart from artificial surface colours for internal decoration, these characteristics, of course, come into evidence in many materials which are in use for decorative purposes, and which, as in the 'encrusted' architecture of Venice and Arabia, may add great charm to a building. In textured marbles, for instance, the transparent play of colour is one of their chief sources of beauty, as it often is in the vitrified colours of tiles and in various metallic or semi-metallic surfaces. Distance also blends decorative colouring, when the individual colour spots are somewhat crude, into rich masses of colour apparently full of quality and iridescence, and in large buildings this fact might, perhaps, be taken more advantage of.

Granting that these two characteristics help much to avoid monotony, something further is also frequently required which, while assisting the general harmony of the colour scheme of a picture, tends still further to prevent it. The painter finds this in the large and broad principles which he sometimes calls 'exchange,' or partial repetition. 'Exchange' as applied to colour may be described as the carrying over of a smaller portion, or repeat, of one colour mass into another. In most scenes in nature which strike us as especially beautiful we find this constantly occurring. The deep blue of the sky is carried down in smaller quantity by cool cast shadows or reflections from water or leaf surfaces into the warm tints of a landscape, and the effect gives us exceptional pleasure. The red of the sunset repeats itself upon rocks or tree-stems, or is carried into the cool tones of a green glade by touches of autumnal foliage, and we again feel a sense of satisfaction in the colour chords.

As in nature, so in art; and in the work of almost every good painter you will find the principle carried out, even though it may have been less the result of deliberate intention than of unconscious artistic feeling.

To go no further than the pictures in our own National Gallery, plenty of examples might be quoted. I will refer to only two. In Titian's 'Bacchus and Ariadne' there is a deep-toned distance of remarkable strength and purity. Its colour is repeated, or exchanged over, into the warm tints of the figures, while some of their rose coloured drapery is carried up into the sky. In the 'Virgin and Child' by Fra Bartolomeo part of the drapery of the Virgin is a very peculiar cool greenish-grey blue. It has its exact counterpart in the colour of the sky, while portions of the flesh tones are repeated in the clouds.*

Probably you will also be able to detect it in the case of some of the pictures hanging upon the walls.

It is evident that it also applies to architectural design, that many buildings owe part of their satisfactory colour to it, and that it might help to redeem the colour scheme of others. In many cases the colour of a building material has nothing to do with its strength or utility, and there is a fairly free choice to the architect, apart from his opportunities for giving artificial surface colour in interiors and elsewhere. The principle would seem to be very beautifully carried out in parts of the exterior of St. Mark's, and in many other Venetian palaces in which small spaces and panels, and even dots of colour, are carried down into other masses and help to give unity without monotony. So also in some excellent buildings of the early Renaissance elsewhere in Northern Italy and in many Spanish ones which I have sketched with delight. But although a good many precedents may be found amongst the exteriors of architectural buildings, colour has apparently for a long time been so little considered in their design that it is rather to the future treatment of them, when there may be more feeling for colour, that I would suggest that the principle may apply. No principle, however, can do more than assist the artist, and much artistic feeling is always required to carry out colour repeats and exchanges successfully.

Taking two more detached principles from the sister art, I would refer next to those of gradation and 'focussing.'

We all know how important a part gradation plays in Nature, and that scarcely a colour space can be found in a landscape in which it is not present almost to the verge of infinity. Beauty of colour does certainly depend on it in a large degree, and is still further increased in many instances if the gradation culminates in a focus or spot of colour which is predominant.

How, it may be asked, can these principles possibly apply to architecture? Perhaps you will permit me to answer that question by a very brief description of a building which is to me amongst the most beautiful pieces of architectural colour I know in Europe, and to which I have made more than one pilgrimage. I mean the Palazzo Publico of Piacenza. It is a structure of considerable size, interesting and beautiful, not only in respect of its colour, but also as to its general forms and details.

The first story of the north façade is carried upon a substructure of pointed arches raised upon piers. These latter are of cool-toned marble, coolest at their bases, and gradually intermingled with stone of a warm tone, which approaches a delicate pink grey of indescribable tint at the upper part of the arch and in the spandrils. Warmth of colour thus having been led up to, the first story is built of terra-cotta of about the colour of red sandstone, the grey of the substructure is 'exchanged' into this in small quantity by the marble shafts of a line of extremely beautiful windows, and the colour tends towards increased warmth as it rises to the battlements above it. These are finally of red brick of the deepest burnt sienna, mellowed and qualified, of course, by irregularity of tint and the action of time, but still a splendidly strong 'trumpet blast' of red against the sky.

The building is as harmonious in colour as a Bellini background, and it is, I think, an instance of what might be done by introducing the painter's principle of gradation in exteriors.

Nature is continually employing it in the happiest way in her treatment of buildings. I have often painted a roof in which the tiles have been toned down by time to one large gradation towards brown umber or a russet grey, whilst perhaps some interesting feature remains the strongest note of the original colour.

Leonardo da Vinci thought painters might learn a good deal from an old wall. So, perhaps, Nature's treatment of the colour upon a roof may have some significance for the architect. The builders of the delightful old Tudor houses of Gloucestershire varied the size of the shingles or tiles in a progressive ratio towards the ridge. Why should not we vary our colour somewhat similarly? Gradation being a source of beauty in colour, we should at least be careful not to destroy it where it is given by curved surfaces and gradually increasing shadows, which even a few spots or patternings of colour which are out of tone may easily do. 'Focussing' also is unquestionably of great use in painting, in rendering colour more interesting, and in accentuating features or details which it is desired to bring into special notice; and in colour schemes for architectural buildings I think it might also be made use of.

A most important aid to the painter in making his colour tell with some approach to the force it has in Nature is of course contrast. In fact, it is at the very root of the painter's art. Without contrast he cannot even express a sense of light. So too with regard to colour; the full force of colour can only be felt under conditions of contrast, just as movement can best be realised in opposition to repose. Contrast is, however, so powerful an instrument, that the best painters are careful not to overdo its use. A picture is helped by one or two passages of strong opposition—sharp darks entering boldly into lights, or warm colours telling forcibly against cool ones, but in the greater part of a good picture the artifice is not resorted to, and harmony may easily be destroyed by over-contrast, which is the besetting vice of the second-rate painter. It is a very keen-edged, though valuable tool, and may easily cut too deeply, and I submit that these considerations apply quite as much to colour in architecture as in a picture. More buildings seem to be ruined by over-contrast than from any other cause, and it is certain that many otherwise fine buildings are often prejudiced in cultivated eyes solely by reason of it.

It is scarcely necessary to call to your minds some few buildings in London in which strong contrasts have done their vulgarest worst, and seem to have tried to shout down that impossible enemy of the modern architect, namely, the street advertisement.

Still, so valuable a resource as strong contrast cannot be neglected, and in all contrasts the question of the relative quantity of the colour masses is an important factor. A violently opposed colour which would be unendurable when in large volume will be no longer irritating if it is in very small quantity relatively to the principal colour masses. It is

* Other instances of more complexity may be found in the following pictures:—Ghirlandaio's "Procession to Calvary"; Garofalo's "Madonna and Saints"; in almost every Turner, and most of the pictures of Rembrandt, Vandyke, and P. de Hooch.

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often most successfully employed in pictures in very small points of opposition, and it may also be of great use if skilfully introduced in forcing several rather too divergent colours into harmony, just as a slightly discordant accidental is often valuable in musical composition.

Examples of this may, of course, easily be found in the works of the great colourists and also in the ornamental embroideries, enamels, and mosaics of the good colour periods and nations, especially in those of India and Persia and Japan. In architecture I have seen many charming examples in Italy and Spain and in other parts of Europe. The harmonising effect of the detached and isolated points of strong colour in many Moorish and Arabic buildings is often delightful. Moderate contrast of colour would seem to be of special use in architecture where the building itself is relatively uninteresting.

Time presses, however, and leaving some other general principles upon which I should have liked to have touched, I must pass on to two final ones which are closely related and are certainly common to the arts of both painting and sculpture, namely, breadth and harmony.

It seems almost absurd to mention such well-recognised qualities, but I venture to think that, although harmony and breadth of colour are often talked about, they are not such simple matters as most people suppose. We are deceived when we look at a great and harmonious picture by its apparent simplicity, and we fail to realise how carefully through all its colour scheme the subordination of every particle of colour has been felt out. No art work can be really great without harmony and without breadth, for they are necessary to that artistic unity which is the most universally accepted of all laws in art: namely, that in a given work some one essential idea or impression shall hold the attention or appeal to the emotions.

Harmony does not, however, mean monotony, and a picture will be greater and more impressive if, while containing a great range of colour, it is still harmonious. A musical chord is built up of divergent tones, but they bear an inter-relation; and just as in music there is a science of harmony which is of some assistance to the musician and which is founded upon physical and psychological facts, so in colour, as I believe, there are underlying physical laws which, if we knew more about them, might be of great assistance to us. The universe is built up of what we are pleased to term laws, and it would be strange if there were none which underlie our pleasurable and painful sensations with regard to colour as they do with regard to music. Be this as it may, what I would submit once more is, that as harmony of colour is of the first importance in painting, it is also of the first and greatest importance in colour as applied to architecture, and in much of our modern work is insufficiently studied.

Nature, if you leave her alone, tends to harmonise the discords of colour of almost any building, softening down the sharp contrasts, overlaying the surfaces with lichens, or toning them down by time stains and oxidisation; but we often refuse to learn from her, and go on cutting up our pictures with a patchwork of violently opposed colours, and destroying the effect of buildings by crude contrasts and over-emphasis.

Systematic study of harmonious colouring would thus seem to be as needful for architects as for painters; and as it is now mainly a matter of artistic feeling—whatever help we may some day obtain, from scientific systems of harmony and counterpoint, somewhat resembling those of music, I would put in a plea for the study by architects of the great masters of colour in the sister art of painting. Amongst the old masters of such painters as the Bellini and Perugino, Titian, Veronese, Andrea del Sarti, Velasquez, Luini, and Georgione, and amongst the moderns, Turner, Sir Joshua Reynolds, Watts, Burne-Jones, Lady Waterford, Muller, Albert Goodwin, and other members of that great school of our English water colourists, which is universally recognised abroad as being without a rival in Europe, but which we ourselves are too apt to depreciate.

Pictures are interpretations of, or siftings from, the great colour schemes of nature, and they are easier to study and analyse than those of Nature herself. Careful analytical colour studies, as opposed to mere copies made from the pictures of great colourists, may do much to educate the eye and something towards discovering some of their principles.

Most painters plan out in their minds some more or less clearly-seen scheme of colour for their works. Some go further and make a definite colour-scheme upon paper, which, if it is not allowed to chain down the ideas of the painter too much in the development of his picture, is an admirable plan. It might be, and, I suppose, often is, adopted by the architect. But in order to conceive a good colour-scheme, the colour sense of the artist must have been developed. He must have the same kind of experience and feeling which enables the musician to combine musical sounds. Apart from what has been said as to the study of pictures, some few additional means of training the eye and the mind may, perhaps, be suggested. Notes made direct from nature of natural combinations and composition of colour are, of course, valuable. They should not be too detailed, but made rather with a view to decorative and not realistic colouring. They will, of course, not only store the memory, but will help to educate the powers of observation. Of course, I need say nothing to you of the study of Oriental and other systems of colour decoration.

One curious result of the systematic study of colour carried out in this way, is that it also usually develops a more sensitive feeling for form, for notwithstanding what has been said by some writers, it is hard to enjoy a space of colour without being influenced by its form.

Lastly, throughout what I have said I have assumed that what is beautiful and harmonious in colour is admirable. I cannot conclude, however, without touching upon another side of the question. We live in a strange period of the world's history, and just now, among other strange things, there is what most of us think a morbid current of reaction both in literature and in art towards the ugly and repulsive. We know to what this has led in naturalistic literature. The question for us to decide is whether we shall allow ourselves to be influenced in the same direction towards the ugly in art? I trust, for my own part, that the answer may be emphatically in the negative. The movement has dragged many into it through fear of their being supposed to admire what the opponents of beauty often contemptuously call the 'pretty.' It also includes those amongst impressionist artists whom William Morris has spoken of as 'loudly proclaiming their enmity to beauty' as a deliberate choice, and I think, in addition, not a few who have absolutely no sense of the beautiful, but who look upon art merely as a mode of expressing facts or ideas. If art is not to rest upon beauty as its chief foundation it seems to have no *raison d'être*. We had better give up attempting to be artistic and confine ourselves to empirical science. Architecture would then no longer be an art but merely the science of building, and could be left to the builder and the engineer. In such a view of art good colour could scarcely find a place. But this side-current (for, after all, it is a side-current, though it may lead to a dangerous cataract) has arisen principally, as far as colour is concerned, from the weakness of the colour sense at the present day. It is also a standing temptation both amongst artists and critics to place technical skill in front of the higher qualities of an art work, and the production of good colour is one of the least obvious evidences of technical skill. So it is somewhat under-rated.

Perhaps we may trace some slight reflection of this spirit in some of the recent architectural buildings which have risen around us, and in some of the current opinions about colour in architecture that we hear expressed. Let us beware that it does not help to make the flickering flame of such feeling for beautiful colour as exists amongst us burn yet lower.

Lastly, as one who believes that a field lies open for the creation of a pure colour art, wider and greater in its influence, and differing from anything that we have yet seen, and which might do much to add to the joy and culture of life, may I venture to say that whatever architecture may have done in the past for the development of the colour sense, it has it in its power to do much more in the future. Architecture is the one art with which all classes are in contact, and which perhaps more than any other has the opportunity for silently presenting and interpreting beautiful form and colour to them. And those of us amongst painters who love and reverence good architecture with an intensity which we cannot put into words, and who have drawn so many of the great buildings of the past with a thrill of enthusiasm which we can never forget, sometimes have visions of cities in which every building should be full of interest and beauty, and in which colour should play an infinitely greater part in architectural design than it does at present.

And as tending towards the realisation of such a dream, which we know from the experience of the past is not altogether impossible, I cannot help thinking that the closer association of the two great arts of painting and architecture may be of assistance to both, and that more especially in regard to colour, architecture might perhaps honour painting by considering some of her principles and methods.

I would therefore ask you to consider anything I have said thus briefly with regard to a few of the best recognised of them as merely suggestive of some trains of thought with that object in view, and which you may possibly think it worth while to follow out in the light of your more practical experience of architectural design."

The Chairman, in opening the discussion, said the paper afforded a striking illustration of the comprehensive character of the work of the Association. On two successive fortnightly meetings there had been read before them such papers as that by Mr. Walmisley on "Rolled Joists"—full of valuable and scientific information—and now they had had Mr. Rimington's highly artistic paper. They all knew Mr. Rimington's qualifications for reading such a paper were very great, and they also knew that he was the author of that interesting theory, worked out himself in a practical manner, of colour music, which quite took London by storm some time ago. Mr. Rimington was also an artist who had painted many architectural subjects, and had given special attention to architecture for many years.

Mr. G. H. Fellowes Prynne, in proposing a vote of thanks to Mr. Rimington, said he was quite sure that the author of the very able paper which had just been read had come before them feeling that architecture is, or ought to be, the home of all the arts. Architecture embraced painting and sculpture, though it was true it should do so more than it did. The sympathy of the artist for architecture was the only way in which an improvement could be expected in the colour in our buildings. And why was it that artists had not been more employed in the past in colour schemes in public buildings and churches? It was not solely the fault of the architect; it was more because artists had not really grasped what the decoration of buildings meant; at least, that was too often the case. He felt that modern artists were to a great extent brought up in the pictorial school, so to speak, and when the interior decoration of buildings had to be undertaken, very few artists really entered into the architecture of those buildings as they should. Take stained-glass windows, for instance; if one went to an artist to design a stained-glass window one's fear was that the artist would produce a picture in glass, whereas what was wanted was really a glass picture—two very different things. We did not want stained glass treated too pictorially—we did not want decoration of any kind to destroy the architectural lines of a building, but to work in with its main architectural lines. As to Mr. Rimington's remarks as to criticisms on works of painters, that was certainly not peculiar to the work of the painter. Every one seemed to think they had a right to criticise architecture, and the misfortune for the architect was that any errors he made in his buildings lasted, and proclaimed his errors, perhaps, for generations to come; whereas the painter could paint out from his picture any mistake he made. Moreover, a painter generally had ample leisure to study out his work in his studio, whereas an architect, if not rushed, had to do his work in a certain limited time; and although he might feel dissatisfied with something he had done and would like to think over some new treatment of it, the opportunity was not forthcoming. Of course, in buildings many mistakes were made, and architecture was a constant building on the mistakes as well as the good points of others. Architecture, as architecture, was placed at a great disadvantage when compared in that way with painting and sculpture. As

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to the remarks of the author about middle tone, they must agree that all colour to be seen at its best had to be seen in middle tone. We were too much afraid of using our bright colours—too much afraid of using primaries in the way the ancients used them, and the peoples of the East still use them; though, perhaps, it was because we did not know how to use them so as to bring them into proper harmony together, and had made so many mistakes in the matter of using bright colours in high lights. Consequently we had got too much into the way of using dull colours. Let them think of the low toned interiors of our churches, and of the ancient work, in which they would find the use of strong colours—bright green and red and blue, for instance, beautifully harmonised and toned to suit the light of the church. Mr. Rimington had referred to the use of local material. He (the speaker) had felt the advantage when using, say, such a dull, monotonous stone as Yorkshire rag, of breaking it up by the introduction of some other material. As to the advice that was constantly being given that buildings should be decorated as they were in Venice and in Eastern buildings, architects knew that if that were done in London, the result would be garish. In this sunless climate of ours we could not use bright colours such as were used in Eastern countries. In the interiors of our buildings, that did not so much matter, for the light was generally subdued. Most warmly did he wish that painters, sculptors, and architects would work together, hand in hand. The systematic study of colour was just as necessary to the architect who intended to have any colour scheme in his buildings as the systematic study of architecture was necessary to the artist who painted architectural subjects.

Mr. J. D. Crace seconded the vote of thanks and said he had never heard a more admirable or useful paper on colour than the one they had just heard. Colour always suffered from the fact that hitherto there had been no settled scheme or laws relating to it. The laws of music must clearly touch very closely colour, and the theory of that association was a very old one, inasmuch as it went back to the time of Aristotle, who was probably the first to put it into words. Aristotle said that

"It is possible that colours may stand in relation to each other in the same manner as concords in music: for the colours which are to each other in proportions corresponding with the musical concords are those which appear most agreeable.'

That was most valuable testimony of the commencement of the many attempts to lay down the laws of harmony in colour in relation to those of music. The subject was well worth the study of qualified scientific men, but the great difficulty always appeared to be that the person who took up the subject did not understand the laws of music, or did not know about colour, or had not a very scientific mind. If there could be found a man who possessed all these qualifications there would, he thought, be formulated laws closely analogous to musical laws. It was very interesting to read what Goethe had said about colour. But in the introduction to his "Theory of Colour," Goethe said—

"From time immemorial it has been dangerous to treat of colour; so much so, that one of our predecessors venture on a certain occasion to say 'The ox becomes furious if a red cloth is shown to him, but the philospher who speaks of colour only in a general way begins to rave.'"

Goethe had undoubtedly considered the possibility of the association of the laws of music and colour, and another, Castel, a Jesuit, actually attempted "colorific music," and constructed what he called a "clavecin oculaire," in which the music was made to correspond with a colour system. In the latter part of the sixteenth century a Milanese painter invented something of the same kind. As to what Mr. Rimington had said about the value of placing the richest colour in the half tones, it was interesting to know that Leonardo da Vinci pointed out the same thing, for he said,

"The highest light may be comparatively deprived of colour, but some hues are best seen in their fully-illumined parts, some in their reflections, and some in half lights."

He also said,

"That every colour is most beautiful when lit by a reflection from its own surface, or from a similar hue."

It was interesting to note that these writers of past times said much the same as Mr. Rimington. What Mr. Rimington had remarked about the palpitation of colour related to a subject which was not nearly enough attended to by artists—decorative artists, as well as painters. No colour scheme could be really rich in effect which had not that quality of so placing fragments of colour of nearly allied hues together as to produce what was called palpitation of colour, which was one of the great beauties of old stained glass, for instance. As Mr. Rimington had said, the encouragement of the mind to a little play of imagination was a most valuable quality in art. One point which might be dwelt upon advantageously was as to what Mr. Rimington called the exchange of colour, but what he (the speaker) called the recall of colour. That recall of colour applied to decoration as much as to the painting of a picture. The question of emphasis was another important one in decoration. There was no doubt that when colour was carried to a harmonious result, there must be points at which it must be accentuated in order to give proper emphasis to the whole. They must all feel especially indebted to Mr. Rimington for bringing before them so many beautiful paintings, among which he was glad to see some of Mr. Albert Goodwin's works—works which had fine imagination and beautiful colour tones.

Mr. A. T. Bolton said he thought the discussion of the lecturer's admirable paper might perhaps be helped by a little opposition. In speaking of colour in architecture the tendency was to "see red," but they should not separate the question of colour from that of climate, for there was no greater mistake than to suppose that colour necessarily meant the primaries. A great deal of effect could be derived, from the architect's point of view, from the natural weathering of materials, which required the addition of very little of what was commonly spoken of as colour. One of the pictures on the walls—a study of an English landscape of green fields overhung by opalescent clouds—illustrated his point of view. Reference had been made that evening to the difficulty of getting artists to work with architects, but what he thought had happened was that an advance in another direction had taken place since the golden period of the great decorative work of the Renaissance painters. The point of view changed, and the study of painting became a study of light and atmosphere. The painter had thrown aside the decorative treatment which the old masters of the Renaissance had practised. Imagine a modern artist engaged in introducing gold leaf into his pictures in the way the old masters did, when ultramarine and other colours and materials were used in almost an heraldic style! Some time ago he had had an opportunity of seeing a number of modern Greek churches. At Patras, for instance, he observed that the paintings in the churches, although perhaps not much to look at as pictures, were architecturally pleasing. What was the reason for that? In his opinion it was due to the fact that in a Greek church the old rules and methods were adhered to as a matter of doctrine and discipline, so that the modern Greek decorative church paintings were continuations and shadows of the old methods and masters. Any one who had seen the paintings in recent Roman Catholic churches in Italy, and who had also seen modern Greek churches would understand what he meant, and would realise why architects and painters had parted company. He was afraid that Mr. Rimington had not quite understood the architectural points of some of the old buildings he had referred to. He (the speaker) knew the Palazzo Publico of Piacenza very well, and, speaking in the absence of the guide book, his recollection was that the ground floor, which was built of marble, was built first; that there was an interval, and that subsequently the building was carried on in brick. He thought it was extremely probable that the battlements referred to by the lecturer as of deeper coloured brick were of a different period, as in those days, when the people of the towns in Italy were divided into two parties, *i.e.*, Papal and Imperial, if a town changed sides, as it sometimes did, it also was apt to change its battlements, the pattern of which had become accepted as a symbol. Something of the same kind had no doubt happened in the case of other buildings. Take Hampton Court, for instance; the brickwork of the older part had quite a different colour effect to that of the time of Wren, and also to that of the modern brickwork of the Office of Works. In all probability, when an artist painted such a building he knew nothing about that, and might be led to think that this difference in the colour of the brickwork was intentional on the part of the builders. Reference had been made to the brick churches in Milan, where, as the lecturer had said, a deeper colour was obtained in the hollows of the mouldings. But take the case of S. Maria Della Grazie, which had some circular windows with deep-set Gothic mouldings. In a case like that the weather would alter the colour of the rolls and fillets, but where the natural colour of the brick was preserved in the hollows it would be very much deeper. That was an instance of what atmosphere and weather did for architects, and it was the greatest mistake for an architect not to take time and climate into consideration. An architect could not absolutely determine a colour scheme as a painter might in his picture, because the weather and other circumstances would not allow it. In the case of St. Paul's, the effect of which was glorious, the great masses of white and black were determined by the way in which the wind and rain struck the building, and here, at any rate, were elements which the architect could not control. One thing that they could do was to avoid the imperishable material which patentees were only too anxious to foist upon them. He knew of a painful case. A building which most architects would regard as one of the best of modern country houses had been built of a reddish stone, and had, with the exception of the roof, weathered most beautifully. Fourteen years had passed, but the roof, which was of Somebody's tiles, looked as though it had been done yesterday, and in twenty years it would probably look the same, for some materials never would colour. In our climate an architect had not got a free hand in introducing colour. Take the case of the west or park front of the Foreign and India Offices, where Sir G. Scott had been at great expense in introducing into the string courses inlaid marble panels. Circumstances—the London dirt and smoke—had practically obliterated those spots of colour, which were never seen except when the sun was setting, at which time those bands caught the rays and formed lines of fire along the building; but the plate-glass windows did the same, and on a larger scale! There was another way of introducing colour in buildings which had been rather popular, and that was by the use of terra-cotta and granite and similar materials, but all polished surfaces acquire a skin of greasy dirt, which was far more offensive than the natural decay of materials; therefore, in introducing colour, architects had to be exceedingly careful in the case of buildings erected in smoky towns. He quite agreed with what Mr. Prynne had said with regard to the sun. In Sicily many of the country carts were coloured in vermillion, &c., with painted panels and quaint devices, but what would they be over here? In the glorious sunshine the effect was very good. Even common Manchester cottons would, under the wonderful skies of the East, be satisfactory, though we know well enough how they look at home.

Colonel Luard, in supporting the vote of thanks, said that at Keble College, Oxford, the chapel was built of red brick and stone, but the other buildings—no doubt for the sake of economy—were built of red vitrified brick, and the difference now was very manifest. The exterior of the chapel had weathered very satisfactorily, but the other portions, which had not weathered, looked ugly.

The Chairman said he did not think they could altogether blame the climate for our want of feeling for colour. In northern countries, where the climate was very little better than our own—for instance, in Sweden and Norway—costumes, where taste had not been vitiated by modern ideas, were full of colour. He was afraid that the deterioration in the colour feeling was due, amongst other things, to the everlasting striving after money-making, to the exclusion of almost everything else. It must be obvious to them as architects that the great conventionality of their work—the very rigid lines of architecture, the very limited materials at their disposal, and the limited power of varying those materials made the application of any colour principles extremely difficult; but, as they knew, such principles had been observed and had been worked upon by many architects, especially in the country, and they knew of beautiful cottages and country houses where the materials had been very carefully selected, and where the jointing of the brickwork was such as to give the maximum amount of texture to

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that brickwork, where rough cast had taken the place of stucco and one uniform and hard face, and where the tiles were sand-faced, and yet good, hard, honest material which would last. With regard to the application of Mr. Rimington's principles to monumental buildings, it was much more difficult, of course. As to St. Paul's, he did not suppose that a better material could have been selected for use in London. It weathered sufficiently to produce that effect which they knew so well; to have introduced any colour in the exterior of that building would have been a fatal mistake. In connexion with St. Paul's, the sky effect seen through the turrets of the façades helped the building considerably, and was an instance of the effect of interchange referred to. He was very much interested in what Mr. Rimington had said as to the American efforts at training the public in colour. The great natural laws which governed colour and its use both in the case of architecture and the allied art, were no doubt hardly understood, and they looked to scientific men and artists to elucidate those principles by experiment and observation, for those principles would be most valuable to architects. There was no doubt that in Mr. Norman Shaw's work there was a profound sense of the value of colour, and in his new work at Liverpool, *i.e.*, Parr's bank, the colour scheme would be called a daring one, but it appeared to him (the chairman) to be absolutely successful. He was glad that Mr. Rimington had pointed out the importance of studying good pictures. They would all agree with Mr. Rimington's criticism of the practice of putting white paint on the window frames in red brick fronts, cutting up the broad mass of red into little panels with a narrow line of white around them. In the Passmore Edwards' settlement in London, the architects had put a white frieze of stucco underneath the heavily projecting eaves, the general surface of the building being red brick, but he had often thought that the treatment was very effective—due no doubt to the great shadow thrown down on the white surfaces; and he felt that if the frieze were enriched by a fresco, or something of that kind, the result would be very satisfactory, and no doubt something of the kind was the intention of the architects. They had, no doubt, noticed in Italy and other places the heavy projecting eaves with beautiful fresco friezes underneath, and in some of our buildings might be seen sculptured friezes in the same position, with the light falling on the gradated surfaces and producing the greatest richness of effect, both in form and light and shade. In putting the vote of thanks he must include the names of those artists who had been good enough to lend Mr. Rimington their paintings for the purpose of illustrating the lecture, viz., Messrs. Colin Hunter, A.R.A., Blake Wirgman, S. J. Hodson, Alfred Hitchins, Miss R. Wallis, and the Fine Art Society.

The vote of thanks was then put and very heartily agreed to.

Mr. Rimington, in reply, said he was much interested in Mr. Bolton's criticism, because he thought that truth was always best extracted by the clash of opinions. Perhaps the point on which there was the most difference between Mr. Bolton and himself was that Mr. Bolton appeared to be opposed to increased colour in buildings—almost to colour in buildings at all. Mr. Bolton said that the difference in the colour of material of the Palazzo Publico at Piacenza was due to accident. Probably that was so, but he had only quoted the building as an instance of a happy colour scheme which was due to the intention of the architect or the effects of time. So, also, in regard to the campanile of San Gottardo, the colour was accentuated in the mouldings—again probably a matter of accident, but a happy accident, and he had mentioned these instances as showing what could be done and what could be copied in other buildings. It seemed to him that if they were not to employ colour in buildings, and if they were not to look forward to the time when more colour might be employed, they had better give up the whole question at once. He could not agree at all that we required less colour in our dull climate than was required in a climate like that of Italy, and for this reason:—Take the simplest street in Italy—a street, say, of very little colour. As soon as the sun shone all sorts of beautiful colour effects were to be got. In a sunny climate the reflected colour playing about a perfectly white building was simply beautiful, but in our climate a white building remained white, and it seemed more necessary, when no assistance was to be got from the sun or from reflected light, or from what he had called reverberation, to introduce colour. We were afraid in England of colour because our colour sense was not as strong as it might be. He must not be understood to assert that strong colour was always needed, as some of the delicate grey harmonies were just as beautiful in their way as stronger colours. If we did not like strong colour, we could have grey colours and in one of Mr. Goodwin's pictures before them they would see how beautifully grey tones could be treated. As to effects of colour produced by weather being the only legitimate ones, were we to wait fifty or one hundred years for the ugliness of a building to disappear because the architect refused to make a good colour design? Was colour in architecture to be condemned everywhere because London was smoky? Good colour often gained by smoke. He did not mean to say that the laws he had been referring to applied only to strong colour, for he thought they applied to other schemes of colour equally. At all events, if any one objected to colour in the exterior of buildings there was great scope for its use in interiors, and in some cases those laws might be more applicable to interiors than exteriors. He thought he had been a little misunderstood in what he had said as to the relations between painters and architects. He did not mean that architects should directly use the painter's technique in his colour designs. It seemed to him to be most important that colour designs should be conventional when applied to architecture, but he did mean to suggest that the principles underlying the painter's work are applicable to the general colour scheme of a building. He was quite convinced in what he said as to there being a serious deterioration in our feeling for colour, and he thought that architects had more opportunity for educating the public in colour than any other artists. People were constantly in contact with buildings and they imbibed, or might do so, their love of colour from them. That love could not be acquired from costume, because there was so little colour in dress. Architects had it in their power to do very much in the way of an improved appreciation of colour. He had been pleased to meet in Pompeii a party of German architectural students who said they were coming to England to study our colour and decorative work, and he thought that was a tribute to our modern architectural decoration.

The meeting then terminated.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE third meeting of the Session of the Discussion Section was held on Friday evening, November 30, at 56, Great Marlborough-street, W., Mr. C. H. Strange presiding, when Mr. F. G. W. Buss read a paper entitled "Is the Quantity Surveyor a Necessity?" He argued that necessity alone had been the origin of the profession of quantity surveyors, as it was called into being by architects themselves, as how else could a price be set and for work be obtained? The taking out of quantities did not and could not increase the cost of any building; in fact, many contractors would not tender unless quantities were supplied, but inexperienced and unqualified men did undoubtedly increase the cost 10, 15, or even 20 per cent. as they invariably took full measure to cover any mistakes they might make. Quantities were invariably taken out in some shape or form if not supplied by the contractor, and he only naturally made a charge for doing so. Was it reasonable to think that large firms of contractors were going to keep a competent quantity surveyor to take out quantities for nothing for the benefit of the architect and his clients?

The architect taking out his own quantities, he argued, was a misguided man, not nearly so qualified as a professional quantity surveyor; further, as custom usually dictates that the quantity surveyor is to be paid by the builder, the architect acting as the *client's* agent was certainly not in a desirable position. Quantities prepared by the architect were looked upon with great distrust by builders as a body, many adding a percentage to their tender to cover feared uncertain treatment. He held that the client should also have the advantage of the old adage, viz., "Two heads are better than one," and, an independent quantity surveyor checking every detail of the work of the architect, the client got better value for his money, and the surveyor's work including adjusting extras and omissions at the end of the contract.

Mr. Buss also favoured the practice of the quantity surveyor writing the specification, but added he thought he ought to be paid for it by the architect. He should, too, be held responsible for the accuracy of his work, thus weeding out the cheap quantity surveyor, who works at a cutting percentage. Finally he urged that the employer should not be kept in the dark with regard to the question of quantities; the architect should get him fully to understand that the surveyor was being employed and that he (the client) was responsible for the fees for taking them out; and the architect should in common justice make it his business to see that the quantity surveyor was paid, as agreed, out of the first instalment.

Mr. Kimber Bull (Special Visitor), speaking as a solicitor often engaged in questions of building contracts, stated that most trouble arose from the building owner not knowing the fact that a quantity surveyor had to be employed, and being astonished at being called upon (and often refusing) to pay his fees, especially if the work did not go on. Dealing with the recovery of fees the quantity surveyor was in rather a difficult position (supposing the work did not go on). In taking the matter to court and suing the building owner, the quantity surveyor runs great risks: first he probably ruptures his connexion with the architect in future, and also upsets the relations between the building owner and architect, and finally may fail to prove "custom" satisfactory to the jury (to be proved in each particular case), and so lose his case and pay all the costs of the action as well. The architect, if acting as his own quantity surveyor should have express or implied permission from the building owner, and should be paid by him direct, though he held with Mr. Buss that the building owner got better value for his money in employing an independent quantity surveyor. In dealing with public authorities the quantity surveyor's (as also the architect's) position and duties should be under seal, else he could recover nothing above the value of 50*l*. He felt there should be more confidence between building owner and architect in this matter, and a contract between building owner and quantity surveyor would often save disputes.

Mr. W. E. Davis wondered, the architect being considered agent in all dealings with the builder and others, why he should not be considered in the matter of the quantity surveyor.

Mr. W. B. Hopkins thought an agreement between all four parties, the building owner, the architect, the builder, and the quantity surveyor ought to be entered into.

Mr. G. M. Nicholson held that the practice of the best architects, *i.e.*, in employing quantity surveyors, thoroughly qualified men (a "worker-up" needed some eight or nine years to be fully qualified) had been thrashed out and could be taken as sound.

Mr. George Smith, dealing with points raised by one speaker, stated that the War Department still adopted the old custom of appointing two surveyors, one for the department (*i.e.*, the client), the builders appointing the other. These surveyors doing the work together, one as a salaried servant of the department, the other at 1¼ per cent.

Messrs. Weymouth, Greenop, W. A. Pite, and the Chairman also joined in the discussion.

Mr. H. H. Statham held that the true philosophy of all building was on these lines:—The architect to specify everything and the quantity surveyor to find out how much there was of it for the sole benefit of the builder who wants it to price the work to be done. The one point, however, rather forgotten was the tendency of the present system, by cutting down estimates, to militate against the production of really good work such as one could see in the early Renaissance buildings, where it was plain that in the wealth of material and enrichment none had evidently been executed under the harassing bonds of a modern contract. The only way, he felt, to get back to this, was to follow the method of the Belfast Bank he so gladly noticed the other day, viz., placing all in the hands of the architect, instructing him to engage a first-class contractor and accept what

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he thought a fair estimate from him without competition. A great style of building could only again be hoped for in this or any country on these lines.

Mr. Buss, replying to the vote of thanks, the meeting terminated.

MAGAZINES AND REVIEWS.

THE *Art Journal* includes an article on "Lambeth Palace," by Mr. Francis Watt, with illustrations by Mr. E. C. Clifford. An article on "The Ruby," by Mr. G. W. Thornley, is among the contents, and also one on the works of Herr Hiremy-Hirschl, an Austrian artist who appears to devote himself to the painting of ancient Roman subjects. The illustrations do not attract us very much. The special extra Paris Exhibition Supplement is continued.

The *Architectural Review* (Boston), Vol. VII., No. 11, contains among its illustrations two competition designs for the Baltimore Custom House—very French; and the Manhattan Congregational Church in New York, by Messrs. Stoughton, which is French in another way, the modern Romanesque way, which we do not like so much as the modern Renaissance way. Mr. Russell Sturgis contributes a paper on "The Authorship of Architecture," which is an appeal, at the conclusion, in favour of architects doing their own work as much as possible, in which we need hardly say we concur. There is a glance at the historical side of the question also.

The *Berliner Architekturwelt* bestows several illustrations and an article on the Tietz warehouse in the Leipziger-Strasse, by Herr Sehring of Charlottenburg and Herr Lachmann of Berlin; a rather notable instance of the treatment of a business building with sculpture and other decorative accessories. The competition designs for a monumental fountain for Oppeln, by various artists, are of interest as examples of contemporary German decorative art, but the only one we can admire is that by Herr Felderhoff, of Charlottenburg, with a figure standing in the centre of the basin and a stag and sheep on two pedestals on the rim, as if about to drink; the whole a graceful fancy.

The Architectural Record (New York) commences a series of articles on "Great Buildings of the World" with the Palace of Fontainebleau; rather a singular selection to start with, for one might imagine many other buildings with a higher claim to this title; but thechoice was perhaps owing to the fact that Fontainebleau has not been so hard-worked by photographers and sketchers as some other famous buildings. The literary portion of the work is by Mr. Russell Sturgis. "An Idyll of the Renaissance" is an illustrated description of a visit to the Villa Caprarola, not so often visited as its fame would lead one to expect, since it is in a situation difficult of access. An article on "Modern French Architecture" by Mr. Hamlin is a good piece of critical writing, and the illustrations are well selected; we cannot however quite agree that the modern portions of the Chateau of Chantilly are "fully as good as the old, or better;" nor, we think, will most English architects who have visited it echo that sentiment, which is a part of the modern American architects' philo-Gallicism. We regret to see a periodical of the generally high style of the *Record* giving way to the popular taste for personal articles, and publishing views of the interior of an eminent firm's offices, under the title "Where our architects work." Tbis kind of thing is beneath the dignity of a high-class magazine.

The Magazine of Art has an article on the Harris Library and Museum, Preston, a building which shows one of the most important modern attempts in England at uniting sculpture with architecture, in the fine pediment group by Mr. Mullins. The article, however, is mainly concerned with the contents of the building. The Rev. W. Hopkin Rees, a missionary, contributes an article on Chinese architecture, a branch of the art, however, which can hardly be taken very seriously, nor does the author of the article seem to think very much of it. He mentions that there are no architects in China, and that even the plan, agreed upon with the builder, is generally defined verbally and not by drawings. The same number includes an article on the house at Auteuil called "Castel Béranger," where the architect, M. Guimard, has endeavoured to start what is here referred to as the "New Art" in architectural decoration; which, however, does not essentially differ from what is being put forth at present by German architects and decorators. Wildness of line—a kind of "scribble" avoiding anything like definite or symmetrical design, is the main element in this new school of decorative design, which will probably cease to be attractive as soon as its novelty has worn off.

The *Antiquary* publishes an interesting article by Mr. Chalkley Gould on "The Buhr at Leicester," dealing with the early history of Leicester as a fortified town. "The hut-circles at Auchingarch Glen," to which reference has before been made in our columns, are the subject of an article by Mr. David MacRitchie, who regards these circles as the remains of summer habitations "once common all over the British Isles," formed with a breastwork of earth with a superstructure of poles thatched with heather or turf; the remains in question being only the lower portion or earthwork. The writer suggests that, though a very ancient form of habitation, these actual examples may be comparatively recent. The "Diary of Journeys in England" between 1761 and 1762, of which the third number is published this month, is of no little interest.

The most prominent article among the multifarious contents of *The Artist* is one on the works of Mr. Abbey, with a portrait and other illustrations.

The *Architects' and Builders' Magazine* (New York) contains the third number of a useful practical article on "The Superintendence of Sanitary, Hydraulic, and Gas Piping," by Mr. W. Paul Gerhard, some of whose treatises on sanitation have been mentioned before in our columns.

Feilden's Magazine includes an article on "The American Isthmian Canal," the new Panama Canal scheme, which appears to be actually in progress, and is following de Lesseps' route, with only some slight variations. "Electrical methods of heating as applied to the working of metals" is continued, as also Mr. Twelvetrees essay on the Central London Railway.

The *Engineering Magazine* includes an article on "Machine-shop Expense Account," on the best method of keeping factory accounts; one on "The Iron Ores of British Columbia," and one on "Central Station Practice in England" in connexion with electric lighting, an article containing much interesting information.

Scribner contains a long article on "Puvis de Chavannes," by Mr. Le Farge: an extremely just and thoughtful critical summary, pointing out the true greatness as well as the limitations of the great French painter's art. Under the heading "The Field of Art" are some good remarks on "Portrait-painting and the State," urging the duty of a Government to encourage the painting of portraits of its eminent men, both to commemorate them and to form a decorative adjunct to the interiors of public buildings.

The *Century* contains a reprint of Milton's ode on the Nativity, with pictures and decorations, mostly in colour-printing, by F. V. Dumond. Mr. Birrell contributes a picturesque article, "Down the Rhine," with some charming illustrations. An article by Sir W. Besant, under the title "East London Types," gives some interesting historical information in regard to the suburbs of the Stoke Newington and Hackney district. Cole's "Old English Masters" is represented by an engraving of a picture by the elder Leslie; not however one of the most representative of that charming artist's works.

Harper includes an article by M. Benjamin-Constant (whose name is incorrectly printed without the hyphen) on "Victor Hugo as an Artist," with illustrations of original and rather fantastic sketches by Hugo, the value of which we think is over-rated.

The *Monthly Review* contains an illustrated article by Mr. Roger Fry on the work of Giotto at S. Francesco at Assisi, and how much of it is Giotto's and how much the work of another and un-named artist. Mr. Fry, by the way, seems disposed to dismiss Cimabue as little better than a myth; but in that case how does he explain Dante's well-known couplet (which he quotes) to the effect that "Cimabue held the field, but now the cry is Giotto" &c.? Dante was in a position to know, and his expression implies that Cimabue had an actual and wide renown as a painter; it can mean nothing else.

In the *Fortnightly* Mr. C. Sheridan Jones makes a violent attack on the London County Council in respect of their dealings with the Housing of the Working Classes problem. Some of his criticisms are to the point, no doubt, but he injures his own case by a violence of language which is likely to alienate rather than convince readers.

The *Pall Mall Magazine* includes an article on "Royal Tapestry at Windsor," by Mr. Ernest M. Jessop, which contains a good deal of interesting information in regard to tapestry work in England and France. In the same number is an article, under the heading "Capitals of Greater Britain," giving a description and illustrations of Wellington, New Zealand.

In the *Revue Générale* M. Julien Buse concludes his article on working-class dwellings.

The *Essex Review* has an article, with some curious illustrations from ancient seals, &c., on ancient legends connected with the arms of Colchester. "Life on an Essex Farm Sixty Years Ago" is an interesting bit of social and industrial history.

The *Genealogical Magazine* gives an illustration of an old Roman memorial sculpture found at Hexham, representing a mounted knight, with an inscription to "Flavinus, Knight of the Petriana Cavalry."

The Christmas number of *Country Life* deserves mention for its numerous and well-executed illustrations.

We have received also the *Gentleman's Magazine*, *Knowledge*, and the *Quarry*.

ARCHITECTURAL SOCIETIES.

THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.—The annual general meeting of the Royal Institute of the Architects of Ireland was held on Thursday, December 6, at the Institute rooms, 20, Lincoln-place, the President, Sir Thomas Drew, R.H.A., F.R.I.B.A., in the chair. The President said he had some correspondence to lay before them formally. The first letter was the reply of her Majesty the Queen to the address presented to her Majesty by the Institute. He had received a communication of a private kind from the Directors of Science and Art Department in Dublin, in reference to the better technical education of architects, and he was in consultation with the Council of the Institute on the subject. He had also received a letter from Mr. W. J. Gilliland, of Belfast, in reference to the formation of a branch of the Institute there, and the matter would be attended to.—The Acting Secretary, Mr. William M. Mitchell, R.H.A., then presented the annual Report of the Council, on the motion of Mr. Rawson Carroll, F.R.I.B.A., seconded by Mr. W. Kaye Parry, F.R.I.B.A., the Report was adopted. Mr. Charles A. Owen, F.R.I.B.A., the Hon. Treasurer, then read his Report, which showed a balance in hand of 74*l.* 1s. The amount of new 2½ per cent. stock invested in the names of the Trustees now stood at 450*l.* 9s. 5d. The amount of arrears due was 24*l.* 3s. Mr. Owen also read the Report of the Arts Committee, which was adopted. The President then delivered his address.

After some preliminary and personal remarks, he said:—"I propose to make my special address, on this last occasion when I can rejoice in speaking with authority, on the subject of 'Insularity and the Effacement of the Irish Architect,' and to lecture my brethren. An old and valued correspondent of mine in London, who knows more of current affairs in the profession and of architects than, I believe, any man living, or who is ever likely to live, and a friend towards Irish Architects, has consistently held and directed to me a taunt that Irish architects effaced themselves. In their insular tradition and easy-going national temperament they did not assert themselves in the modern world of architecture at large. It is delicate ground, perhaps, to touch on, but the situation is one to be plainly debated. In the rapid change of universal society (on which I have dwelt as affecting our fraternity with architects at large) I feel bound to notice that this development has brought an increasing number of architects who are not of Ireland to practise in our midst. It would be an invidious thing to make a list of the architects from across Channel who in the past two or three years have been called to lend variety to a, perhaps, too insular school of architecture. I am bound to say I have not heard from a single member of our Institute a murmur of discontent at the new migratory excursion of the cross-Channel architect in force of num-

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bers. The fair and courteous professional feeling among us is summed up in the saying that 'He who pays the piper should call the tune,' and indeed, call the piper too, even if the national pipes on which the performer plays are other than the refined and harmonious instrument of Ireland. The fact, however, remains that an expenditure on many architectural works which will not be particularised, may in the aggregate be estimated at a very large amount, and has not been under the service of architects of Dublin or Ireland. The causes of this migration habit are worth consideration. Some strange sheep, no doubt, enter our fold by the fair path of competition; but beyond this it seems due in a measure to the administration of the Departments of State, civil and military, which shows antipathy to employment in public buildings of any but Departmental architectural officials, or, if an outside architect in any instance for Irish work, one selected and in reach at headquarters in London. There is also the new development of employment of outside capital in buildings in Dublin under operations of the syndicate system, and by companies having their headquarters in London or other large places. With them there is a tendency to finance and direct their scheme for Ireland with an architect at the fountain head, a matter very properly for their own consideration as matter of business. There is also a certain fashion, indicated by the appearance of very admirable works among us, to introduce the work of eminent English architects into Ireland. Who is to say that this may not be for the ultimate advantage of architecture in Ireland, and the making of its future history. Let us remember that the making of a past history of Dublin architecture, of which we are proud, was not that of native architects but almost exclusively of the imported foreigner. Our policy if we would turn back the tide of friendly invasion would be, as our wise old mentor, my correspondent referred to, would counsel, to play at returns, and put Irish architects more in evidence in the general affairs of the profession of the kingdom at large. There is no doubt such advice is sound. The Irish architect fails to exhibit his interest and critical faculty in works of imperial concern. He is not ambitious in communicating his works by published illustration or by exhibition to an outside world, and while the literature of architecture is every day increasingly enriched by authorship of architects in publications, the Irish architect (with no lack of sufficient ability among us) does nothing to add to the store, or advertise the scholarship in architecture of any architects in Ireland. It may not be, perhaps, granted to the elders of our profession to see a reciprocity spring up under which the Irish architect, famous as some sort of specialist beyond Dublin, may be called in his turn to do service on other sides of the Channel. There is a hope, however, arising in the spirit of a new generation of younger architects—in the enthusiastic movement for better architectural education of the Architectural Association of Ireland, which it is the delight of their elder brethren of a past tradition to encourage and applaud—that by every legitimate means of competition a school of architects of Ireland may hold its own among the allied societies of the kingdom of the future. A new century opens with the spirit of healthy and hearty rivalry in all manner of play of 'return matches.' It has been my earnest advice to those who seem in earnest in producing more proficient architects in Ireland to play up for the credit of their Irish side in architecture, in matching themselves against the healthy rivalry of those schools trained elsewhere—to be better draughtsmen, better scholars, better men of a universal world. And I might add, if it were necessary, to be forward players too, not wanting in cool audacity or self-assertion, or confidence in their own superlative powers—why not? I have a hesitation in saying however, knowing my young countrymen as I do, that the last advice is absolutely called for."

The ballot for the election of the council resulted in the election of the following members:—William M. Mitchell, George C. Ashlin, C. J. MacCarthy, R. Caulfield Orpen, Albert E. Murray, Charles Geoghegan, J. Rawson Carroll, W. T. Sheridan, and J. J. O'Callaghan. Mr. Frederick Batchelor, F.R.I.B.A., President of the Architectural Association of Ireland, was also elected a member of council, *ex officio*. Mr. W. Kaye Parry, F.R.I.B.A., was elected Hon. Secretary for the ensuing three years, and Mr. Charles A. Owen, F.R.I.B.A. was re-elected Hon. Treasurer. Messrs. Allberry and Winn were elected Hon. Auditors. Mr. William Hercules Mandeville Ellis was elected an honorary member of the Institute. The proceedings then terminated. In the evening the annual dinner was held at the Central Hotel, the President of the Institute occupying the chair.

LIVERPOOL ARCHITECTURAL SOCIETY.—Mr. Alfred Darbyshire, of Manchester, read a paper on "Some English Cathedrals" to the members of the Liverpool Architectural Society, in the Law Library, Cook-street, on the 3rd inst. By means of lantern views Mr. Darbyshire showed the various phases of Gothic architecture of English cathedrals.

ARCHÆOLOGICAL SOCIETIES.

ROYAL ARCHÆOLOGICAL INSTITUTE.—At the general meeting on December 5, Sir Henry H. Howorth, President, in the chair, Mr. Wentworth Sturgeon exhibited a collection of objects found during an excavation on the site of St. John's Priory, near Lechlade, Gloucestershire. A paper was read by Rev. J. C. Cox, LL.D., entitled "Northamptonshire Wills *temp.* Henry VIII." Dr. Cox said there were an unusual number of sixteenth-century wills for Northamptonshire which were mainly at the probate office of the county town. There was not a single parish unrepresented, and he was able from the pre-Reformation examples to construct a perfect list of church dedications throughout the shire. This list proved what a large number of dedication blunders there were in modern calendars and directories. The wills showed that there was a good deal of substantial church repair going on in the county in the early part of the reign of Henry VIII., particularly with towers and spires; occasionally a new aisle or south porch was built. Much work, particularly in the way of gilding and painting, was being done to the rood lofts. The bequests for costly vestments, altar plate, candlesticks, &c., were numerous, and where the testator was too poor to bequeath a costly gift of this character he usually left some trifle "towards" the necessary outlay. One of the most interesting features relates to service and other books. Although printing had come into common use for church books, the art of writing and illuminating them had by no means been abandoned. A bequest was cited of 5*l.* for a breviary, which had been begun to be written by a friar of Hertford during the testator's lifetime. Charity-schools, funeral feasts, and a variety of curious customs were illustrated by extracts given from these Northamptonshire wills. Every church was in the habit of receiving bequests for maintaining a light before different images, several of small size having as many as five or six. From an ecclesiological point of view, the wills at the different stages of the Reformation movement were particularly interesting; they proved that in country districts the various injunctions about lights, &c., were but tardily obeyed.—Mr. Philip M. Johnston read a paper on "Hardham Church and its Eleventh Century Paintings." The little church of Hardham, with the Saxon dedication to St. Botolph, on the River Arun, near Pulborough, is a primitive structure of nave and chancel, typical in dimensions and rude simplicity of many others in that part of West Sussex. Its walls of roughly-plastered sandstone rubble contained a quantity of Roman material, quarried from some building close at hand. Taken in conjunction with the hammer-dressed masonry, the inclined jambs of the small windows, and a singular square-headed doorway on the south side, this fact seemed to point to a very early date for the erection—between 1050 and 1100; and to the same exceptionally remote period the author ascribed the paintings covering the interior of the building. These were partially laid bare in 1868, but had been little noticed, and had suffered considerably in the interval from neglect and various destructive agencies. They had now been rescued from further decay, and by the removal of the remainder of the whitewash Mr. Johnston had been enabled to clean, size, and varnish the whole of the paintings. He also made tracings of the most interesting portions. These which were exhibited included the Annunciation and Salutation—the former in exceptionally perfect condition. Above was the hexameter in white letters on a red ground ✠ VIRGO SALVTATVR. STERILIS FECVNDA PROBATVR; the character of the lettering and the square c in *fecunda* denoting a date before 1100. The announcing angel held a lily sceptre in his left hand, and the Dove is shown hovering over the Virgin's head. Mr. Johnston also exhibited a coloured tracing of the Fall, from the east side of the chancel arch, which showed very remarkable details combined with striking colouring. It was painted to imitate a piece of tapestry hung by loops on the wall. The Last Supper and Visions from the Apocalypse were among other subjects in the chancel, the Twenty-four Elders being represented as playing on fiddles—another mark of very early date. In the nave were two tiers of paintings, the subjects of the upper being taken from the Birth and Infancy of Christ, and the lower being of allegorical or legendary character. Of the latter, Lazarus being carried by the angels to Abraham's bosom, and St. George at the battle of Antioch, were the best preserved, the last-named showing kite-shaped shields of an early type. The west wall appeared to have been occupied with representations of Hell. Mr. J. G. Waller and Mr. C. R. Peers entirely agreed with Mr. Johnston as to the date to which he had ascribed this series of paintings. Messrs. Rice and Dewick also took part in the discussions following the papers.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The third meeting of the Session was held on the 5th inst., Mr. C. H. Compton, Vice-President, presiding. A paper by Mr. T. Cann Hughes, M.A., entitled "Rambles in South Devon," was read in his absence by Mr. S. Rayson, sub-treasurer. A curious feature of the church at Totnes is a large buttress at the south-east angle of the chancel which formerly had a way through it, now blocked up. From time to time considerable discussion has taken place as to the object of this curious passage (see "Notes and Queries," 1st S., ii., iii.), but it is still an unsolved problem. One suggestion made is that it formed a place of deposit for the bodies of persons seized for debt. The church, which is dedicated to St. Mary, possesses, it is said, one of the finest examples of a stone rood-screen. The screen is 60 ft. in length with parcloses, of rather unusual design. It is full of light tracery and rich with niches and tabernacle work. The screen is groined only on the west side, all the tracery in the fan groining being pierced through. It was erected to the order of the Corporation of Totnes in 1460. The chief features of Dartmouth, Ashburton, one of the old Stannary towns created by Edward I. in 1285. Berry Pomeroy, Kingsbridge, Abbotskerwell, and Ipplespen, and other places were also described.

COMPETITIONS.

TECHNICAL SCHOOL, TYLDESLEY.—In this competition the first premiated design is by Mr. John Holt, C.E., architect and surveyor, Exchange Buildings, 6, St. Mary's-gate, Manchester.

POLICE COURTS AND FIRE STATION, BLACKBURN.—The assessor in this competition (Mr. A. N. Bromley, of Nottingham) has selected the design by Messrs. Briggs & Wolstenholme and Messrs. Stones & Stones, two Blackburn firms who competed conjointly, and his award has been accepted by the Corporation. The competitive designs are on view in the Town Hall, Blackburn, till to-day (Saturday).

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—The forty-seventh annual general meeting of the Society of Engineers was held on December 10, at the rooms of the Society, 17, Victoria-street, Westminster. The chair was occupied by Mr. Charles Mason, Vice-President. The following gentlemen were duly elected by ballot, as the Council and Officers for 1901, viz.:—As President, Mr. Charles Mason; as Vice-Presidents, Messrs. Percy Griffith, James Patten Barber, and David Butler Butler; as ordinary members of Council, Messrs. Joseph Bernays, G. A. Pryce Cuxson, W. H. Holttum, R. St. George Moore, Henry Sherley-Price, Nicholas J. West, Joseph W. Wilson, and Maurice Wilson; as hon. sec. and treasurer, Mr. George Burt; as hon. auditor, Mr. Samuel Wood, F.C.A. The Chairman announced that the hon. treasurer, Mr. George Burt, had presented to the Society

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a President's badge of office in gold and enamel. He also announced that the following premiums had been awarded by the Council for papers read during the past session, viz.:—The President's gold medal to Mr. Henry C. H. Shenton for his paper on "Recent Practice in Sewage Disposal," the Bessemer premium to Mr. Richard F. Grantham for his paper on "The Closing of Breaches in Sea and River Embankments," a Society's premium to Mr. C. Rous-Marten for his paper on "English and French Compound Locomotives," and a Society's premium to Mr. Robert Henderson for his paper on "Paper-Making Machinery."

Illustrations.

COMPETITIVE DESIGN FOR MUNICIPAL BUILDINGS AND TECHNICAL SCHOOLS AT SOUTHEND.

THE proposal of the promoters of this competition was to fit a town hall of large dimensions, municipal offices and council chamber, a technical school, a fire brigade station, and eventually also a police-court, a police-station, and a public free library into a single block of buildings upon an irregular site. The relative situation of several of the sections was indicated in a general way, and the problem before the competitors was to devise, under these conditions, a convenient and stately building, of which the town might be proud, at a price which was put, as is so often the case, at an almost impossibly low figure.

As there was no question of erecting the whole block at once, but only those sections of it for which money was available, the provision of the scheduled accommodation and the other requirements were more fully considered in preparing this design than the eventual cost.

F. T. BAGGALLAY.

ENTRANCE GATE AND LODGE TO A MANSION IN SUFFOLK.

THE lodge and gates, of which a plan is also given, form the entrance to Cavenham Hall, and were completed early last summer. The gates are executed in English oak, with wrought-iron grills and wrought-iron electric light fittings.

The lodge, besides the accommodation shown on the ground floor plan, contains three large bedrooms on the first floor with two cupboards for storage purposes. The external woodwork is deal painted white. The cornice and eaves gutters are also of the same material, with lead lined gutters.

AND. N. PRENTICE.

DESIGN FOR CHURCH OF ST. EDWARD, BARNSLEY, YORKSHIRE.

THIS church was designed to hold 414 persons exclusive of choir, which would number 22—the nave having seats for 270, and each of the side aisles for 72.

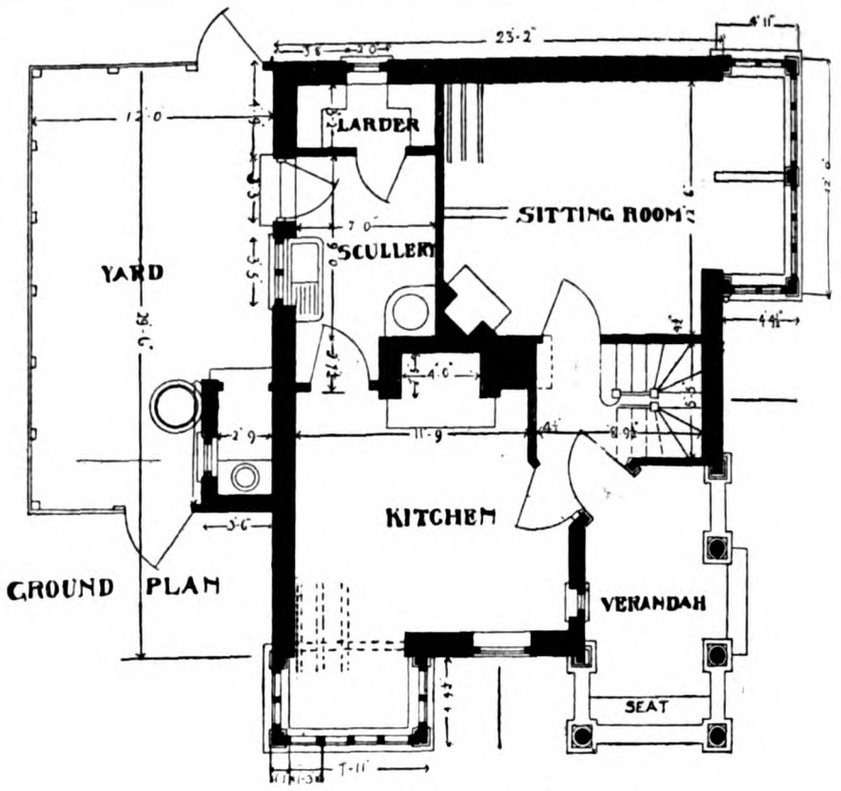
For the sake of economy, and owing to a considerable fall of the ground towards the east end, the choir vestry is placed below the clergy vestry, and access to the church obtained by a staircase. A parish room and heating-chamber are provided under the chancel. The organ is placed on the north side of the choir and partly over the clergy vestry.

The interior of the church was proposed to be plastered with stone arcading and dressings, and with wooden dado up to the cill level of the aisle windows. The roof to be open timbered, with carved principals, and all stained green; the rest of the internal woodwork, with the exception of the chancel fittings, was to have been treated in a similar manner, which would have given a cheerful and bright appearance. The exterior walling would have been faced with Yorkshire parpoints with ashlar dressings.

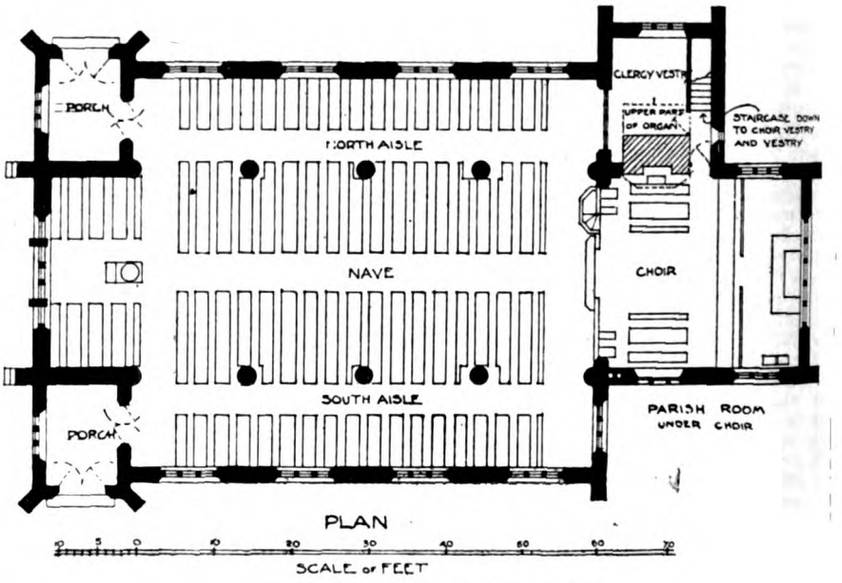
No tower or expensive features were provided, in order to keep down the cost. A bell turret, with lead spire, is provided over the chancel arch, which would have been a dominating feature from all sides of the church. The cost was estimated at about 4,500*l*.

The drawing was exhibited at the last Royal Academy exhibition.

HAROLD C. TRIMNELL, A R I.B.A.



Entrance Lodge to a Mansion in Suffolk. Plan.



Design for Church, Barnsley. Plan.

ST. EDITH'S CHURCH, ANWICK, LINCOLNSHIRE.

THE Church of St. Edith, Anwick, Lincolnshire, is one of the most beautiful examples of the decorated period of Gothic architecture, and is well known by architects and archæologists throughout the country.

The church consists of nave, north and south aisles, western tower and spire, and south porch, and all that is left of an evidently fine chancel are two western bays, the roof of which has been lowered to the springing of the windows. The arcades, which are exceptionally fine, consist of four bays on the north supported by clustered pillars with a band of nail-headed ornament on their caps. The hood mould of this arcade is also enriched with a band of similar ornament. The south arcade is in the decorated style, its pillars being supported by diagonal plinths and having clustered shafts.

The whole of the building, with the exception of the north doorway and arcade, which are Early English, is of fourteenth century date.

The church has had three roofs at different periods, as shown by the weatherings on the east wall of the tower, one of which was so high as to cover the eastern belfry window.

In taking down the modern east wall of the chancel the whole of the tracery of one and the greater portion of another of the side light windows was found buried in the foundations, also a large portion of the original east window, moulded arches, labels, and a considerable amount of other stone work, and, where possible, every portion has been placed in its original position.

The church was opened after the first portion of the restoration on September 29 last by the Bishop of Lincoln. Owing to lack of funds the entire restoration of the building is impossible, and it is therefore hoped that it will be carried out in separate contracts as the money for each portion is collected.

The first contract consisted of restoring the chancel, the drawings for the work being made by Messrs. Brewill & Baily, architects, of Nottingham and Newark, under whose direction the work has been carried out by Mr. F. Pattinson, builder, of Ruskington, near Sleaford.

SOME EXAMPLES OF DECORATIVE DESIGN.

THE four designs collected on this plate were all exhibited at the last Royal Academy Exhibition.

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The design for a chintz, under the title "Spring," by Miss Gertrude Hildesheim, was drawn at the School of Arts and Crafts in Regent-street from a branch of apple-blossom which had been brought in; the thrushes being added to complete the idea of Spring. The design was practically left unaltered, but, of course, was made in accordance with the necessary measurements for a chintz. The repeat is 7½ in. by 6 in.; there are six colours, and the design is meant for block-printing on a glazed white ground.

The studies for wall-papers, by Mr. Rupert C. Austin, were designed with the idea of keeping the forms as close to nature as possible, the constructive lines being arranged on a purely conventional basis; by this means it was thought that symmetry might be obtained without sacrificing the natural character of the forms.

The studies have been somewhat modified in the larger scale, and are reproduced by Messrs. Chas. Knowles & Co., of Chelsea.

The frieze and dado for a bathroom, by Mr. C. H. Temple, are to be executed in encaustic mosaic, the ornament being in transparent coloured glazes of blues and greens on a golden sienna lustred background. The filling is composed of under-glaze painted tiles in blues and greens on a cream ground. The work was designed for Messrs. Maw & Co., the well-known tile manufacturers.

ROYAL ACADEMY PRIZE LIST.

THE following is the list of students who have obtained prizes at the Royal Academy Schools:—

Landscape painting, Creswick Prize (30*l*), Ernest Board.

Painting of a figure from the life (open to male students only).—Silver medal—1st, Ernest Board; 2nd, Ernest Howard Shepard.

Painting of a head from the life.—Silver medal—1st, Ernest Board; 2nd, Florence Eleanor Chaplin.

Painting of a draped figure (open to female students only). — Silver medal — 1st, Gertrude Lindsay; 2nd, Maud Marion Wear.

Cartoon of a draped figure.—Silver medal and prize (25*l*), Fred Appleyard.

Design in monochrome for a figure picture. Armitage Prizes—1st (30*l*.) and bronze medal, George Murray; 2nd (10*l*.), Ernest Board.

Design for the decoration of a portion of a public building.—Prize (40*l*.), Florence Eleanor Chaplin.

Set of six drawings of a figure from the life (open to male students only).—1st prize (50*l*.) and silver medal, Francis Edward Colthurst; 2nd (25*l*), Fred Appleyard; 3rd (15*l*.), Ernest Howard Shepard; 4th (10*l*.), Noel Denholm Davis.

Drawing of a head from the life.—Silver Medal—1st, Nina Isabel Baird; 2nd, Edith Maud Mair.

Drawing of a statue or group.—Silver medal—1st, Catherine Ouless; 2nd, Bernadine van Mentz.

Model of a design.—1st prize (30*l*.), Alexander James Leslie; 2nd prize (10*l*.), Charles James Pibworth.

Set of four models of a figure from the life (open to male students only).—1st prize (50*l*.) and silver medal, Stanley Nicholson Babb; 2nd (20*l*.) Charles James Pibworth.

Model of a bust from the life (open to female students only) —Silver medal—1st, Mary Constance Buzzard.

Model of a statue or group.—Silver medal—1st, Sydney March; 2nd, George Gilbert Walker.

Design in architecture.—Travelling Studentship (60*l*.)—Henry Tanner.

Set of architectural drawings.—Silver medal—1st, Alfred Charles Bossom.

Set of architectural designs (Upper School).—Prize (25*l*.)—Bernard Hugh Webb.

Set of drawings of an architectural design (Lower School)—Prize (10*l*.)—James Black Fulton.

Plan of a building.—Prize (10*l*)—James Hervey Rutherford.

Perspective drawing in outline (open to architects only).—Silver medal—George Thow Smith.

The Landseer Scholarships, of 40*l*. a year, tenable for two years, have been awarded.—In painting, to Oswald Crompton and Ernest Board; in sculpture, to Frank A. Wright and Stanley N. Babb.

NEW TECHNICAL INSTITUTE, NORWICH. — Mr. W. Emerson, President of the Royal Institute of British Architects, has given his award as to the first part of the arbitration between the Corporation of Norwich and Mr. Samuel Warburton, of Manchester, contractor for the new technical institute at Norwich. The Corporation's case was conducted by the City Engineer (Mr. A. E. Collins, M.Inst.C.E.) The Corporation claimed 985*l*. 14s. 11d., and were awarded 620*l*. The contractor claimed 1,040*l*. 0s. 9d. for alleged shortages in quantities and other matters, and was awarded 336*l*. A further arbitration will take place respecting claim and counter claim for delays.

THE SURVEYORS' INSTITUTION:

FUTURE OF THE LONDON WATER SUPPLY.

AN ordinary general meeting of this Institution was held on Monday in the Institution premises, Great George-street, Westminster, the President, Mr. John Shaw, presiding.

Mr. Penfold, Hon. Secretary, having announced that the Council had transferred Mr. Thomas Hood, of Halstead, Essex, from the class of Professional Associate to that of Fellow, and some donations to the Library and Library fund (a vote of thanks being accorded to the donors),

Mr. R. E. Middleton, M.Inst.C.E., read the following paper on "The Future of the London Water Supply":—

"The future of the water-supply of London is of so much importance to the inhabitants of the metropolis, that a short statement setting forth the estimated population to be provided for, the amount of water to be afforded, the sources from which it is to be obtained, and the effect of taking water from one district for the supply of another, cannot, it is thought, fail to be of interest to the members of this Institution . . .

Population.

The eight great water companies, the Chelsea, East London, Grand Junction, Kent, Lambeth, New River, Southwark and Vauxhall, and West Middlesex companies, supplied water to a population of 5,232,155 persons in the year 1891, while the population of Greater London, including the outlying portions of Water London, was at the same date 5,732,950, or 500,795 in excess of that included in the area supplied by the water companies. The population of 500,000 odd not supplied by the eight companies is located partly within and partly without the areas of supply of these companies, but entirely within the area of 845 square miles comprised in Greater London and the portions of Water London lying outside of Greater London, which for the sake of simplicity we will call 'Metropolitan London,' and obtains water from the following nineteen companies or corporations: namely, the East Surrey, the West Surrey, the Sutton, the Limpsfield and Oxted Companies, the Croydon and Richmond Corporations, and the Epsom Local Board, to the South of the Thames. The South-west Suburban Company supplies both in Surrey and Middlesex, and the Barnet District Gas and Water Company, the Central Middlesex, the Colne Valley, the Rickmansworth, and Hoddesden Companies, and the Uxbridge, Cheshunt, Enfield, Tottenham, and Ware Local Boards, supply in the counties of Middlesex and Hertford, while the South Essex Company supplies part of Essex. The population of Greater London, 701 miles in area, was 5,659,909 in 1891, increasing at the rate of 18·2 per cent. per decennium, and that of the outlying portions of Water London, with an area of 144 square miles, was at the same period 76,041, increasing at the rate of 10·7 per cent. per decennium. The population of Metropolitan London will therefore be, following the same rate of progression, at the end of each decade—

—	Greater London increasing at rate of 18·2 per cent. per decennium.	Outlying portions of Water London increasing at a rate of 10·7 per cent. per decennium.	Metropolitan London.
1891	5,659,909	76,041	5,735,950
1901	6,685,445	91,407	6,776,852
1911	7,909,087	100,385	8,010,372
1921	9,337,542	130,899	9,468,441
1931	11,035,289	156,045	11,191,034
1941	13,043,712	187,504	13,231,216
1951	15,417,667	224,442	15,642,109
1961	18,223,682	268,657	18,492,339

The density of population in the County of London, with an area of 118 square miles, was in 1891 56·1 per acre. A population of 18,223,082 in 701 square miles would be at the rate of 40·6 per acre. With a density of 56·1 per acre, 845 square miles would contain a population of 30,338,800.

That the population of London, a city or aggregation of cities standing for the most part on an area circumscribed by a line drawn with a radius of 15 miles with Charing Cross as a centre, will ever reach a figure of 18½, not to speak of 30 million persons, is, to say the least of it, improbable; but prophecy on this subject would be improper, even if it were possible. If, however, it can be shown that the same sources of supply which have been sufficient in the past can, if adequately guarded and under proper treatment, be made sufficient for the future requirements of this vast population, it will be agreed that no anxiety need be felt for the immediate future, that each succeeding census will tend to prove or disprove the assumptions on which the estimate of the future population is based, and that it will be sufficient, when the population of London has reached a total of 15 million persons (should that time ever arrive), to inquire whether London does or does not require any addition to its water supply which cannot be afforded by an extension of the system already adopted.

Population in the Area of Supply.

Besides the population of the metropolis, there were in 1891, in the valley of the Thames above the intakes of the Metropolitan Water Companies near Hampton, 1,056,415 persons, increasing at the rate of 9·88 per cent. per decennium, and in the valley of the Lea above the intake of the East London Company, 189,287 persons, increasing at the rate of 14·17 per cent. Following out these figures, the population in the valleys of the Thames and Lea would be in 1961—

In the Thames Valley	...	...	2,042,985
In the Lea Valley	...	...	478,614
Total	...	...	2,521,599

In the chalk area of Kent, to the eastward of the Kent Company's district, and to the north of a line drawn from Sevenoaks to Dover, but excluding the isles of Thanet and Sheppy, which could not do more than supply their own population, there was in 1891 a population of about 379,819 persons, increasing at the rate of 11·7 per cent., which, following the same rate of increase, would make the population in this area in 1961 824,041. In the county of Essex, the district which is increasing in population with the greatest rapidity, lies within the area of 845 square miles, which we have called metropolitan London. It is improbable that the rest of the county will be supplied to any great extent from the valleys of the Lea or the Thames, or from any district which will be called upon to contribute to the supply of the Metropolis, and it will suffice if 100,000 be added to the population in 1961, already referred to, to meet any calls in this direction.

The total population to be provided for in the future up to the year 1961, taking the rate of increase to continue as it was from 1881 to 1891, will be as given below.

Of the water supply for this estimated population of 22 millions in round numbers, that for the Metropolitan area in the county of Kent and in Essex passes away, after being used, into tidal waters, while that drawn from the valleys of the Thames and the Lea, for the use of the population living above Hampton and Chingford, is returned to the land and eventually to the rivers, and is therefore available for the supply of the population below; the total population to be supplied may therefore be reduced by 2,521,599 to 19,410,380, or, say, 19½ millions.

Population to be supplied with water.		Metropolitan London.	Thames Valley.	Lea Valley.	Kent.	Essex.	Total.
6,149,551	1891	5,735,950	1,056,415	189,287	379,819	33,782	7,395,253
7,240,547	1901	6,770,852	1,160,789	216,109	424,258	39,447	8,617,445
8,530,330	1911	8,010,372	1,275,475	240,732	473,896	46,062	10,052,537
10,051,570	1921	9,468,441	1,401,402	281,604	529,342	53,787	11,734,756
11,846,016	1931	11,191,934	1,539,059	321,610	591,275	62,897	13,707,585
13,995,009	1941	13,231,216	1,692,109	367,182	660,454	73,339	16,024,300
16,405,474	1951	15,642,109	1,859,289	419,212	737,727	85,038	18,743,975
19,410,380	1961	18,492,339	1,042,985	478,614	824,041	100,000	21,937,979

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There are breweries and manufactories both in the valley of the Thames and the Lea which use large quantities of water, but practically the whole of it is returned to the rivers, as the small quantity which is carried away in steam and in beer, &c., forms such an infinitesimal proportion of the whole that it may be ignored.

So far as the writer is aware, the only water which is carried away is that drawn by the London and North-Western Railway Company from their chalk wells at Bushey, and even this goes in reduction of the water used for trade purposes in London, as does the water pumped from wells in London for similar and other trade purposes.

That the requirements of the population of the valleys of the Thames and Lea above the intakes of the Metropolitan companies can be affected by the water drawn from these rivers at Bell Weir, Sunbury, Hampton, Ware, or Chingford, or from wells sunk in the chalk at Streatham and from Ware to Barking, is not possible. Were it not that they return the water to the land or to the rivers after using it, the inhabitants of the upper reaches of the valleys of the Thames and Lea, having the first pull, could deprive those below them of water, but they themselves cannot be deprived, nor can their supply be reduced, and, as things are, neither suffers; it is the interests of those situated below the intakes and below the pumping stations, not those above, which have to be considered, and the requirements of the former are fully safeguarded in the scheme propounded by the writer by their inclusion in the population to be supplied.

When reservoirs are formed in natural valleys for the supply of water to a particular town or district, it is usual for the promoters, who have to pay for the necessary works, to obtain powers over the drainage area down to the position of the dam, to impound all the water flowing off the drainage area, and to give back to the river as compensation for the right to abstract a certain amount of water from it about one-fifth to one-third of the available water running into the reservoir on the average of three dry years. The remainder of the water, except so much as may run away over the byewash of the reservoir, becomes the absolute property of the promoters. Under these circumstances no large quantity of water can be abstracted from the river above the dam, while below the dam the flow of the river is reduced to something less than one-third of its average volume, and it is unlikely that Parliament would allow anything further to be taken from the main river, though that body might perhaps permit other reservoirs to be constructed by the same or another authority, and on similar conditions as to compensation, on one or other of its tributaries. Under the conditions referred to above, neither those above nor those below the waterworks can hope to be able to draw any considerable quantity of water from the river.

The reservoirs already constructed in the basins of the Thames, those in course of construction, and such as may be built in the future, are designed to be used under totally different conditions. The promoters are not empowered to take the whole of the waters of the river, but may only pump the water into the reservoirs when it exceeds a given quantity. They can only take such surplus water as flows down to their intakes, and cannot prevent those above them from drawing water from the river for their own purposes, though no doubt they would successfully oppose the abstraction of water if it were the intention to divert it to the use of a district outside the drainage area of the Thames, and to prevent its return to that river or to land within the drainage area. The intakes to the reservoirs are situated so far from the source, and so near to tidal waters and to the metropolis, that the population below the intakes will be provided with water drawn from the several intakes, and cannot suffer from any abstraction of water from the river even if it were greater than is proposed, while it has been shown that the inhabitants living above the intakes would not be interfered with in any way. In the case of impounding reservoirs, as for instance those proposed by the London County Council to be constructed in Wales, a given very large quantity of water would be abstracted from the area of supply for the use of London, and would be entirely lost to the inhabitants of the area from which it was drawn and to those living geographically below the reservoirs.

It is calculated, on the assumption that the rate of increase existing between 1881 and 1891 is maintained, that the effective population within the area of supply, the population to be supplied with water from the sources to be enumerated hereafter, will number 19½ millions in 1961, but the calculation is based on the merest assumption. In calculating the probable population at any given date in any of the large provincial towns, it is generally assumed that there will be a decremental rate of increase, that is to say, the rate will be less than compound and greater than simple, but whatever assumption be made it is based on knowledge derived from the past, and is at best only assumption. For the present purpose the percentage of the rate of increase will be taken as constant.

Rate of Supply to be Afforded.

The Royal Commission, presided over by Lord Balfour of Burleigh, decided, after hearing a very large amount of evidence on the subject, that a supply at the rate of 35 gallons per head per diem for all purposes is ample. It has been maintained that advanced and advancing sanitation, the increased use of public and private baths, the demands for street watering, flushing of sewers, &c., necessitate a much larger use of water, and that a supply at the rate of 35 gallons per head is inadequate.

The gross misuse of water which is allowed to exist in the cities of America, and the lavish supply afforded in Glasgow and at times in Paris, have been adduced as arguments in favour of this contention, but the experience of provincial towns disproves it. It is notorious that the waste of water in America is unparalleled, that Glasgow will have to curtail its supply, and that Paris is in great straits for water at the present time, while it has been repeatedly shown that the legitimate use of water for domestic purposes in large towns does not exceed 17 gallons, and in country districts from 10 to 12 gallons per head.

The supply afforded by the metropolitan water companies has, during the last three very dry years, exceeded 35 gallons per head. There can be no doubt, however, that this quantity could be very materially reduced, probably to 27 gallons per head, if the companies enforced with the utmost stringency the powers they have, and obtained such further powers for the prevention of useless and unnecessary waste as are possessed by many provincial companies and corporations. Should the undertakings be transferred to a trust, as recommended by Lord Llandaff's Commission, it is certain that waste would be put down with the strong hand, and that the water consumer would be brought under much more strict supervision than he is accustomed to at present.

Taking the rate of supply to be that provided for by Lord Balfour's Commission, or 35 gallons per head, including that required for the rural districts—a very ample provision indeed—the quantity of water to be supplied at the end of each decade will be:—

AVERAGE DAILY SUPPLY OF WATER TO BE PROVIDED.

	Gallons.
1891	215,234,285
1901	253,410,145
1911	298,501,550
1921	351,804,050
1931	414,610,560
1941	488,775,315
1951	576,291,500
1901	679,573,300

The actual increase in supply does not proceed by regular increments, but depends to a considerable extent on the conditions of each year, whether the general temperature is high or low, whether there is much or little rain, and whether the winter period is open or frosty. It is necessary, therefore, to provide for something more than the calculated requirements, to the extent of probably about 5 per cent. The greatest possible provision necessary to be made for the year 1901, supposing the population at that date to number 19½ million persons, would therefore be 717½ million gallons a day.

Before proceeding to examine into the question of how this quantity of water (more than three times the average supply at the present date) can be provided, it is necessary to clear the way by the removal of erroneous interpretations of the findings of the two Royal Commissions of 1893 and 1899, and other stumbling blocks which interfere with a true solution of the problem under consideration.

It has been repeatedly stated that the report of Lord Balfour's Commission gave a verdict to the effect that only 300 million gallons a day were available from the Thames. The report of Lord Balfour's Commission contains not one word to this effect, nor does the later report of Lord Llandaff's Commission confirm the statement erroneously said to be made by Lord Balfour's Commission. On the other hand the report says:—'We do not understand Lord Balfour's Commission to have expressed any opinion as to 300 million gallons a day being the limit.' We are asked to believe that Lord Balfour's Commission, on which the engineering profession was represented by Sir George Bruce (who was also a member of Lord Llandaff's Commission), Mr. Hill and Mr. Mansergh, was deceived in its estimate of the capabilities of the Thames to supply 300 million gallons a day, or 22 per cent. of the average flow of the river. On the other hand we are required to accept as a conclusion with which there can be no cavil, that an area of 488 square miles in Wales, only one-eighth of the drainage area of the Thames basin, can supply 415 million gallons a day without injury to the rivers, or, in other words, be nearly eleven times as productive, as an equal area in the Thames basin.

It is desirable at this stage to consider what is the real value of the Thames for purposes of supply, and to compare it with the Welsh drainage area, and with impounded supplies generally. The drainage area of the Thames down to Teddington weir is 3,766 square miles, or to the companies' intakes 3,548 square miles, and the average rainfall on this area is 28·50 in. The actual average run off from the larger area is about 1,450 million gallons a day, or 9·7 in. of rain, the average of three dry years 1,016 million gallons, or about 6·8 in. of rain, and the flow of the driest year was 644 million gallons a day, or 4·3 in. of rain. In order that the same run off should be obtained from 488 square miles in Wales the average rainfall would have to be approximately 90 in., whereas it is doubtful if it is so much as 55 in. The value of the Thames basin as an area of supply is therefore greater, not less, than that of the Welsh rivers. The run off from a considerable area of this district was not, on the average of two years, more than 37 in. If the value of the whole district be taken at 40 in. of rain, its value as compared with that of the Thames is as 488×40 to $3{,}548 \times 9{\cdot}7$ in., or as 1 to 1·76 nearly, all the advantage being with the Thames. I wish it to be understood that I do not pin my faith on these figures as representing the average run off from the Welsh district; they may or may not do so; the probabilities are that on the average of a number of years the run off is more than 40 in., but not to such an extent as to materially affect the comparison with the Thames.

The least natural flow of the Thames during a month was at the rate of 212 million gallons a day. At such a time, supposing the average supply to be afforded to be 415 million gallons a day, the draft on the Thames Valley reservoirs would be 405 million gallons a day. The least natural flow in the Welsh area would be not more than thirty-five million gallons a day, and the draft on the reservoirs under like conditions with those already instanced for the Thames would be 677 million gallons a day or thereabouts, and it is again shown that the advantage rests with the Thames. Experience has proved that impounded supplies have, when worked to their full capacity, failed to afford the quantities of water expected from them, and there is no reason to suppose that the Welsh area would be an exception to this rule: indeed, the gaugings of one of the rivers show that in order that the estimated supply should be afforded, the reservoir capacity would have to be largely increased. On the other hand, the Thames has been gauged for more than sixteen years, during which period the rainfall has been 2 in., or 7 per cent. below the average. The rainfall of the last two and a half years was 23·3 in., which is 18·3 per cent. below the average. These figures agree very closely with the rules which are accepted as governing the flow of rivers, and so far from disproving the findings of Lord Balfour's Commission they confirm them. In another respect the Thames has the advantage over Wales, in that, while the storage capacity requisite for a supply of 415 million gallons a day from Wales is estimated by the promoters to be 104,000 million gallons, on the terms set forth

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in the report of Lord Llandaff's Commission namely, that storage may be calculated on the basis of the year 1893, the requisite storage in the Thames Valley would be only 45,000 million gallons, or 43 per cent. of that necessary to supply the same quantity of water from Wales. The flow of certain Welsh rivers has fluctuated, on the average of a month, from something like 35 million gallons at the lowest to 2,500 million gallons a day at the highest, or in the proportion of 1 to 72, while the flow of the Thames varies from 212 million gallons at the lowest to 6400 million gallons a day at the highest, or in the proportion of 1 to 30. The lowest flow of the Thames is six times that of the Welsh rivers, while the highest is two and a half times that in Wales. Storage must be made use of, whether in the Thames, in Wales, or elsewhere, if the water is to be employed to the best advantage; and it is obvious that the more regular the rate of flow and the less the quantity of water to be used in comparison with the average flow off the drainage area, the more certain is the supply and the smaller the reservoir capacity to be constructed for a given supply.

The advantage is with the Thames in both respects, and it is not proposed to use, for purposes of supply, more than 30 per cent. of the average flow of that river, while something like 60 per cent. of the average flow of the Welsh rivers would be abstracted for a like purpose. In the Thames the flow is so well maintained, that it is unnecessary to give compensation water to the river, while in Wales at the time of minimum flow, compensation to the extent of from 100 to 175 million gallons a day would have to be afforded, and the requisite storage increased by from 20,000 to 35,000 million gallons for that reason.

As regards cost, the comparison is again largely in favour of the Thames. In the items which are strictly comparative, Lord Llandaff's Commission found that the cost of reservoirs and appliances in the Thames Valley would be as 1 to 2·3 when compared with the like provision from Wales. I am of opinion that this is an under-estimate, and that the comparative figures should be as 1 to 2·8. The above comparisons refer to works other than those for filtration, for service reservoirs, and distribution, which must be incurred whether the supply be drawn from the Thames, the Lea, and from wells, from Wales or elsewhere.

To return to the arguments which have been raised against the continued use of the Thames and the Lea; it has been suggested that the water derived from these rivers is polluted, and is liable to increased pollution in the future, due to a larger population. The Report of Lord Balfour's Commission refutes this contention, and the freedom of London from zymotic disease nullifies it. Since the Thames Conservancy obtained their Act in 1894 there has been a reduction, not an increase, in the organic impurities contained in the water, and the knowledge obtained during recent years of the biological treatment of sewage points to a time, not far distant, when, even in populous districts, our rivers may be freed from impurities, and be kept nearly as pure as those which run through barren tracts. In this connexion Mr. James Mansergh, President of the Institution of Civil Engineers, in his Presidential Address delivered on Tuesday, November 6 last, called attention to the danger which may be apprehended from water derived from sources hitherto considered pure. He said:—'A word of warning may be spoken with regard to water obtained from elevated and sparsely populated moorlands, for the danger is, in my opinion, greater if such water became infected, especially if not passed through impounding reservoirs, than if the supply were taken from a large river.'

In order to attain the most desirable result of freeing our rivers from impurities, it would be of the utmost advantage if the existing divisions of the country into counties, unions, and parishes were, for water supply and sewage purposes, replaced by drainage areas, which could be conserved on a system similar to that of the Thames basin, but somewhat more extended in its application. Although Thames water contains more impurities of animal origin than does that flowing from the Welsh rivers, it must not be supposed that the latter is free from organic matter, or that it is invariably clear and bright.

Among many other questions which appear to be misunderstood there is one error which requires correction. It has been stated in the Press that the area of reservoirs in the Thames Valley, to afford a supply of 300 million gallons a day, will be 10 square miles. According to the Report of Lord Llandaff's Commission, the capacity of the reservoirs yet to be constructed to afford this supply should be 17,500 million gallons. The area of Staines reservoirs to contain 3,300 million gallons is 421 acres, or two-thirds of a mile; therefore, with the same depth of water, reservoirs to hold 17,500 million gallons will have an area, not of 10 square miles, but of 2,233 acres, or 3½ square miles.

The above calculation is based on the supposition that the reservoirs to be constructed in the future will be of similar capacity with those in course of construction at Staines, but, should the reservoir capacity be increased, more water is stored on a given area, and it also becomes economical to increase the depth of water; therefore the total future area of land to be employed for reservoir purposes up to a supply of 300 million gallons a day is likely to be less rather than more than 3½ square miles. The maximum area to be occupied by reservoirs, including those already constructed or in course of construction, according to the conditions set forth in the Report of Lord Llandaff's Commission, is, for a supply of 400 million gallons a day, 7½ square miles."

[The remainder of Mr. Middleton's paper, together with some notes of the brief discussion which took place, will be given next week. The next meeting of the Institution on January 14, is to be devoted to a further discussion of the paper.]

INSTITUTE OF SANITARY ENGINEERS:

ANNUAL DINNER.

THE annual dinner of the Institute of Sanitary Engineers was held on Wednesday evening at the Holborn Restaurant. Dr. J. B. Wilkinson, D.P.H., &c., presided, and among those present were Dr. Wynter Blyth, Professor Adams, Messrs. W. J. Wells, H. M. Dove, J. Farley, S. Minty, S. I. Adams, J. Thompson, F. P. Barber, E. W. Mayner, F. J. Rayner, J. Allan, E. R. Palmer, C. Butcher, G. H. Carter, N. W. Hoskins, W. J. Cornwell, J. T. Griffin, T. W. Deadman, H. Knight, A. H. Scott, W. E. Markham, W. H. Coltart, W. Templeman, T. R. Nash, J. Jenkins, H. E. Milton, A. R. Hutson, F. W. Mason, T. M. Taylor, F. B. Patch, and W. G. Wilkinson.

The Chairman mentioned the deep regret they all felt at the death of the late President, Mr. R. Reynolds Rowe.

After the loyal toast, Mr. G. Reveirs proposed "The Institute of Sanitary Engineers." He said that for some years he had watched the growth of this institution and had noticed its steady progression. The members of the Institute were engaged in excellent work. The Institute deserved congratulation on the advance made, and he trusted they would jealously guard their doors to see that no one unworthy should creep in. He was glad to see that there was interchange of thought between the members, because that was most advantageous. Theory and practice must be combined—we were told that an ounce of practice was worth a pound of theory, but the combination effected a great deal of good.

The Chairman, in reply, said that the object of the Institute was one of education not only for themselves, but for others who did not belong to them, for engineers of other departments—civil engineers, for instance—however celebrated they might be, required education in sanitary matters. They saw very big triumphs, some of which had only recently come before the world and caused surprise by the immensity of their conception, but they found that buildings which had been erected by even celebrated engineers were not perfect when examined from a sanitary point of view. He recently examined a house which cost about 5,000*l.* to erect, but which was a veritable death-trap to the people who lived in it. Many years ago he examined a hospital which had been erected by a well-known engineer, and yet, even though it was an infectious hospital, the only ventilation in the wards was through the doors and the windows. Their results as sanitary engineers were not so prominent before the world and were not looked upon as such triumphs as those of civil engineers. Such a thing as the proper collection of refuse had a considerable effect in the saving of human life in this country, and although five per thousand did not seem much, it represented a considerable number of lives saved throughout the country. This Institute was wise in allowing members to meet together to discuss their pet theories one with the other. A man was apt to think that his own way of doing a thing was the best until it was subjected to criticism. Sanitary science was even yet only in its infancy. If they looked at the sewage question they realised that they had not yet arrived at a complete method by which this could be dealt with. He thought this education could be assisted by the Government. It was insisted that certain qualifications were necessary for a medical officer of large towns, and this should be enlarged so as to embrace sanitary inspectors.

Mr. J. Thompson proposed "The Navy, Army, and Reserve Forces," which was responded to by Mr. S. Minty.

Professor H. Adams, the Chairman of the Board of Examiners, then submitted "The Chairman and Members of the Council." He said that the Institute had chosen a very noble name, but it carried with it a responsibility. A sanitary engineer was something more than a sanitary inspector, and this some candidates at the examinations did not fully realise. He was afraid that it would be necessary to raise the standard of their examinations even beyond the point at which they stood at present, not in the way of theory, but in the way of making them more practical and giving them a broader basis.

Mr. S. I. Adams briefly replied, stating that the Council had a large amount of work, which they did quite willingly.

Mr. J. Farley proposed "The Medical Profession," stating that doctors were finger-posts to sanitary engineers.

Dr. Blyth, in reply, said that medical officers of health wished this Institute every prosperity.

"The Visitors" was then proposed by Mr. H. M. Dove and responded to by Mr. J. T. Brown.

A toast to the "Press" concluded the list.

THE BUILDING TRADES' GIFT TO THE NATION:

HOMES FOR DISABLED SOLDIERS.

WE are asked to announce the following further contributions which have come to hand:—

	£	s.	d.
West Bromwich Master Builders' Association (per Mr. Henry Smith)	19	14	3
Stockport Master Builders' Association (per Mr. R. Williamson)	12	9	0
Workmen of Messrs. G. Longden & Son (per Secretary of the Sheffield Master Builders' Association)	8	10	3
Workmen of Mr. J. M. Boekbinder (Camden Town)	5	0	0
Messrs. John V. Kiddle & Son and workmen	4	4	0
Mr. C. F. Kearley and workmen (Kensington)	4	0	0
Mr. C. M. Schmidt and workmen (Upper Holloway)	3	3	0
Messrs. Davis & Leaney and workmen (Southend-on-Sea)	3	0	6
Workmen of Mr. F. Cottrell (Crouch End)	2	12	0
Workmen of Messrs. Battley, Sons, & Holness (further contribution)	1	3	6
Mr. F. Cottrell (Crouch End)	1	1	0
Mr. Chas. Rotson and workmen (Lewisham)	0	16	6
Mr. G. A. Williams and employees	0	9	0
F. M. (per editor of *Builders' Journal*)	0	2	0

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday in the County Hall, Spring-gardens, Alderman Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend the Camberwell Borough Council 4,775*l.* for the erection of stables; the Fulham Borough Council 13,500*l.* for paving works; the Shoreditch Borough Council 2,165*l.* for street improvements; the Battersea Borough Council 17,120*l.* for the erection of stabling, &c.; the Greenwich Guardians 14,690*l.* for the purchase of land and premises, and 34,300*l.* for the erection, &c., of workhouse; and the Woolwich Guardians 25,310*l.* for erection of homes for children.

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Housing of the Working Classes: Norbury Scheme.—A long debate took place on the following recommendation of the Housing of the Working Classes Committee:—

"That the estimate of 20,000*l.* submitted by the Finance Committee be approved, and that the Council do acquire, under Part III. of the Housing of the Working Classes Act, 1890, and the Housing of the Working Classes Act, 1900, a site of about 31 acres of land at Norbury, Surrey, lying to the west of the London-road and south of Norbury Station (London, Brighton, and South Coast Railway), at the sum of 600*l.* per acre, including, at a valuation, the brickmaking plant now on the site, for the purpose of erecting cottage dwellings; and that the Solicitor be instructed to prepare the necessary agreement for the purchase of the land and plant, and that the seal of the Council be affixed to such agreement when ready."

The Committee, in their report, stated that:

"The site lies on the western side of the main road (London-road) running from Streatham to Croydon, and about a quarter of a mile from the county boundary. The whole plot has a frontage to the road of 500 ft., and is well situated from a building point of view, rising gradually from the London-road to a slight eminence, from which it slopes gradually in the direction of Mitcham Common. The frontage will be reserved by the vendor for the erection of shops, leaving two 45 ft. openings for roads to develop the back land. The frontage is about a quarter of a mile distance from the Norbury station on the London, Brighton, and South Coast Railway Company's line from Brighton to Croydon. Workmen's tickets are issued by the trains leaving Norbury for London Bridge at 7 a.m., and for Victoria at about 5 a.m. The return fare is 4d.

We learn that the Croydon Corporation obtained powers in the last session of Parliament to construct an electric tramway from Croydon to the county boundary. A tramway service, therefore, will be established in the course of the next two years along the main road, which will give direct access to Thornton Heath and Croydon on the south and also to the tramway system belonging to the Council on the south side of the river, so soon as the Council forms a connecting link with the new line.

The vendor is utilising a part of the land for the purpose of brick-making, and one of the conditions of the sale of the land to the Council is that the brick-making plant shall be taken over at a valuation. This plant is of a simple character, and is now being worked by the vendor. By acquiring the plant the Council will be in a position to make the bricks required for building, and if this is done we anticipate that more than sufficient will be obtained to pay for the cost of the plant. We have not, however, decided whether it is desirable that the Council should itself undertake this work or whether an arrangement should be made with the vendor for the supply of the quantity of bricks that will be required. We shall report again on this point after further consideration.

The plan for developing the estate prepared by the Architect, which we have tentatively approved, provides for the erection of 551 single cottages of three, four, and five rooms each, and of 211 double cottages each containing tenements of two and three rooms. Two roads, 45 ft. in width, planted with trees, are shown on the plan running east and west through the estate, and subsidiary roads, 40 ft. in width, will also be formed. Provision for a small open space dividing the site is also made. It is estimated that about 5,800 persons can be accommodated on the site, or 105 persons per acre, and the average number of cottages per acre would be about twenty-five. The rents proposed to be charged are approximately as follows:—Single cottages—three rooms, 7s. to 9s.; double cottages—three rooms, 6s. 6d.; two rooms and small kitchen, 6s.; four rooms, 9s. 6d.; and five rooms, 11s. to 11s. 6d. We do not propose at this stage to commit the Council to any definite scheme of laying out the estate, and the above particulars are merely given to enable the Council to arrive at the financial result of the proposal. Detailed plans will, however, be submitted for approval in due course. The estimated cost of the land, including the brick-making plant and incidental expenses, will be 20,000*l.* . . ."

Mr. Waterlow (the Chairman of the Committee), in moving the Report, said this was a new departure, and it was the first attempt to use the Amending Act passed by the Government last year which enabled Authorities to build outside their own boundaries. Before the Act was passed the land had been offered to the Committee, and when they got the power they availed themselves of the offer. With regard to the cost, the valuer had assured them that the cost of 600*l.* per acre was reasonable. It was true that other land in the locality was offered at 450*l.* per acre, but the valuer said the land they had chosen was worth the extra money. They did not propose to erect row upon row of cottages like the speculative builder, and there was no doubt that their cottages would be readily filled up. It was a scheme for helping the people of South London, and not the people of Whitechapel and Bethnal Green, who would be dealt with in another scheme. The cottages would be red brick-faced, and would have gardens of 70 ft. or 80 ft. Personally, he did not believe it was possible to house the very poorest, and it was not intended to do that by the scheme.

Mr. Campbell said they were asked to spend 300,000*l.* on a visionary scheme. It would be spent merely for the good of Croydon, and Croydon people, earning their two guineas and two and a half guineas, would go to live in the cottages. They had much better spend the money in pulling down the slums within the county. He moved, as an amendment, "That the Report be referred back for further consideration, particularly with regard to the benefit from the scheme in question to the very poor and overcrowded parts of London."

Dr. Cooper, in seconding the amendment, expressed his sorrow that the Committee should make a first use of the Act in a way which he felt sure would bring disappointment to the people of London. It was proposed to erect 5,800 houses on the land, but if that was done there would be more persons to the acre than was the case in many of what were called over-crowded districts.

The amendment was defeated and the recommendation adopted after a three hours' discussion.

Open Space, Southwark.—The Parks and Open Spaces Committee recommended, and it was agreed, to approve of an estimate of 5,000*l.* submitted by the Finance Committee, and to agree in consideration of that sum to transfer to the charge of the Parks Committee the portion of the Falcon-court area, cleared under the Housing of the Working Classes Act, 1890, for the purpose of an open space, and also to lay out and maintain the ground when so transferred.

North Woolwich Drainage.—The Main Drainage Committee recommended, and it was agreed,

"That the estimate of 800*l.* submitted by the Finance Committee in respect of the drainage of North Woolwich be approved; that the erection of a building for store and staff accommodation, smithy, fitting shop, messroom, bathroom, sheds, boundary wall and railing, &c., be carried out without the intervention of a contractor; and that the plans, specification, and estimate of the cost (1,722*l.*) be referred to the Manager of Works for that purpose."

The Water Question.—The Parliamentary Committee recommended that the "London Water (Purchase Companies) Bill be approved." After discussion the recommendation was, on a division, carried by sixty-four to seventeen. The Metropolitan Water Companies (Amendment of Acts) Bill was also approved.

Tribunal of Appeal under the Building Act.—The Building Act Committee stated that Mr. A. A. Hudson, whose term of five years as a member of the Tribunal of Appeal had expired, had been reappointed by the Secretary of State.

Housing.—It was agreed, on the recommendation of the Bridges Committee, "That the vacant land set aside for dwellings in connexion with the Trafalgar-road, Greenwich, scheme be transferred to the Housing Committee for the erection of cottages for the accommodation of 306 persons of the working class, and that the sum of 1,000*l.* be fixed as the value of the land for that purpose."

Millbank Estate.—It was reported by the Housing of the Working Classes Committee that Turner-buildings, one of the largest of the blocks of working-class dwellings now being erected on the Millbank Estate, Westminster, will shortly be completed. The block is about 320 ft. in length, is divided into four houses, and contains 85 tenements and 215 rooms, providing accommodation for 430 persons. Two of the houses (40 tenements) will be open to inspection by members of the Council and their friends on December 13 and 14, and the remaining two houses on December 20 and 21.

Street Improvement, Wandsworth.—The Improvements Committee recommended and it was agreed: "(*a*) That the Council do give its statutory consent to the complete improvement proposed to be undertaken by the Council of the Metropolitan Borough of Wandsworth in High-street, at Nos. 1 and 3, and in St. Ann's-hill, at Nos. 2 to 18, and at the slaughter-house adjoining.

(*b*) That the estimate of 1,150*l.* submitted by the Finance Committee be approved. . . ."

The Council adjourned at 7.30 o'clock.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

AT the meeting of the London County Council on Tuesday the following applications under the 1894 Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

Conversion of Buildings.

St. George, Hanover-square.—That the Council do allow the third and fourth floors of a building on the east side of New Bond-street, at the corner of Maddox-street, St. George, Hanover-square, and known as Nos. 45 and 46, New Bond-street, and Nos. 53A, 55, 57, and 59, Maddox-street, to be used for residential purposes. (Mr. G. G. Vertue, for Mr. C. H. Newman.) That the allowance of the Council be not issued until the case has been dealt with by the magistrate.—Agreed.

Lines of Frontage

Greenwich.—The retention and completion of two houses, with shops on the ground floor, in course of erection on the south side of Woolwich-road, Charlton, at the corner of Ransom-road. (Mr. J. Ellis.)—Refused.

Lines of Frontage and Width of Way.

Hackney, Central.—Buildings on the site of Nos. 1 to 15, Tower-street, Hackney, to abut also at the rear upon London-fields (Mr. J. Hamilton for Mr S. K. Prager).—Refused.

Projections, and Construction of Gangways.

Bow and Bromley.—That the application of Mr Max Clarke for an extension of the period within which the erection of four iron gangways across Fawe-street, Poplar, to connect warehouses on the opposite sides of that street, was required to be commenced, be granted.—Agreed.

Width of Way and Height of Buildings.

City of London.—That the application of Mr. P. B. Tubbs for an extension of the periods within which the erection of a factory building on the north side of Fann-street, Aldersgate-street, City, at the corner of Hot-water-court, was required to be commenced and completed, be granted.—Agreed.

Width of Way and Construction of Building.

Woolwich.—An open cart-shed on the north side of Brewery-road, Plumstead, at less than the prescribed distance from the centre of the street (Messrs. Inskipp & Mackenzie for Mr. C. Beasley).—Refused.

Means of Escape from Top of High Buildings.

St. George, Hanover-square.—Means of escape in case of fire, proposed to be provided in pursuance of Section 63 of the London Building Act, 1894, on the seventh and eighth stories of the Empress Club, No. 35, Dover-street, Piccadilly, for the persons dwelling or employed therein (Messrs. J. T. Wimperis and Arber for the Hotel and Club Investment Company, Limited).—Consent.

City of London.—Means of escape in case of fire proposed to be provided in pursuance of Section 63 of the London Building Act, 1894, on the eighth story of Cocker's Hotel, Nos. 18 to 21, Charterhouse-square, Aldersgate, for the persons dwelling or employed therein (Mr. E. Haslehurst).—Consent

Buildings for the Supply of Electricity.

Strand.—A building, to be used as a sub-station and offices, on the site of Nos. 59, 60, and 61, St. Martin's-lane, Strand (Mr. W. B. Pinhey for the Charing Cross and Strand Electricity Supply Company, Limited).—Consent.

Woolwich.—An addition to an electric light station at the Woolwich District Electric Light Company's works, Globe-lane, High-street, Woolwich (Messrs. Church, Quick, & Whincop).—Refused.

"THE STUDENT'S COLUMN."—Our Student's Column article ("Lessons in Electrical Engineering") is held over until next week, when two chapters will be given.

RAILWAY RATES AND CHARGES.—A special general meeting of the Mansion House Association on Railway and Canal Traffic was held on the 10th inst. at the Westminster Palace Hotel. Mr. W. E. M. Tomlinson, M.P., in the chair, when the Association's further course of action with reference to the increases made in 1893 and maintained since that date was determined. Questions relating to the additional increases made recently by railway companies in many of their rates and charges, the curtailment of railway facilities for the conveyance of merchandise traffic, and the position of owners and occupiers of private sidings were also considered.

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Correspondence.

To the Editor of THE BUILDER.

COLOUR HARMONY.

SIR,—In Mr. Rimington's suggestive paper on "Colour in Architecture" the question of the existence of some analogy between the laws which govern musical harmony and those which possibly govern the harmony of colours was naturally touched upon. I ventured to remind the audience how old a problem this has been; and how, from Aristotle downwards, philosophers have perceived the probability—almost the certainty—that such analogy exists, yet have not succeeded in formulating its results.

Nevertheless, it seems much to be desired that the problem should not be lost sight of. We may surely hope that some day there may come the man whose knowledge of musical laws of harmony and of the theories of colour may be supported by so sound a scientific training as to qualify him for the research?

It seems not unlikely that previous failures at elucidation have arisen in some instances from attempting to prove too much—in fact to prove identity instead of analogy. But probably the difficulty has most often been to find in one investigator the needful qualifications.

Moreover, the opposition of ignorance has been, and is, not without effect. Painters commonly resist the idea of "laying down laws" for colour harmony—apparently thinking that such laws imply rigidity of practice, and forgetting that in music such general laws may cover compositions as different as the sonatas of Beethoven and the last music-hall ditty.

It is also sometimes urged that such laws could only apply to some limited or selected scale of colours. But here, of course, the analogy with music is particularly strong, since whatever division or scale we may apply to the spectrum, a slight shifting, right or left, at once *alters the pitch*.

I do not for a moment suppose that any one discoverer will succeed in defining the whole science of colour harmony, or perfect in a decade, for colour, that which, in the case of music, has taken centuries of devoted study. But I plead for keeping this problem before the artistic and scientific world. Many facts unknown to Goethe and to Field are now available, and it seems not unreasonable to hope that by degrees the study of colour may emerge out of an empirical chaos into the splendour and dignity of harmonic law.

J. D. CRACE.

SAXON CHURCHES.

SIR,—I should, of course, be pleased to do anything in my power to further the study of our oldest churches, and I hope, by the aid which correspondents who have local knowledge are kindly giving to me, to add to the list which you have recently been good enough to publish. For the examination of new examples, however, one must have leisure and rideable roads, and these are not to be looked for until the spring, when I may hope to take advantage of your kind offer of space and to present a corrected list in the short form suggested by your correspondent Mr. Holling.

In the list contained in the recent successive issues of the *Builder* from September 29 to November 17 the examples are actually distributed in counties, which are grouped in larger districts, and perhaps this for the moment is sufficient. It will be seen that in the case of out-of-the-way churches some topographical indication has been given by which their location in the map will be facilitated.

G. BALDWIN BROWN.

ROOFS OF FARM BUILDINGS.

SIR,—In reference to Mr. Walmisley's paper at the Surveyors' Institution, I should like to say that I think too much importance is attached to the idea of roofing over cattle-yards in order that better quality manure may be produced; certainly for any other reason it is of doubtful advantage. The greater majority of tenants with whom I have had to deal would much prefer the money being spent in loose boxes, as they can be put to such a variety of uses. A yard for young stock should undoubtedly face south and be protected from north and east winds by high fences or walls; but so long as there is a covered portion in which the manger is fixed, I think the remainder is better left uncovered. Not only is less manure made nowadays, but it is not valued so highly as formerly, the artificial kinds being preferred, as they require much less labour in their application. The yard should have a hard bottom (but not of concrete) laid to falls and well drained.

With regard to a material for roofs, the appearance of many of our villages is being spoilt by the inordinate use of corrugated iron. Thatching, where good wheat straw is abundant, can still be done at a very reasonable price, and if the eaves are protected by fine mesh galvanised wire netting to keep the birds at bay, and the site is a sheltered one (high winds will do more damage than sparrows), a life of twenty years may be anticipated. When it requires renovating a fresh layer of thatch about half the thickness of the original can be applied on the top of the old. The reeds obtained from inland waters are an excellent roofing material.

Plain tile roofs can be made proof against driven snow, either by bedding in mortar or by a layer of straw placed between the laths and tiles. Bedding in mortar has a tendency to perish the tiles. Iron nails used for slating over stables or cow-sheds are found quickly to rust away, owing to the moist warm air which rises from the animals.

Where a corrugated iron covering is used on a wood framing the sheets should be blocked off the purlins so that condensed moisture can run down the convex rib into the eaves gutter. I have seen wall plates and purlins completely decayed from not attending to this. Unless assisted by boarding or some non-conducting substance underneath, corrugated iron is not a suitable covering to stables or cow-byres.

The "space boarded" roof is not nearly so unsightly as galvanised iron, and it only requires a very light framing; but the pitch must be at least 45 deg. The covering consists of 6-in. by 1-in. rough boards, with a shallow groove near each edge, nailed parallel to one another up the slope, with a ½-in. clear space between them. The boards require to be blocked off the purlins by small cast-iron studs. With this roof it is very important that the boards should be left rough, when practically no rain finds its way through.

A. G. N. MANN
(Late Surveyor to the Bridgewater and Ashridge Estates).

OBITUARY.

MR. FRANCIS CHAMBERS.—We regret to announce the death, on November 30, at Broadstairs, of Mr. Francis Chambers, of No. 11A, College Hill, E.C., and of St. Martin's, Crouch Hill, N., aged seventy-one. Mr. Chambers was elected an Associate of the Royal Institute of British Architects in 1851, a Fellow in 1865, and for some period was a member of the Council; he was also a member of the Board of Examiners for District Surveyors. His experienced services as an arbitrator and as an assessor in competitions were frequently called into requisition, and during a long period he held the appointment of surveyor to the Cannon Brewery Company, of St. John-street, Clerkenwell. After the dissolution of his partnership with the late Richard Tress he remained in business for some while alone, and succeeded in establishing an extensive City practice, the majority of his clients being wholesale traders and merchants for whom he built many large riverside offices, warehouses, and premises of a similar description in the City and other quarters of London, both on the north and south sides of the Thames. Of his ecclesiastical work during that interval we may cite two churches at Norwood, and, as we gather, that of St. Anne in Hoxton-street, 1869-70. Some years ago Mr. Chambers took into partnership his only son, Mr. Frank Job Chambers, who survives him and intends, it is stated, to carry on the practice of his firm. Messrs. Francis Chambers & Son recently prepared plans and designs for ten blocks of working-class dwellings to house 1,776 persons in 888 rooms, proposed to be erected on behalf of the Donkin Land Company upon a site of two acres at the rear of Nos. 55-57, Southwark Park-road, Bermondsey, and extending at the rear to Cadbury-road. Amongst the work undertaken by Messrs. Francis Chambers & Son may be here mentioned the plans and designs for new buildings along the south side of Lea Bridge-road eastwards of Thistlethwaite-road, 1898; the rebuilding of the old Hop Pole public-house in Hackney-road, 1898-9; Horseshoe Wharf, No. 10, Upper Thames-street, for Messrs. Pilkington Brothers, in 1888-9; a warehouse on the site of Nos. 136-148, Tooley-street, at the corner of Magdalen-street, Rotherhithe; and, we believe, Paul's Wharf, at No. 25, Upper Thames-street, in 1890.

MR. JAMES BUCKLEY WILSON.—We have also to record the death, on the 6th inst., at his residence, Tretenna, Swansea, of Mr. James Buckley Wilson, of No. 15, Castle Bailey-street, Swansea, aged fifty-four years. Mr. Wilson, the eldest son of the late James Wilson, F.S.A., of Glen Avon, Bath, became an Associate of the Royal Institute of British Architects in 1872, and was elected a Fellow in 1888. He had his education at Lansdowne College, Bath, and then served his articles to Messrs. Wilson & Wilcox, architects, of that city. After studying for a period of six years in London, he made a prolonged sketching tour in France, Spain, and Italy. Having settled in practice at Swansea in 1883, he quickly found employment—his principal early works comprising the restoration of the churches at Loughor, and Berry-Narbor, near Ilfracombe; the chancel of Penllergaer (co. Glamorgan) Church for Sir J. T. D. Llewellyn, Bart.; Bryn-y-Caeran Castle for Mr. James Buckley, of Llanelly; and the Parish Hall, Llanelly, erected, 1888, in celebration of the fiftieth anniversary of the Queen's accession. In 1888 he contracted a partnership with Mr. Glendinning Moxham, The firm were employed in respect of most of the more important buildings and residences in Swansea and its vicinity. They made the plans and designs for the Queen's Diamond Jubilee Nurses' Home, Swansea, in 1897, and for the new operating-theatre at Swansea Hospital (opened on October 28, 1898), built of native stone, in courses, with dressings of Bath stone, by Mr. Henry Billings, of Swansea. Messrs. Wilson & Moxham received the award of an "honourable mention" in November, 1898, for their designs submitted in the Wrexham County School competition, and were lately appointed architects of the new block of buildings at Llandrindod Wells for the London and Provincial Bank, Limited. Of their other architectural works should be mentioned the New Market, the Metropolitan Bank in Wind-street, the Capital and Counties Bank, Limited; St. Thomas and St. Mark Vicarages; the Eye Hospital, and the Waterloo and Goat-street Arcade—all in Swansea; additions, with an operating-theatre for the Infirmary, Brecon (Queen's Jubilee Memorial); the Metropolitan Bank, and Castle-buildings, Llanelly; the churches at Ystalyfera and Gowerton, both in Glamorganshire; the Intermediate Schools, Ystalyfera; and the London and Provincial Bank, Limited, Neath.

GENERAL BUILDING NEWS.

CHURCH, NAILSWORTH, GLOUCESTERSHIRE.—A new church has just been consecrated at Nailsworth. The building, erected on the site of the old chapel-of-ease, is built in the Early English style. The walls are of local stone, with dressings of Hampton Common and Bath stone. The church, when complete, will consist of nave and aisles, chancel, vestries, and tower 80 ft. high, and will provide about 670 sittings. The total cost of erection is estimated at from 9,000*l.* to 10,000*l.* The portion of the work which has been completed, and which was consecrated, comprises the nave and aisles, north porch, and base of the tower, which forms the principal entrance to the church on the south side, and which has a groined ceiling in stone. The cost of the work up to the present time amounts to about 7,000*l.* A temporary chancel has been formed in the nave. The seats are open benches of pitch-pine. The building of the chancel, vestries, and tower will be proceeded with when the necessary funds are obtained. The church has been built by Messrs. Wall & Hook, of Brimscombe, to the design of Mr. M. H. Medland, F.R.I.B.A.; and Mr. W. Wiggall, Longford, Gloucester, was clerk of the works.

MISSION CHURCH, BROAD EYE, STAFFORD.—A mission church, dedicated to St. Bertolline, was opened in Broad Eye, Stafford, on the 30th ult. Messrs. Adams & Pemberton were the builders; and Mr. G. Wormal, of Stafford, was the architect.

BOARD SCHOOL, LUCKWELL, BEDMINSTER.—A new Board school has been erected at Luckwell, Bedminster, for the Bristol School Board. The new schools consist of three departments, viz., infant school, mixed school, and a cookery department, and will accommodate in all over 1,000 children. The infant school stands by itself, with a separate playground, and accommodates 400 children. The mixed school is a large two-story building, with accommodation for 600 children. All the floors of the building are fireproof. The cookery department accommodates about fifty children. There is also a caretaker's house adjoining the Luckwell-lane entrance. The buildings are all of pennant stone and Bath stone, with red tile roofs. The cost of the building, exclusive of site, has been about 12,500*l.* Mr. H. C. M. Hirst was the architect, and the builders were Messrs. Love & Waite, of Bristol. The heating apparatus was supplied by Messrs. Skinner, Board, & Co., Bristol.

BOARD SCHOOL, HULL.—The foundation-stone has just been laid of the new Board Schools which are to be erected in Holland-street, Hull, at an estimated cost of about 17,000*l.* The schools are the first of four new schools to be erected by the Board, and in each case the central hall scheme will be adopted. The principal building in the new schools will be a two-story mixed school, the upper floor of which will be set apart for the seniors and the ground floor for the juniors. The central hall will be 55 ft. by 32 ft., and it will be surrounded on three sides by classrooms. These number eight, and all of them open into the hall by means of a corridor. Six of the classrooms will accomodate sixty children each, and the other two fifty each. Swing doors will be fixed at both ends of the corridor, which abut out on to the outer part of the corridor, from which access is obtained to the

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cloakrooms and lavatories. Beyond this are to be entrances and staircases, the girls at one end and the boys at the other. The infant school is to be a separate one-story building, planned on the same central hall system, surrounded by five classrooms, four of which will accommodate sixty children each, and the fifth fifty, with a gallery. In each school ample accommodation has been provided in the way of teachers' rooms, cloakroom, &c. In a separate building, and behind the main block, a two-storied building will be set apart for the teaching of cookery and laundry work. The cookery classroom is to be 32 ft. long and 25 ft. wide, and the laundry-room will be the same size. Covered playgrounds are provided for each school. It is proposed to adopt a combined system of heating and ventilation. The exterior of the building will be of red bricks. Mr. J. Bilson is the architect, Messrs. Hockney & Liggins, of Hull, are the contractors, and Messrs. Ashwell & Nisbett, of London, are responsible for the heating apparatus.

SCHOOLS, CARDIFF.—The Virgil-street Schools Grangetown, Cardiff, have been built for the Cardiff School Board. In addition to the school accommodation there are a caretaker's house, manual instruction centre, and large playgrounds. The schools are built with the classrooms grouped around central halls. The buildings are being built of rubble masonry faced with dressed Newbridge stone and Bathstone dressing. They consist of the infants' school—a one-story building, containing nine classrooms, teachers' rooms, stores, and an assembly-hall, 67 ft. 6 in. by 27 ft. The school will accommodate 400 infants. The girls' and boys' school is a two-story building, having the girls' department on the ground floor, and the boys' on the first floor. The arrangement of the two floors is very similar, each containing seven classrooms and a central hall, 73 ft. 6 in. by 28 ft. 3 in., teachers' rooms, and stores. The total accommodation provided in the boys' and girls' departments is for 880 children. Two entrances have been provided for each department. The whole of the rooms are heated by large open fires. A fresh-air flue is conveyed to the back of each fireplace, and is admitted into the rooms after being warmed. There are fresh-air inlets in each room and foul-air outlets in the centre of each ceiling, carried up to ridges of roofs to patent ventilating turrets. The greater part of the windows are hung to open. The floors throughout are of concrete, with wood-block flooring laid on same. The manual instruction school consists of a workshop 55 ft. by 33 ft. 3 in., with windows facing north and south, and with a lantern light running the whole length of the roof. It is heated by low-pressure hot water, with coils placed upon each side of the room. The window fittings were supplied by Messrs. Brown & Co., of Birmingham; and the lavatories and sanitary fittings by Messrs. Adams & Co., Leeds. The architects were Messrs. Robert and Sidney Williams, Cardiff; the contractor, Mr. Charles C. Dunn, Cardiff; and the clerk of works, Mr. John Gardner.

NEW WING, NOTTINGHAM GENERAL HOSPITAL.—The new Jubilee wing of this hospital has just been completed. The addition forms part of a scheme for remodelling the hospital, and for providing an out-patients' department, and a new range of laundry buildings with boiler-houses. The three new circular wards, one above the other, are each reached by means of a corridor 81 ft. long, placed at right angles to the present corridor, and on the right side of each are two small wards containing two beds. On the left of the corridor are rooms forming the usual adjuncts to large wards, consisting of sculleries, larders, sisters'-rooms, linen-rooms, and stores for patients' clothing. As there are two basements, one in which are the porters' dining and bedrooms, and the other the maids' rooms, the ward block may be said to be five stories. Each of the circular wards on the upper floors will contain eighteen beds. Externally the diameter of the wards is 60 ft., and internally 55·6 ft., the walls themselves being 2 ft. thick. With regard to the sanitary tower, it is pentagonal in shape, measuring 27 ft. from base to apex, 27 ft. along the base, which abuts on Postern-street, and 13 ft. on each side. On every floor it contains a bathroom for patients, in which are portable baths that may be taken to the bedside in case of need, sanitary accommodation for nurses and patients, a housemaid's apartment, and a room for clinical investigation. This portion of the building is cut off from the ward by means of bridges, with the customary arrangement in regard to cross ventilation. Not only is there a promenade on the top of the new wing, but each floor has a balcony for the use of patients who are unable to get downstairs or up to the promenade above. The walls of the building are composed of brick, and generally faced with brickwork, relieved in the strings, dressings, and cornices with Ancaster stone. The interior is lined with glazed bricks, and all the floors are fireproof. They are constructed of steel joists, encased in concrete and covered, in the case of the ward floors, with teak, the corridors being in marble terrazzo. The architects were Messrs. Alfred Waterhouse, R.A., & Son, and Mr. G. Reed was the clerk of the works. The contract for the superstructure was let to Mr. Woodsend, of Nottingham.

GORDON SMITH INSTITUTE, LIVERPOOL.—The institute which Mr. Samuel Smith, M.P., has built in Paradise-street for the use of the Liverpool Seamen's Friend Society and the Strangers' Rest was formally opened on the 20th ult. The building, designed and planned to suit the work of the two societies by Mr. James Strong, of the firm of Messrs. Walker & Strong, architects, Liverpool, faces Paradise-street, and for nearly half its length is of three stories, the higher portion having an ornamental tower at each end. The part which extends to Hanover-street has a flat roof, which will serve as a roof garden and promenade. The façade is of terra-cotta, and the woodwork of doors, windows, and internal fittings of pitchpine. The main entrance is in the centre of the building in Paradise-street. There are other entrances in Hanover-street and at the southern extremity of the building. On entering by the central door the office of the institution lies immediately on the right. Beyond the office, to the right, is a reading-room. This room has an entrance opposite the Sailors' Home. The room now faces the pay-office in the Sailors' Home. To the left of the main entrance is the main hall of the institution. This is 54 ft. by 35 ft., and it will accommodate 300 persons. At the west end of the room there is a platform, and at the north side a vestry. At the extreme south end of the building, on the ground floor, there is another room, which will be set apart as the Strangers' Rest. A staircase of pitchpine rises from a central point, and branches towards the north and south parts of the building. This gives access to the rooms on the first floor. In the centre of the building, on the first floor, the superintendent's room is situated. The boardroom adjoins the superintendent's room to the south. At the side of the building next to Price-street, on the first floor, there is a large upper hall. The second floor contains caretaker's apartments, with cooking range, hot-water apparatus, pantry, with convenience for storage. There is a special-service room, with hot-water supply, which is in communication with the lower floors by means of a lift. On this floor there are three bedrooms. Rooms formed by the bases of the two towers will be used for store purposes. The roof promenade is 64 ft. long by 24 ft. in its widest part. The work of construction has been carried out by Mr. James Readdie.

EXTENSION OF STOCKPORT INFIRMARY.—A new wing has been added to the Stockport Infirmary, and it was opened on the 28th ult. The wing comprises two new wards, each 54 ft. by 23 ft.; a new top-lighted operating theatre, mechanically heated and ventilated; anæsthetic, instrument, and cleaning rooms; a room for the surgeons and a special recovery ward. There are also new nurses' quarters; a recreation or day room for patients; new suites of lavatories for doctors, staff, and patients; laundry, wash-houses, mortuary, and post-mortem rooms. In the original building various alterations have been carried out, embracing enlargements of the kitchen and other apartments. The new buildings, which are fireproof throughout, have been erected, at a cost of about 12,000*l.*, by Messrs. T. & W. Meadows, contractors, of Stockport, from designs of Messrs. Woodhouse & Willoughby, architects, of Manchester.

ASYLUM, KINGSEAT, FIFE.—Tenders have been invited for the masen work of the new asylum to be erected by the Aberdeen City Parish Council at Kingseat, Newmachar, and an early start is expected to be made with the work. Mr. A. Marshall Mackenzie, A.R.S.A., is architect. The site is on the north side of the railway, about a mile nearer Aberdeen than Newmachar Station. The asylum is designed on the model of Alt Scherluetz, in Prussian Saxony, in the segregated system. There will be in all twenty-seven separate buildings, and they will occupy a site of about 30 acres. The rest of the estate will be utilised for farming and gardening work for the patients and for recreation ground. The buildings are arranged in three sections, viz., medical, industrial, and general. In the medical section there are eight separate buildings, as follows:—(1) an hospital divided into separate wings for physically sick, infirm, and recent acute mental cases (bedridden); (2) an isolation ward for suspected cases of infectious disease; (3) two observation villas; (4) two closed asylums; and (5) two convalescent hospitals. The industrial section consists of six villas—three for males and three for females—accommodating from thirty to forty persons in each, the patients being grouped according to their fitness or unfitness for freedom from supervision and for outdoor work. Villa No. 1 is intended for workers who are untrustworthy owing to restless habits and to delusions which render them troublesome or offensive, or to want of intelligence to direct their behaviour, or to a tendency to run away or to commit offences. Villa No. 2 is for patients able to work, who require somewhat less day supervision than the former class, but cannot be wholly trusted to themselves. Villa No. 3 is for working patients requiring a minimum of day supervision and no night supervision. The general section consists of twelve separate buildings, viz., administrative offices and boardroom, kitchen and stoves, laundry, boiler-house and workshops, houses for nurses and female servants, medical superintendent's residence, steward's house, lodges for gardener and engineer, cottages for married attendants, greenhouses, recreation hall, and mortuary. The accommodation provided for at present is for 550 persons, and it is proposed that future extension should be met by the erection of extra villas from time to time as required. In view of this prospective addition to the number of villas, the central buildings, such as the kitchen, hospital, and boiler-house, have been made large enough to suit an asylum of 700 instead of 550.

NEW OFFICES FOR THE PADDINGTON GUARDIANS.—Mr. F. J. Smith has been appointed architect of the Boardroom and other offices about to be built in the Harrow-road for the Paddington Board of Guardians.

WORKHOUSE INFIRMARY, SKIPTON.—The new infirmary in connexion with the union workhouse at Skipton has just been completed. The building has two stories and contains four wards. Each ward is 30 ft. by 24 ft., and will accommodate twelve beds. Accommodation for the nurses is provided in the administrative department. The building is of stone, the interior walls being of glazed bricks. The woodwork generally is pitch pine, and the floors are of maple boards. Mr. James Hartley, Skipton, was the architect, and the following were the contractors: Masonry, Mr. Benjamin Kirk, Skipton; joinery, Mr. James Greenwood, Crosshills; iron and steel work, Mr. William Fawcett, Skipton; plumbing, Messrs. H. Walker & Son, Bingley; plastering, Mr. T. Bailey, Skipton; slating, Messrs. R. Thornton & Sons, Skipton; hot water engineering, Mr. Thomas Mears, Bradford; ventilating, &c., Messrs E. H. Shorland & Bro., Manchester. The baths, lavatories, &c., were by Messrs. Doulton & Co.

FIRE STATION, BRADFORD.—The memorial stone of the new fire brigade station in Nelson-street, Bradford, was laid on the 30th ult. Messrs. Mawson & Hudson are the architects.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY SCHEME FOR DERBYSHIRE VILLAGES.—An inquiry with regard to a scheme of water supply proposed by the Rural District Council of Bakewell for certain villages in Derbyshire was held by Mr. F. H. Tulloch, a Local Government Board Inspector, at Stoney Middleton, on the 20th ult. The scheme, for carrying out which the Council seeks to borrow 17,000*l.*, would include Stoney Middleton, Froggatt, Calver, Great and Little Longstone, Hassop, Ashford, Rowland, and part of Eyam. The water would be obtained from Stoke Flat. At the inquiry an alternative scheme was submitted on behalf of the Duke of Devonshire. It was arranged that Mr. Sterling, the engineer for the Council's scheme, and Mr. Winser, for the Duke of Devonshire, should consult on the matter.

DRAINAGE SCHEME, WIRRAL, BIRKENHEAD.—On the 30th ult. Colonel J. T. Marsh, R.E., an Inspector to the Local Government Board, conducted an inquiry at the Wirral Council Offices, Birkenhead, into an application by the Wirral District Council for permission to carry out their scheme of sewering a portion of their district through the Fender Valley, and thence into the Birkenhead culvert discharging into the Mersey. The cost was estimated at 27,500*l.* Evidence was given by Mr. F. E. Priest, one of the Engineers to the Council. The scheme was opposed by Mr. Charles Brownridge, the Borough Surveyor of Birkenhead.

SEWERAGE SCHEME, CASTLE WARD, NEAR NEWCASTLE.—Mr. R. H. Bicknell, an Inspector of the Local Government Board, held an inquiry at Heddon-on-the-Wall, Newcastle, on the 7th inst., respecting an application of the Castle Ward Rural District Council to borrow 1,250*l.* for works of sewerage in the parish. By this scheme the sewage at present flowing into various ditches and fields and creating nuisances will be collected and discharged into tidal water. Mr. Harry W. Taylor, of Newcastle-on-Tyne and Birmingham, is the engineer. There was no opposition.

FOREIGN.

FRANCE.—The Conseil Général of the Seine will be shortly occupied with the subject of the construction of the Canal from the Marne to the Seine, which will leave Neuilly, to come out at Epinay, near St. Denis, after having crossed sixteen parishes in the Department of the Seine, situated to the north and east of Paris. The *Builder* has already mentioned this project, which would be of considerable importance, not only from a commercial point of view, but from a strategic, and would also prevent the inundations which occur every spring in the neighbourhood of Paris.——The jury on the competition arranged by the municipality of Lyons for the construction of grilles and monumental gates for the Parc de la Tête d'Or has awarded the prize to M. Charles Meysson, architect, of Lyons. —— A subscription committee has been formed at Bordeaux for the erection of a monument to the memory of Gambetta.——The Municipal Council has just given the name of the architect, Charles Garnier, to one of the streets of Paris. They have also named another road after Joseph Peyre (1730-1785), architect and director of the King's Buildings. It was he who built the Odéon Theatre.——A bridge is shortly to be built at the Pointe du Hode on the Havre Canal at Tancarville; it is to be finished by the end of next year, and will cost 145,000 fr.——A white marble monument of Mgr. Rivet, Bishop of Dijon, has just been placed in the Cathedral at Dijon. It represents the bishop kneeling with clasped hands. It is the work of Paul Gasq, sculptor.—

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The Civil Hospitals Commission of Beaune has restored the beautiful chapel of the Hospice de la Charité, which is one of the most interesting monuments of this town.——It is announced that an æsthetic college has been founded at Montmartre; the directors include MM. Rodin, Emile Zola, Gustave Charpentier, Mouet, Arsène Alexandre, &c. ——The death is announced, at the age of seventy-three, of Eugene Barthélemy, architect, at Rouen, late President of the Société des Architects de la Seine Inferieure. He built a number of religious buildings, amongst them the spire of the Cathedral, and that of the church of St. Maclou, the belfry of St. Romain, the churches of Sotteville, Oissel, &c. ——The Municipal Council of Paris has decided on the immediate demolition of the exhibition buildings on the Esplanade des Invalides; and the palaces of the "Armées de Terre et de Mer," of Navigation, of Congress, and of Forestry, will also be shortly demolished. The Council have recommended the retention of the Horticultural building on the Cours la Reine, and of the foot-bridge adjoining it.——M. Moyeux, member of the Institut, has been elected president of the Société Centrale des Architectes. MM. Lalanne, Gautier, and Frantz Blondel have been elected vice-presidents, and M. Poupinel general secretary.——M. Chancel, the architect, has brought forward a scheme for a grand circular Place at the intersection of the Avenue Nicholas II. and the Avenue Marigny, to be decorated with a large column supporting the statue of The Republic by M. Barrias, with a "Ville de Paris" figure by M. Dalou beneath: the pedestal to be adorned with decorative bas-reliefs by M. Roty and mosaics from cartoons by M. J. P. Laurens.——The Administrative Committee of Fine Art have awarded to M. Dalou the medal of honour of the Lheureux prize, in recognition of his monument of the Republic in the Place de la Nation.——New postage stamps are to be put into circulation, from designs by MM. Joseph Blanc, Mouchon, and Olivier Merson.——The death is announced, at Dijon, of M. Alfred Lirodot, engineer and architect, at the age of sixty-nine. M. Lirodot was a member of the Committee of Antiquities of the Côte d'Or, and was also architect of various churches in the Department.

UNITED STATES.—The Report of the Isthmian Canal Commission was submitted to Congress on the 4th inst. In many respects it is new so far as details are concerned, and the Commissioners favour the Nicaraguan route, the estimated cost being a little more than 200,000,000 dols. This is more than any previous estimate, and may be attributed to greater experience in this class of engineering, to the general rise in the cost of labour and materials, and to the circumstance that the canal, as now designed, is of larger dimensions than contemplated by any previous design. The Commission dismiss the Panama Canal route on the ground that even if the United States bought the work already done by the French, there is the serious provision that after ninety-nine years the whole would belong to Columbia. By this document the depth of the Nicaragua Canal is fixed at 35 ft. mean low water, and the bottom width at 150 ft., with increased dimensions at certain points. The locks are proposed to be 740 ft. long, 84 ft. wide, and 35 ft. deep. The time of completion is put at ten years; and the total length of the canal, from Greytown on the Mexican Gulf side to Brito on the Pacific, is 186 miles. The whole of this distance would not be canalised, however, because a large lake is available over part of the route.——Mr. Franklin W. Smith is about to lay before Congress designs for a wide avenue on which it is proposed to concentrate an immense group of museum buildings in the city of Washington. American architects recognise the value of the proposal, though there seems to be some divergence of opinion as to the actual locale of the avenue. They favour the erection of the buildings along the banks of the river Potomac, so as to leave the present parks intact. ——The authorities of the Cornell University contemplate the erection of a building or group of buildings to form a large College of Fine Arts, at an estimated cost of three million dollars.——The judges in the competition for a monument to the soldiers and sailors who perished in the recent Spanish war and on board the *Maine* have chosen three designs, by Messrs. Austin Hays, O. Piccivilli, and G. J. Zoinay respectively. These artists have been requested to furnish more detailed designs before the successful competitor is selected.

RUSSIA.—The Russian Government contemplates representing the country's industries on a large scale at the forthcoming Glasgow Exhibition. The Minister of Finance having instructed a Moscow architect, M. Schechtel, to prepare designs for the building which is to be erected for the Russian section at the exhibition, the architect has proceeded to St. Petersburg with his plans. It is understood that his designs have been approved, and that he will go to Scotland in order to direct the construction of the building.

THE INSTITUTE OF SANITARY ENGINEERS (INCORPORATED).—At a meeting of the Election Committee, held on the 5th inst., the following were elected:—Fellow: T. E. Fellows, Willenhall; Member: A. W. Pelling, London; Associate: A. E. Kinder, Blackpool.

MISCELLANEOUS.

THE STEPS OF ST. MARTIN'S CHURCH.—At the meeting on the 6th inst. of the Westminster City Council, over which the Mayor, the Duke of Norfolk, presided, the following report was received from the Works Committee:—"We have considered as to the alteration to the St. Martin's Church steps, and are informed that the County Council have resolved not to contribute towards the proposed alteration. The work has been commenced under contract, and we are of opinion that it should now be completed, provided the platform in the steps on the southern side of the church is retained. We have accordingly authorised the surveyor to complete the work in accordance with amended plan." A motion that the report be approved was adopted.

SUNDERLAND BUILDING TRADES ASSOCIATION.—The annual dinner of the Sunderland and District Building Trades Association was held at the Grand Hotel, Sunderland, on the 4th inst. Mr. J. W. White, President, was in the chair. Mr. J. Rule gave "The Mayor, Corporation, and other Municipal Bodies," and the Mayor responded. Mr. W. Lowry, of Newcastle, proposed "Success to the Sunderland Branch of the Northern Counties Federation of Building Trade Employers." The building trade at present, he said, was in a very unsettled state. There was the unfortunate bricklayers' strike, and it seemed a pity that there were not some means of conciliation to bring to an end that deplorable dispute.—The Chairman replied, and, after having expressed the pleasure of the trade on the election to the chief magistracy of one directly connected with them, he went on to observe that, although there had been a great increase of members, it could only be by the combination of all branches of the trade that they could hope to cope successfully with the various demands made upon them. Dealing with the brisk business of the past year, he said that the advanced price of material and labour largely diminished the margin of profit when people thought it should be highest. He thought, however, that the limits of good trade had been reached, and that they might look for a declining. Regarding the lock-out, he would advise both sides in the present dispute to keep cool. Nothing could be gained by discussion now, but he hoped that before long the men would see the justice of the masters' suggestion and adopt it. Other toasts followed.

EXHIBITION OF MODERN ILLUSTRATION.—The Board of Education has decided to open this Exhibition on Monday, January 7 next, in the galleries of the Indian Section of the Victoria and Albert Museum, South Kensington. A private view will be held on Saturday, January 5.

IMPORTANT TIMBER SALE.—An unusually important sale took place recently on the Farnborough Hill Estate, near Banbury, when 338 oak, ash, and elm trees were submitted to auction by Messrs. Simmons & Sons. The feature of the sale was the magnificent size and quality of many of the oak and elm trees, the general opinion being expressed that it was very seldom such high-class timber came under the hammer. The first lot, a large oak tree and a smaller one near it, realised 45*l.* This was followed by seven elms trees, which were sold for 135*l.* A magnificent oak tree brought 65*l.*, four elm trees were knocked down at 73*l.*, and a parcel of nine elms at 150*l.* Eight nice oaks in the park realised 167*l.*, and two ash trees near Mollington village made 46*l.* Another lot of nine elms brought 72*l.* Then followed a quantity of witch elms, which made very satisfactory prices, the next lot of importance being a quantity of copse oak in Mollington Wood, where fifty-three trees realised 264*l.* The sale concluded with twenty magnificent oak trees taken from the avenue; they were sold in five lots, and fetched in the aggregate 608*l.*—an average of slightly over 30*l.* a tree. The total received for the 338 trees was 2,038*l.*

GODALMING TOWN HALL.—The project of removing the Town Hall, so strongly opposed some ten or eleven years ago, has been revived, and now, we gather, its demolition is decided upon, on the grounds that the building interferes with the traffic. The Town Hall and market house, standing near the west end of the High-street, was erected by public subscription in 1814, as a memorial of King George III.'s Jubilee, after the plans and designs of Perry, of Godalming.

ST. ANN'S, BARNES.—This freehold property, comprising a riding-school, a pavilion, and five acres of laid-out ground, with a frontage of 158 ft. to the High-street, was sold at the Auction Mart on November 28 last for 6,350*l.* The house, a former residence of Lord Lonsdale, has been occupied during late years by the Lyric Club.

SLATE TRADE.—The price lists for 1901 have been issued by the Carnarvonshire quarries, and show a rise in some sizes of best, but (as in the Festiniog list) a slight fall in some of the cheaper qualities, no doubt with a view to meeting foreign competition. The deadlock at the Penrhyn Quarries continues, and it is reported that Mr. Gerald Balfour is endeavouring to bring about a settlement. In the last strike the efforts of the Board of Trade and other outside mediators were unsuccessful.

APPOINTMENT OF CONSULTING ARCHITECT TO THE GOVERNMENT OF BOMBAY.—The President of the Royal Institute of British Architects announces that he has been desired by the India Office to assist them in the appointment of Consulting Architect to the Government of Bombay. The salary would be 1,600 rupees a month (*i.e.*, 1,900*l.* per annum in India, or 1,300*l.* in England), and in all probability offices would be provided. The officer selected should be competent to assist the Government in designing and reviewing plans of important buildings. He would be required to enter into an agreement for a term of either three or five years; the engagement to be capable of extension thereafter, if so desired, and to be terminated with six months' notice on either side. The President would be very glad if members would assist him in the matter. Should any member be inclined to offer himself as a candidate for the post, he is requested to send in his application to the President not later than December 31.

PUBLIC IMPROVEMENTS, YORK.—Mr. R. H. Bicknell, a Local Government Board Inspector, held an inquiry in the Guildhall, York, on the 4th inst., into applications by the City Council for sanction to borrow 26,936*l.* for the purchase of land for street improvement, 20,000*l.* for electric lighting, 7,920*l.* for constructing and laying-out a river promenade, 1,700*l.* for the extension of the Foss Islands depôt, and 1,280*l.* for the purchase of the Barleycorn Inn for the improvement of Coppergate. The inquiry was attended by the City Surveyor, Mr. A. Creer, and the City Electrical Engineer, Mr. C. A. Midgley.

BRITISH FIRE PREVENTION COMMITTEE (NEW TESTING STATION).—We are informed that the testing station of the British Fire Prevention Committee will henceforth be near Royal Oak Station on the Metropolitan Railway, and within easy reach of the Great Western and the District Railways, Paddington and Praed-street Stations and the Central London Railway Station at Queen's-road, Bayswater. The testing station will again comprise a large, old-fashioned house with considerable grounds, and the house is being immediately arranged for the purpose of committee rooms, a museum, and a laboratory, as well as apartments for the resident engineer. It is anticipated that testing operations will be again resumed in the early spring, and applications for tests can now again be received at the Secretary's offices, No. 1, Waterloo-place, Pall Mall, London, S.W.

GLASGOW ARCHITECTURAL CRAFTSMEN'S SOCIETY. —The annual meeting of the Society was held on Friday, December 7, when a paper was read by Mr. Thomas S. Fraser on "Some Principles of Design." Mr. Fraser stated that the paper was written to help craftsmen intelligently to appreciate the beauties of architecture. Artistic design was the use of architectural precedent, having regard to certain principles, viz, fitness of application, expression, proportion, repetition, variety, symmetry, gradation of contrast, these principles being applied with the designer's individualism.

CAPITAL AND LABOUR.

PENRHYN QUARRY DISPUTE.—The following notice has been served on all the quarry officials:—"Sir,—I am instructed by Lord Penrhyn to order all the quarry officials to remain at their posts until the 31st inst., in case any of the late employees should change their minds and apply for work, in which event they can return with their tools, &c., under the conditions named in the notice dated December 1. This notice does not apply to those six persons who were convicted on the 21st ult. before the magistrates at Bangor under the Conspiracy and Protection of Property Act, 1875. I must now give you notice that in the event of there being no favourable response from the men before December 31, your services would not be required until further notice.—Yours truly, E. A. YOUNG, Port Penrhyn, Bangor, December 10, 1900."

THE BUILDING TRADE DISPUTE, NORTHERN COUNTIES.—An official statement has been issued by Mr. Rankin, President of the Northern Council of the Federated Builders, regarding the causes which have led up to the present dispute in the building trade. The statement, after reciting in detail the negotiations which have taken place between the employers and the bricklayers in Newcastle, with a view of avoiding a struggle, sets forth the claim on the part of the employers that the onus of the present lock-out rests not only on the Newcastle bricklayers and their advisers, but also in an equal degree upon the local associations of the districts who decided to support them. The statement continues: "Since the beginning of the strike the demand for men has become much less and the supply much greater. In Scotland generally the building trade is almost at a standstill, and in many parts of Yorkshire and other parts of the north of England there is no demand for men, whilst in the immediate neighbourhood there is a plentiful supply. The men also who were drafted from Newcastle have in many instances returned and have demanded to be replaced upon the books for strike pay, and this will no doubt increase. The speculative builders in the district generally declare that owing to the high price of material and the high wages demanded by the men, and also by the limitation of the output of work by them, property cannot be built to sell or to pay in letting, and some of them had closed their works before the

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lock-out, while others are prepared to follow; and the contractors declare unanimously that no prices can be obtained in contracting to pay, for the same reasons. In view of this and the lessening demand everywhere, it is clear that in the interests of themselves, and in justice to the public who employ them, it is impossible for us to grant a demand for a higher rate of wages than is paid in any part of England for the same work, and much higher than is paid in most places throughout the kingdom, and that it must be resisted to the utmost by all the legitimate means in our power."—On the 5th inst., at the Victoria Hotel, Manchester, there was a conference of the Lancashire, Cheshire, and North Wales Building Trades Employers' Federation, and representatives of employers of bricklayers in the federated towns, in respect of the trouble between the bricklayers and their employers at Newcastle-on-Tyne. It will be remembered that the members of the Federation had been asked by circular if they would agree to a lock-out, in case the affair was not shortly settled, not only of the bricklayers, but also of the allied workers. There had not been, it appears, an expression of unanimity on the question, but at the conference on the 5th inst. a strong Committee was appointed to try and secure united action. The result of this Committee's work will be reported to the half-yearly meeting of the Federation, to be held at Liverpool on December 19, when it is expected a final decision will be arrived at in respect of supporting by a lock-out the employers at Newcastle-on-Tyne.

WORKING RULES FOR OPERATIVE BRICKLAYERS.—The London Master Builders' Association have agreed with the Operative Bricklayers' Society on a revised set of working rules, which are in the hands of the printer and will be forwarded to members by Monday. We have not space this week to print these rules, a copy of which only reached us at the last moment.

LEGAL.

ACTION BY AN ARCHITECT FOR FEES.

THE case of Dollar *v.* Higgs and another came before Mr. Justice Wills and a special jury in the Queen's Bench Division on the 6th and 7th insts.—an action brought by the plaintiff to recover from the defendants 262*l.* 10s., moneys received by them to his use, or in the alternative for work done by him at their request. The defence was that the money was not received by defendants to the use of the plaintiff, and that the work was not done by him at their request. The case was tried before the late Lord Chief Justice and a special jury in May last (reported in the *Builder* of May 12, 1900), but the jury disagreed. The case accordingly now came on for re-trial.

Mr. McCall, Q.C., and Mr. Stewart appeared for the plaintiff; and Mr. Dickens, Q.C., and Mr. Chester-Jones for the defendants.

Mr. McCall, in opening the case, said that the question involved was one of great interest to both architects and builders. The plaintiff, Mr. Peter Dollar, was a London architect, and the defendants were a firm of builders who had done a considerable amount of work under Mr. Dollar and other architects. Amongst Mr. Dollar's clients was the firm of Pickford & Co., the carriers, who required a considerable amount of building work done for stables, depots, and so on. Messrs. Pickford & Co. sometimes asked for tenders from builders upon plans, specifications, and quantities, and sometimes for tenders on a different system, viz., on plans and specifications, the builder agreeing to be paid upon the certificate of measure and value by the architect who prepared the plans plus a certain percentage representing the profit. In the spring of 1897 Messrs. Pickford required a depot to be built for them in the High-road, Tottenham, and they accordingly instructed the plaintiff to prepare the necessary plans for the work, and, in addition, as this was to be a tender upon the measured value, they instructed him to make, and he did make, a long schedule of prices, the prices of the various works to be done—to some extent very much the same thing as a bill of quantities. The defendants amongst other firms tendered for the work. The tender, which was addressed to Mr. Dollar, was as follows:—"We do hereby propose to execute and completely finish, and maintain for nine months after certified completion the whole of the works which are mentioned or referred to in, or shown or intended by the specifications and drawings which have been prepared by you, which said drawings, &c., have been exhibited to, and carefully considered by us, and the works to be measured up by you or your nominee in the usual manner, and prices according to the schedule of prices you have furnished us with subject to a premium of 15 per cent." The defendants' tender was accepted, and they started the work immediately afterwards, and completed it somewhere about October, 1897. The next step, of course, was to have the work measured up, and as the contract said either by Mr. Dollar or his nominee, accordingly Messrs. Higgs nominated a Mr. Saunders, an architect, to measure up for them. And Mr. Dollar, acting as principal for Messrs. Pickford, sent a Mr. Preston, a qualified surveyor in his office, and paid a salary, to measure up for Messrs. Pickford. These two gentlemen continued to measure up the work from October to the middle of December, 1898. Mr. Preston then left Mr. Dollar's employment, and it not being convenient for Mr. Dollar to send any one from his office to continue the work Mr. Preston had begun, he asked a gentleman named Wardle, who had frequently done work for him before, to do the work. This Wardle did. There was some delay over the work, and Messrs. Higgs complained about it to the plaintiff in the early part of January, 1899, and asked the plaintiff to push it on. Plaintiff promised to do so, telling Mr. Higgs that he was responsible for Mr. Wardle. The plaintiff did so, and on February 1, 1899, Mr. Wardle sent to Mr. Dollar the draft measurements and prices, in order that he might go through the prices and alter them where he thought necessary, and so arrive at the exact figure that Messrs. Higgs were entitled to from Messrs. Pickford, plus the 15 per cent. commission provided for by the contract. The plaintiff had employed Mr. Wardle on many jobs to take out quantities upon the terms of Mr. Wardle receiving one-third of plaintiff's commission. This was the arrangement in the present instance, Wardle being plaintiff's assistant, the plaintiff taking the whole responsibility of seeing that the figures were accurate. The plaintiff's case was that Messrs. Higgs were told by him that Wardle was only his assistant *in* doing the work. On June 27, 1899, there was an interview between Mr. Dollar and Mr. Higgs, when the latter stated that he had had a letter from Mr. Wardle asking that the amount of his fees for measuring up should be paid to him. Mr. Dollar then told Mr. Higgs that Mr. Wardle was his assistant, and that he was not to pay him. The learned counsel stated that he ought to mention that at *this time* there were disputes between Messrs. Higgs and Mr. Dollar which rendered the position extremely strained. Mr. Dollar was the architect for various buildings on which Messrs. Higgs were engaged, and in one or two of these the work was very badly done; he was making no imputation against Messrs. Higgs, but the work was scamped and so badly done that Mr. Dollar had to insist upon the work being taken down and rebuilt. Messrs. Higgs were much irritated about this, and under the terms of the contract appealed from Mr. Dollar's decision, but were beaten, and the work had to be taken down and rebuilt according to the contract. In October Messrs. Higgs pressed Messrs. Pickford to pay the amount due to them, although the final certificate had not been given by Mr. Dollar. Messrs. Pickford, knowing what the ultimate figures would come out at, dispensed with the necessity of Mr. Dollar's certificate, and paid Messrs. Higgs a sum of over 2,000*l.*, the balance due to them including this sum of 262*l.* 10s. for surveyor's fees. If Mr. Dollar had had the opportunity of revising the figures he would not have claimed so much as 202*l.* 10s. However, the money was paid by Messrs. Pickford to Messrs. Higgs, and the latter, in spite of the warning given them by Mr. Dollar, paid the 262*l.* 10s. direct to Mr. Wardle. As soon as Mr. Dollar heard of it, he applied to Messrs. Higgs for the money, and their reply was that, as Mr. Wardle had threatened them with an action for his fees, they had no option but to pay the money over to him. The plaintiff then commenced the present action.

Mr. Peter Dollar, A.R.I.B.A., was then called, and generally bore out the opening statement of counsel. He stated that he should not have charged 262*l.* 10s. for the work as Mr. Wardle had done. Wardle had charged 2½ per cent., which was the amount allowed by scale, but witness would only have charged 2 per cent. and that would have made 200*l.* The schedule cost 10*l.* 10s. to prepare, and 10*l.* 4s. 2d. for lithography, which made altogether 220*l.* 14s. 2d., and which he would have been satisfied with for the work.

Cross examined by Mr. Dickens.

You did not suggest that at the last trial, you know? I was not asked.

Did not the Lord Chief Justice put this to you, that you were claiming 262*l.* 10s. from your employer when you had actually got the work done for 87*l.* 7s.? And did he ask you this question, "Did your employer know you were going to put the profit in your pocket?" Were you asked that by the Lord Chief Justice at the last trial?

The witness replied that he could not remember whether he was asked that question.

Did Messrs. Pickford know you were getting this work done for 87*l.*? They did not know any figures at all.

Therefore you were going to put in your pocket the profit between 87*l.* and the 262*l.*?—I was going to put in my pocket the difference between what it cost me and what I was going to receive.

Do you suggest that you ever said at the last trial that you were entitled to a single penny less than 262*l.*?—No, I do not think I did.

You have taken proceedings against Wardle, have you not, to recover the balance from him?—Yes, I took proceedings.

In which you claim the balance of the whole amount, between 262*l.* 10s. and 87*l.* 7s., which you say you are entitled to?—I think you are correct.

Why this change of front that you are entitled now only to about 230*l.*? Well, I was asked by my solicitor whether 2½ per cent. was a fair charge, and I said if I had been left to make my own charge I should have charged 2 per cent.

Cross examination continued: Wardle was a quantity surveyor sharing an office with his brother in Temple-avenue. When witness asked Wardle to take the matter on Wardle asked witness if he minded him meeting Saunders on his own responsibility because Saunders was a younger man than he was, and he (Wardle) would not like to meet him on the terms of being an assistant. Witness agreed to Wardle being able to make appointments without him and to do the work as if he were working the job himself.

Re-examined: It was quite usual for an architect or surveyor when he could not do work himself, or with his own staff, to employ another architect as assistant. Before witness could complete the figures Messrs. Higgs issued a writ against Messrs. Pickford & Co., and the latter without waiting for the certificate paid the amount, 2,000*l.* odd.

Mr. J. R. Preston having also given evidence in support of the plaintiff's case,

Mr. Dickens, in opening the defendants' case, said he hoped to satisfy the jury not only by his witnesses, but also by the admissions made by Mr. Dollar, that Messrs. Higgs should not be called upon to pay this money twice over. Messrs. Higgs had paid the money over in the ordinary course as builders were entitled to pay it. He submitted that the evidence given by Mr. Dollar conclusively showed that no notice was given to Messrs. Higgs that Wardle was Mr. Dollar's assistant. It was idle to suggest that because there were differences between Messrs. Higgs and Mr. Dollar that the former paid the money to Mr. Wardle, knowing that he was not entitled to receive it and knowing that they might have to pay the money over again to Mr. Dollar. The sole question in the case was whether in the circumstances Messrs. Higgs were entitled to pay the money over to Mr. Wardle. As the jury had heard, an action was now pending between Mr. Dollar and Mr. Wardle in which Mr. Dollar claimed from Mr. Wardle the fees paid over to him. Mr. Wardle claimed that in this matter he was entitled to those fees as against Mr. Dollar, as it was clearly understood between them that Mr. Wardle was to act as an independent quantity surveyor. Mr. Dollar took the opposite view. There could be no doubt that if an architect did such work as this he was entitled to the fees, but if an independent quantity surveyor did it he was entitled to the fees, and the custom was that as soon as the builder received the fees from the building owner he had to pay them over to the quantity surveyor. All that the defendants had been told was that Mr. Wardle was to complete the work commenced by Mr. Preston. The defendants did not know what arrangements Mr. Dollar had made with Mr. Wardle. All they knew of Mr. Wardle was that he was an independent quantity surveyor. The statement was signed by Mr. Wardle and not by Mr. Dollar at all. That was exactly what would have been done if Mr. Wardle was an independent quantity surveyor. The summary sent to Mr. Dollar was signed by Mr. Wardle, and Mr. Dollar did not demur. It was the duty of Messrs. Higgs as soon as they received the amount from the building-owners (Messrs. Pickford) to pay the money over at once to the quantity surveyor, and this was done.

Mr. Frederick Higgs, examined by Mr. Chester Jones, said he was senior partner in the defendant firm, who were builders and contractors, carrying on business at Loughborough Junction. Mr. Dollar had never suggested that Mr. Wardle was acting as his assistant. He remembered the interview with Mr. Dollar at the Harrow-road on June 27. There were present at the interview Mr. Dollar, Mr. Archibald (Mr. Dollar's clerk), Mr. Saunders (Selby & Saunders, quantity surveyors), and witness. Witness showed Mr. Dollar the letter he had received from Mr. Wardle and asked him what he was to do with it. Mr. Dollar replied, "Don't pay that man anything." Witness took that to mean that he was not to comply with the request in the letter. Not a word was said at the interview about Mr. Wardle being Mr. Dollar's assistant.

Cross-examined by Mr. McCall:

The reason witness asked Mr. Dollar on June 27 what he should do about Wardle's letter, was that if Mr. Dollar had said, "Well, you can pay him 40*l.* or 50*l.* on account, it will be passed," he (witness) would not have objected to advance the money. They never communicated with the architect before paying the quantity surveyor. As soon as they received their balances they paid the quantity surveyor.

Mr. H. B. Saunders, examined by Mr. Chester Jones, said he was a member of the firm of Selby & Saunders, quantity surveyors, of Victoria-street, Westminster. In September, 1897, he was instructed by the defendants to act as their quantity surveyor at their building at Tottenham. He commenced the measuring up with Mr. Preston, Mr. Dollar's clerk. After Mr. Preston left and Mr. Wardle commenced the work the latter had to go through the whole of the measurements himself, and to check all the dimensions taken by Mr. Preston. He had always looked upon Mr. Wardle as an independent quantity surveyor. He was present at the interview between Mr. Higgs and Mr. Dollar on June 27, and was sure that Mr. Dollar never told Mr. Higgs that Mr. Wardle was his assistant.

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Mr. R. S. Wardle, examined by Mr. Dickens, said he was a quantity surveyor of thirty years' experience and had been in practice for himself twenty years. He had known Mr. Dollar from the beginning of 1896. From time to time he had done work for Mr. Dollar, both in making out quantities for tenders and measuring up work which had been done. The action which was pending between himself and Mr. Dollar was in respect of several matters. When Mr. Dollar spoke to him about taking over the Tottenham job, witness told him that matters between them were shifting into a very unsatisfactory condition. He told Mr. Dollar that if he undertook the work it must be distinctly understood that he must be appointed surveyor in the matter. Mr. Dollar replied, "Very well, go on and get it done," or words to that effect. He had never acted for Mr. Dollar as his assistant, but always in the capacity of an independent surveyor. He did the work absolutely independent of Mr. Dollar, and employed on the work three assistants, one of whom he paid 2s. 6d. an hour, another 1s. 6d. an hour, and an articled pupil, since dead. Preston's measurements were of no great assistance to him. His dimensions were not taken in London form. He did not say they were inaccurate, but they caused witness a great deal of trouble.

Cross-examined by Mr. McCall:

He was still carrying on business in Temple-avenue.

If you are ordered to repay this money, are you in a position to do it?—I believe I am; but, taking the expenses which are likely to accrue, I do not know what my position may be.

Other evidence having been given,

His Lordship, in summing up the case to the jury, said it really depended upon the verbal representations which had taken place. If the plaintiff's evidence was right, the defendants were clearly wrong in paying Wardle; but if the defendants' story was right that nothing was said to put them on their guard with respect to the true relations between Mr. Dollar and Wardle, the defendants were justified in paying Wardle. Nobody was more alive to the mischief of what were called secret commissions and improper dealings in matters of this kind than his lordship, but he could not think that this was a class of case in which any observation of that kind at all applied. The contract between Messrs. Higgs and the building-owners showed, on the face of it, that the person who was to take out the quantities to measure up for the final settlement of the work was Mr. Dollar or his nominee. Of course, if Mr. Dollar did the work himself he would get payment, and there was no harm in his getting the payment. The work had to be done by Mr. Dollar, or somebody else whom he named. There was nothing objectionable in that, and in his lordship's opinion it was absolutely harmless for Mr. Dollar to get the work done as cheaply as he could. What difference was there between Mr. Dollar getting the work done by his own clerk, who would probably not get as much as a third, and his getting it done by an independent person not in his service for one-third? In his opinion there was no harm in Mr. Dollar getting the work done in as advantageous a manner as he could for himself. His Lordship then reviewed the evidence given, and in the result the jury returned a verdict for the plaintiff for the amount claimed.

After some discussion, judgment was entered for the plaintiff for 174*l.* 15s. 10d., the amount due after giving credit for the 87*l.* odd due to Mr. Wardle. The plaintiff was awarded the costs of the action, and also of the former trial.

LONDON BUILDING ACT, 1894.

DISTRICT SURVEYOR'S FEES FOR ARCHES, &C., UNDER PUBLIC WAYS.

DICKSEE *v.* DEWRANCE.

THIS case, in the form of a summons for the recovery of fees, came before Mr. Paul Taylor at Southwark Police-court on December 4, for his decision on the point of law as to what fees the District Surveyor is entitled to charge in respect of arches or fire-resisting floors under the public way when more than one arch or floor exists in connexion with the same building.

Mr. Bernard Dicksee, District Surveyor for East Newington, explained that Messrs. Dewrance & Co. appeared as defendants at his (plaintiff's) request in order to settle the point of law that had been raised by the London County Council, who had objected to district surveyors charging more than 10s. in respect of several arches appropriated to the same building, as they were of opinion that the decision of the High Court in the case of Power *v.* Wigmore, under the Metropolitan Building Act, 1855, was equally applicable to the London Building Act, 1894. The point was whether the District Surveyor was entitled to 10s. for each arch, or 10s. for a number of arches to some one building.

The facts had been agreed between the parties that Messrs. Dewrance & Co., as builders and owners of 224, Tabard-street, were liable for the fees legally chargeable in respect of three arches, floors or other constructions under the public way and within the rules of Section 72, in connexion with and forming part of one factory building.

The Magistrate's attention was called to Section 154 of the London Building Act, 1894, which enacts that "There shall be paid.....to every District Surveyor in respect of the several matters mentioned in Parts I. and III. of the Third Schedule of this Act the fees therein specified," and it was pointed out to him that this as far as it went was identical in sense and almost identical in words with the first portion of Section 49 of the Metropolitan Building Act, 1855 (repealed), which repealed Section, however, continued, "but one fee only shall be chargeable with respect to any such works done in, to, or upon any building as are in pursuance of the provisions hereinbefore contained included in one notice." This had reference to the last words of Section 38 (Metropolitan Building Act, 1855): "All works in progress at the same time to, in or on the same building or structure may be included in one building notice." This portion of Section 49 of the Act of 1855 had not been re-enacted.

The official report of the case of Power *v.* Wigmore (Law Reports VII., Common Pleas 386) was handed to the Magistrate and considered by him.

Mr. Paul Taylor, in giving his decision, said that it was perfectly clear to him from the case quoted and the respective sections of both Acts that a fee of 10s. was chargeable under the present Act for each arch or floor. The words in the schedule, "For inspecting the arches or fire-resisting floors over or under public ways, 10s.," were, he thought, somewhat ambiguous, but the Judges had decided that point, that it meant 10s. for each arch, and not 10s. for a number of arches. They said that, taking the enacting portions of the Act and the schedule together, the literal construction was that 10s. was due in respect of each arch, and, but for the existence of the latter portion of Section 49 of the old Act, he felt quite certain that the judgment would have ended there. The corresponding enacting portion of the new Act was Section 154, and that and the schedule were up to that point identical with the old Act, and consequently the earlier part of the Judges' decision held good; but as the later portion of Section 49, which the Judges held to cut down the fee to 10s. for the number of arches to any building, was not re-enacted in the Act of 1894, that part of their decision had now no application. There would therefore be an order for the payment of 30s. on the basis of 10s. for each of the three arches or floors.

No costs were asked for.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

16,274.—A CUTTER FOR LATHES: *A. Kohn and B. Kohn.*—The inventors devise a cutter that revolves around the work, which is fixed. The cutter is caused to slide radially in grooves cut in discs which are joined with rods, a sleeve that slides upon the principal spindle and is joined to the cutter by means of links and a lever accomplishing the feed. A handle works the sleeve, which turns together with the spindle. The cutter is prevented from jamming between the discs by means of projections that are fashioned upon it, and the work is drilled and centred by a drill upon the disc.

16,300.—SAFETY FUSES: *E. T. Goslin.*—The inventor seeks to minimise the amount of arcing in safety fuses by causing the fusible wire to support a portion of the conductor, which at the melting of the fuse falls away and breaks the circuit at another point. For a double-break switch the conductor is placed within an insulating tube and slides in the switch's movable portion, its other end being fitted with a socket and a spring contact that engages with a plug-coupling. The conductor is connected by the fusible wires to a ring that carries the contacts of the switch, the plug being connected to the other contact. As the fuse blows the conductor will drop into a tubular receptacle.

16,306.—A METHOD OF VENTILATION: *M. Kugler.*—The pumping apparatus for supplying fresh air to rooms and other apartments comprises an inverted bell which is dipped into a vessel containing water, and can be lifted with a cord joined to a motor-driven crank. As the bell is raised the air is drawn inwards through a pipe and a suction valve, and when it falls—through its own weight—the air is expelled through another valve and another pipe into the room of the building. The principle can be applied to the use of two pumps acting in turns, and discharging into one common outlet pipe.

16,332. — A HOISTING AND LOWERING APPARATUS: *C. H. Sidebotham and R. B. Sibbald.*—The apparatus is intended for use as attached to completed buildings, &c. A carriage, upon which the lifting-pulley is mounted, runs upon the upper face of an inclined beam which is fastened on to a beam in the doorway; the raised load is held up by means of the engagement of a button upon the rope with a fork that hangs from the pulley-casing; a retaining catch is freed by pulling a rope so as to allow the carriage and its load to move inwards along the beam through their own gravity. The hanging-fork may be provided with a tailpiece which, by striking against a stop, will automatically release the button and at the same moment lock the pulley.

16,340.—JOINTS FOR PIPES: *I. Hurst.*—A butt and flange joint for pipes that are made of lead, or of lead and some hard metal, or for joining together two leaden pipes, is formed of two flanged ferrules whose faces are grooved concentrically together with a coupling-nut which will take and compress the flanged ends of the pipes; in the case of a leaden pipe and one of some harder metal the latter pipe is flanged and screwed on its outside to take the coupling-nut — a form of joint that will serve for joining a leaden pipe to a tee or other piece of harder metal.

16,365.—A VENTILATOR: *H. Ough and A. H. Ough (H. Ough & Son).*—The ventilator consists of a perforated brick through which the air passes to the filtering material upon a frame beyond. The frame is a removable one and is kept up with another frame whereon are pins that carry a baffle-plate which slides upon the pins and can be readily detached.

16,392.—A RATCHET BRACE: *J. A. Wade.*—The ratchet brace, which may be employed also as a lifting-jack, has in the body part (the handle being detached) a socket for the drill or tap or other tool, and a screw-thread for the feeding screw with a head and point, the body part including a polygonal portion and two toothed wheels above and below the cylindrical portion; the handle jaws fit the cylindrical and polygonal portions and the head; its angular pin will act as a pawl against one of the toothed wheels when the jaws have engaged with the cylindrical portion. A reversal of the handle, which can be employed separately as a spanner, will turn the brace in an opposite direction.

16,398.—CONTINUOUS OR ANNULAR KILNS: *W. Feld.*—The separate chambers that compose a continuous kiln are placed in inter-communication. The furnace gases are made to pass from the two furnaces (having vertical grates) of each chamber through the goods in the chamber wherein firing is in progress, and so to the central flue, whence they are next passed through flues in the kiln's floor to the spaces behind the next chamber's furnaces, and so on, until at last they escape through a central opening, a movable pipe, and a flue to the chimney; the air for maintaining combustion is similarly drawn through the preceding chambers, entering the first chamber through central opening, the pipe being then out of its position.

16,405.—HOT-WATER SUPPLY FOR DOMESTIC PURPOSES: *H. H. Wilson.*—The supply-water flows into and out of the casing through two pipes respectively, and flows back again through another pipe; other pipes are provided for the heating water. The supply inlet-pipe may lead immediately to the heater, or be passed through the heater's space that it may warm the supply-water on its way to the heater, or it may be joined up to an especial water-casing or series of pipes; the outer casing has four sides and is arched, whilst the inner casing is slung from the outer casing's top, or it may be set flush with that casing at the end instead of being made to project therefrom.

16,486.—FRAMES FOR OAST HOUSES: *A. Blackie.* In order to prevent the escape upwards of heat at the edges of the frames, radial and transverse wooden strips are fitted in the floor of a circular drying-kiln, and the rapid escape of air is provided for by means of a trap at the floor's middle point. The frames are to be raised and reversed with cords passed over pulleys, the frames having handles at their ends for that purpose. In the case of the larger frames of kilns built square on plan, the cord is fitted with a stop whereby it may be held in a catch. Spring catches secure the movable lids of the frames. When the hops have been dried they may be cooled either slowly or quickly by stacking the frames upon one another or by setting them upon their sides respectively. The kilns to which the invention relates are after the kind specified in No. 7,087 of 1898.

16,501.—PLASTIC COMPOSITIONS: *S. Zientarski.*—The composition consists of sand, 100 parts, say, of powdered unslaked lime, and, say, 15 parts of pulverised unburnt clay mixed with gypsum, alum, or some similar substance that will retard slaking, and water. When moulded and pressed the goods will harden slowly without alteration in their volume. With the specification should be read No. 22,227 of 1893.

16,589. — METHODS OF CONSTRUCTION (FOR BUILDINGS): *A. H. Bromley.*—Plaster of Paris or a similar quickly-setting plastic substance, mixed, it may be, with some binding material such as hair, papier-mâché, &c., is used as a centre for the support of arches and floors made of cement or other building material; the centres may be cast in any arched or channelled form, or with curved sides and square on plan, or in a plain segmental shape either without or with a horizontal plate or under face, and when the cement above them has become hard, they may be broken up and taken away or may be left in place to serve as permanent ceilings, their under-faces being suitably ornamented. In one method of the construction the centres are laid so as to repose upon the bottom flanges of the girders; then cement is filled in over them between the girders, and the wooden floor is fixed above the cement.

16,600.—CONDUITS FOR ELECTRICAL CONDUCTORS, &C.: *G. H. Nisbett.*—The conduits, made of concrete, earthenware, and so on, and fashioned as troughs or half-tubes, or as tubes to be afterwards subdivided, are after the kind specified in No. 462 of 1898. The lengths have by preference an oval section, with spigots and sockets at their ends, and in order that they may be easily divided when required for use, nicks or grooves are fashioned

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lengthwise at the ends of the shorter axes; resting surfaces are provided by means of the flattened sockets and spigots, and the cables are set in bitumen within the conduits.

16,613.—RACK PULLEYS: *F. Fewsbury.*—The rack and pulley-carrier are stamped out of blanks of sheet metal; the former is notched and serrated, and its side edges will engage with turned-up lugs upon the pulley-carrier which has other turned-up lugs for the pulley, and also a turned-up nose for engagement with the notches. When the pulley has been pulled forwards the nose can be put out of engagement and an adjustment of the pulley can then be effected.

16,623.—SKYLIGHTS AND WINDOWS: *C. E. Manning.*—For a skylight or window that shall refract and reflect the light in the direction desired narrow strips of glass are built up, one upon another, and at an angle, within a frame, the spaces between the edges of the strips being filled with a soluble and easily-melted glass, in a powdered form and fused so as to make a smooth surface. In another form of the contrivance the inventor superimposes glass strips having rough edges, to which latter he welds hot sheets of glass, or he unites the strips with layers of soluble glass, transparent varnish, &c., applied with a brush or in the shape of sheets.

16,653.—ARTIFICIAL STONE: *C. F. Cross and E. J. Bevan.*—The inventors substitute sulphurous acid in the form of bisulphites for the bicarbonates used in their former process as specified in No. 4,628 of 1898, whereby they harden an admixture of asbestos fibre and chalk, &c., by impregnation firstly with a solution of sodium silicate, and secondly with a solution of a bicarbonate or of carbonic acid; the liberation of the silica, which is dehydrated by heating the admixture after it has been slowly dried, will also be effected by employing some salts of ammonia—such as the sulphate or chloride; the process must be carried out in closed vessels when ammonium salts are used, the ammonia being drawn up and directed through diluted sulphuric acid or fixed by some other means for its use again.

16,679.—A COMBINED BURNER AND SCRAPER FOR THE REMOVAL OF PAINT AND VARNISH: *B. F. Aiken.*—The tool comprises a cylinder-shaped handle at whose lower end is an arm that carries the scraper. The handle serves as a container or reservoir for the liquid supply of the burner; into the cylinder's other end is screwed a shouldered plug, between which and the cylinder is inserted a packing ring; through the plug is formed a passage, closed with a valve, and between the plug and a perforated cap which is screwed over a sleeve is inserted a spring. For use of the tool, naphtha (or other liquid fuel) is put into the cylinder, the plug is set in its place, and the cap is pressed downwards with its aperture shut so that the air forced beyond the valve mixes with the naphtha and the admixture flows through an outlet at the cylinder's remoter end and thence through a tube into a chamber of the burner. Removable plugs are used for closing the ends of the chamber and the tapered opening of its upper portion takes a needle-valve which is moved with a disc. To the burner's head-part is attached the cup-shaped gland of the valve, wherein naphtha may be burned for starting the appliance. The inventor provides also the common hood and combustion chamber.

10,706.—ATMOSPHERICAL GAS-BURNERS: *F. G. H. S. Carl.*—The burner, which is more particularly intended for use in bathroom stoves, has the jets of the gas supply-pipe so inclined that the gas shall be impinged against the inside of the mixing chamber and thereby become thoroughly mixed with the air, which is drawn through it lets, before the mixed gas and air flow to the holes of the burner. In order to prevent any ignition of the gas about and around the nozzle, a separating plate is fixed between the air-inlet and the space which surrounds the mixing chamber, which may be in the shape of a cylinder and cone or of two truncated cones.

MEETINGS.

FRIDAY, DECEMBER 14.

Architectural Association (*Discussion Section.*)—Mr. H. V. Crawfurth-Smith on "The Churchyard and its Accessories." Mr. G. H. Fellowes Prynne will attend as Special Visitor. 7 p.m.

Institution of Junior Engineers (*Westminster Palace Hotel*).—Mr. J. H. Davy James on "The Metallurgy of Tin." 8 p.m.

Institution of Mechanical Engineers.—Mr. H. A. Humphrey on "Power-Gas and Large Gas-Engines for Central Stations." 8 p.m.

Architectural Association of Ireland (*Technical Demonstrations*).—Mr. Thomas Hudman on "Timber," at the Dublin Timber Company, Limited, Lower Ernestreet. 4.30 p.m.

Sheffield Society of Architects and Surveyors.—Mr. Hugh Stannus on "Athenian Buildings." 7 p.m.

SATURDAY, DECEMBER 15.

British Institute of Certified Carpenters.—By permission of Messrs. Trollope & Sons, the members will visit the buildings in course of erection at Farm-street, South Audley-street, W. 3 p.m.

Dundee Institute of Architecture.—Visit to new additions at West Green Asylum.

MONDAY, DECEMBER 17.

Royal Institute of British Architects.—Mr. Beresford Pite on "Some Tendencies of the Modern School of Architecture." 8 p.m.

London Institution.—Professor Silvanus Thompson on "The Tercentenary of the Science of Electricity," illustrated. 5 p.m.

Society of Arts (*Cantor Lectures*).—Professor J. A. Fleming on "Electric Oscillations and Electric Waves." IV. 8 p.m.

Liverpool Architectural Society (*Members' meeting*).—Mr. G. Hastwell Grayson, M.A., on "Skyline." 6 p.m.

TUESDAY, DECEMBER 18.

Institution of Civil Engineers.—Papers to be further discussed:—1, "The Signalling on the Waterloo and City Railway"; and 2, "Note on the Signalling of Outlying Siding Connexions," by Mr. A. W. Szlumper; 3, "Signalling on the Liverpool Overhead Railway," by Mr. S. B. Cottrell. Papers to be read, time permitting:—1, "Glasgow Bridge," by Mr. B. H. Blyth, M.A.; 2, "Railway Bridge over the Fitzroy River, at Rockhampton, Queensland," by Mr. W. J. Doak; 3, "The Niagara Falls and Clifton Steel Arch Bridge," by Mr. L. L. Buck. 8 p.m.

WEDNESDAY, DECEMBER 19.

Builders' Foremen and Clerks of Works' Institution.—Annual meeting of directors. 7 p.m. Ordinary meeting of the members. 8 p.m.

St. Paul's Ecclesiological Society.—Mr. Cuthbert Atchley on "Harvest Thanksgivings and certain other Votive Offices." 7.30 p.m.

Edinburgh Architectural Society.—Mr. A. Muir on "The Architectural Survey."

THURSDAY, DECEMBER 20.

Institution of Electrical Engineers.—Lieut.-Col. Crompton, Past President, on "The Electrical Engineers (R.E.) in South Africa." 8 p.m.

FRIDAY, DECEMBER 21.

Institution of Civil Engineers (*Students' Meeting*).—Mr. C. E. Inglis, B.A., on "The Use of Geometrical Methods in Investigating Mechanical Problems." 8 p.m.

Glasgow Architectural Craftsmen's Society.—"Conditions of Contract" (Mason, Joiner, and Plumber).—Messrs. R. Aikenhead, J. A. Ferguson, and Isaac Low. 8 p.m.

Architectural Association of Ireland (*Technical Demonstrations*).—Messrs. Hudman and Tickell on "Hardwoods" (at the Dublin Timber Company, Limited). 4.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

Nov. 29.—By PERCY MATTHEWS & MATTHEWS.

Lewisham.—58 to 63 (even), Courthill-rd., f. (including mortgage) £1,210
15 to 21 (odd), Albion-rd., u.t. 57 yrs., g.r. 40*l.*, r. 127*l.* 1,170
Greenwich.—31 and 32, John-st., u.t. 34 yrs., g.r. 4*l.* 295
Gillingham, Kent.—95 and 96, Medway-rd., f., r. 18*l.* 16*s.* 315
Caledonian-rd.—135, Copenhagen-st., u.t. 43 yrs., g.r. 5*l.* 10*s.* 365

By C. C. & T. MOORE.

Plaistow.—121 to 127 (odd), Pelly-rd., u.t. 30 yrs., g.r. 44*l.* 275
Leytonstone.—2 and 3, Booth's Cottages, with three workshops, u.t. 66 and 42 yrs., g.r. 10*l.* 310
Hackney.—38 and 39, Rutland-rd., u.t. 52 yrs., g.r. 8*l.*, r. 56*l.* 645
Upton-park.—27, Ashley-rd., f., e.r. 38*l.* 430

By NOTT, CARTWRIGHT & ETCHES.

Edmonton.—3, 5 and 71, Chaunsey-st.; 15 and 16, Hyde-ter.; 6, 8, 10 to 14, 17, 21, 22, 28, 30, 32 and 34, Millfield-rd., u.t. 75 yrs., g.r. 57*l.* 2,150
Pimlico.—29, Charlwood-st., u.t. 37 yrs., g.r. 12*l.* 550
Notting Hill.—30, Kensington-pl., u.t. 49 yrs., g.r. 5*l.* 360
Ilford.—13, Dalkeith-rd., u.t. 993 yrs., g.r. 4*l.* 18*s.*, r. 28*l.* 300

By PRATT & MARSLAND.

Penge.—112, 114, and 116, Woodbine-grove, u.t. 66 yrs., g.r. 20*l.* 7*s.*, r. 67*l.* 455

By RAMSAY, WAINWRIGHT, & CO.

Wood Green.—13, Havergal-villas, u.t. 83 yrs., g.r. 7*l.* 10*s.*, e.r. 50*l.* 475
Wembley, Middlesex.—Station-grove, Truro Villa, u.t. 80 yrs., g.r. 5*l.* 5*s.*, r. 30*l.* 325
November 30.—By C. W. DAVIES & SON.
Hoxton.—3 and 5, Mintern-st., and 1 and 2, Rempstone Cottages, u.t. 35 yrs., g.r. 40*l.* 350
Holloway.—29, Sussex-rd., u.t. 49¾ yrs., g.r. 6*l.*, r. 36*l.* 395
Caledonian-rd.—91, Frederick-st., u.t. 50¾ yrs., g.r. 6*l.* 380
Stoke Newington.—42 and 44, Harcombe-rd., u.t. 63½ yrs., g.r. 10*l.*, r. 56*l.* 640

By W. B. HALLETT.

Holloway.—46, Cressida-rd., u.t. 87 yrs., g.r. 6*l.* 455

By KIDER & SONS.

Notting Hill.—213, Lancaster-rd., u.t. 63 yrs., g.r. 7*l.*, r. 45*l.* 325

By E. & S. SMITH.

Crouch End.—14, Park-rd., u.t. 49¾ yrs., g.r. 6*l.*, r. 30*l.* 315

By WESTMORE & YOUNG.

Norwood.—19, Anerley-grove, f., r. 32*l.* 430
24, Alexandra-rd., u.t. 55 yrs., g.r. 7*l.* 7*s.*, r. 35*l.* 320

By WINDRUM & CLEAVE.

Bromley-by-Bow.—141 to 159 (odd), u.t. 59½ yrs., g.r. 50*l.* 1,070
Hackney.—42, Warburton-rd., u.t. 46 yrs., g.r. 3*l.* 145

By G. B. HILLIARD & SON (at Chelmsford).

Roxwell, Essex.—A freehold house, with blacksmith's shop, forge, and cottage 375
Galleywood, Essex.—Esgore's and 2a. 1r. 18p., f. 475
Blackmore, Essex.—Four freehold cottages 350

December 1.—By FERRIS & PUCKRIDGE (at Marlborough).

Axford, Wilts.—Moore's Farm, 60a. 1r. 16p., f. 1,520

December 3.—By BEDFORD & CO.

Marylebone.—24, Great Barlow-st., u.t. 21½ yrs., g.r. 3*l.*, e.r. 45*l.* 340

By ALFRED RICHARDS.

Edmonton.—8 to 11, Kingston-rd., u.t. 96 yrs., g.r. 18*l.* 480
1 to 4, York-ter., u.t. 96 yrs., g.r. 18*l.* 480
Buckhurst Hill.—Princes-rd., The Fox (late licensed premises), f. 300

By BREADMORE & WEBB.

Tooting.—50, 50A to 56 and 56A, Fountain-rd., u.t. 96½ yrs., g.r. 24*l.* £845
18, 18A, 20, and 20A, Pevensey-rd., u.t. 96½ yrs., g.r. 12*l.* 395
13, 13A, 15, and 15A, Khartoum-rd., u.t. 96½ yrs., g.r. 12*l.* 420
10, 11, and 12, Victoria Parade, f., r. 210*l.* 1,200

By PERCIVAL HODSON.

St. Pancras.—128, Drummond-st., f., r. 42*l.*; also f.g.r. 6*l.*, reversion in 8 yrs. 1,235
Romford, Essex.—1 to 4, The Croft, u.t. 98 yrs., g.r. 18*l.*, e.r. 120*l.* 785
1 to 5, Heathside, u.t. 98 yrs., g.r. 12*l.* 10*s.* 500

By SALTER, REX, & CO.

Holloway.—23, Penn-rd. Villas, u.t. 41 yrs., g.r. 8*l.*, r. 40*l.* 400
88, 90, and 92, Kingsdown-rd., u.t. 249 yrs., g.r. 22*l.* 12*s.*, r. 78*l.* 400
31, Brunswick-rd., u.t. 51 yrs., g.r. 7*l.* 270
Kentish Town.—184 and 188, Weellington-rd., u.t. 36 yrs., g.r. 12*l.* 12*s.*, r. 60*l.* 595

December 4.—By HEPPER & SONS (at Leeds).

Leeds.—169, Woodhouse-lane, area 18½ yds., f. 1,200

December 5.—By FIELD & SONS.

Camberwell.—105A, Flaxman-rd., u.t. 64 yrs., g.r. 4*l.*, r. 32*l.* 18*s.* 370
Southwark.—144, Tabard-st., f., r. 34*l.* 375

By VINCENT S. LEIGH.

Old Ford.—89 and 91, Armagn-rd., u.t. 55 yrs., g.r. 8*l.* 475
Hackney.—91, Richmond-rd., u.t. 44½ yrs., g.r. 6*l.* 5*s.*, r. 40*l.* 495
Bromley-by-Bow.—4A, 5 to 12, Chadbourne-st., u.t. 77⅛ yrs., g.r., &c., 40*l.* 15*s.* 1,530
Victoria Park.—47 to 53 (odd), Montague-rd., u.t. 71 yrs., g.r. 10*l.* 410

By NORRIS, SON, & HADLEY.

Pimlico.—6, Denbigh-st., u.t. 37 yrs., g.r. 8*l.*, r. 55*l.* 625
Clerkenwell.—33, Wilmington-sq., u.t. 15 yrs., g.r. 10*l.*, r. 50*l.* 950

By SWAN WOODCOCK (at Stratford).

Stratford.—51 and 53, Martin-st., f. 460
Leytonstone.—2 to 12 (even), Melrose-rd., u.t. 76½ yrs., g.r. 27*l.* 1,350

December 6.—By FAREBROTHER, ELLIS, & CO.

City of London.—Angel-court, f.g.r. 125*l.*, reversion in 46 yrs. 7,200
Balham.—Upper Tooting Park, f.g.r.'s 47*l.* 16*s.*, reversion in 98 yrs. 1,335
St. Leonards-on-Sea.—1 and 3, Pevensey-rd., f., r. 160*l.* 2,520

By A. & A. FIELD.

Bethnal Green.—18, Quilter-st., u.t. 21½ yrs., g.r. 4*l.* 4*s.* 180
Chalk Farm.—100, Belmont-st., u.t. 65 yrs., g.r. 6*l.* 10*s.* 300
Old Charlton.—1, Maryon-grove, u.t. 25 yrs., g.r. 2*l.* 170
Kentish Town.—73, Carlton-st., u.t. 50 yrs., g.r. 6*l.*, r. 36*l.* 300
Limehouse.—12, Piggott-st., u.t. 16½ yrs., g.r. 3*l.* 3*s.*, r. 32*l.* 190
Neasden.—2, Blakesley-villas, u.t. 73 yrs., g.r. 7*l.* 10*s.* 150
Hackney.—76, Harrowgate-rd., u.t. 42 yrs., g.r. 4*l.*, r. 36*l.* 315

By LAING WATERS, FURNIVALL, & CO.

Lee.—10, Dorville-rd., u.t. 64 yrs., g.r. 7*l.*, r. 37*l.* 300

By T. H. MUSKETT & CO.

Wood Green.—King's-rd., eight plots of building land, f. 454
6 to 10, Crescent-rd., f., e.r. 180*l.* 1,356
1, 2, 3, and 5, Alexandra-villas, f., r. 130*l.* 2,160
68 and 70, Acacia-rd., u.t. 66 yrs., g.r. 8*l.* 8*s.* 420
New Barnet.—3 and 4, Friern Park-villas, u.t. 81 yrs., g.r. 9*l.* 230

By NEWBON, EDWARDS, & SHEPHARD.

Blackfriars.—80 to 88 (even), 96 and 98, Broadwall, c. 1,570
Holloway.—16, Marlborough-rd., u.t. 57½ yrs., g.r. 7*l.* 7*s.*, r. 45*l.* 445
Highbury.—41, Leigh-rd., u.t. 58¾ yrs., g.r. 10*l.*, r. 50*l.* 565
Peckham.—175 and 177, Peckham Park-rd., u.t. 39 yrs., g.r. 4*l.* 16*s.* 9d., r. 36*l.* 245
Islington.—12, Sherborne-st., u.t. 47 yrs., g.r. 8*l.*, r. 36*l.* 330
Hornsey.—Lightfoot-rd., f.g.r. 7*l.*, reversion in 85 yrs. 190
Islington.—13 and 15, South-st., u.t. 26 yrs., g.r. 8*l.* 8*s.*, r. 68*l.* 575
94 and 96, Prebend-st., u.t. 26 yrs., g.r. 8*l.* 8*s.*, r. 68*l.* 550
Canonbury.—8, Compton-rd., u.t. 44 yrs., g.r. nil, e.r. 60*l.* 530
Barnsbury.—8, Offord-rd., u.t. 50 yrs., g.r. 6*l.* 345
Camden Town.—126, Albert-st., u.t. 40 yrs., g.r. 5*l.*, r. 50*l.* 375
De Beauvoir Town.—136, Southgate-rd., u.t. 21 yrs., g.r. 3*l.*, r. 48*l.* 300

By SHEPHERD & CATTELL.

Cricklewood.—229, Fordwych-rd., u.t. 95 yrs., g.r. 6*l.* 10*s.*, r. 50*l.* 300

By J. ANTHONY TRYTHALL.

Norwood.—30, Sunny Bank, u.t. 53½ yrs., g.r. 3*l.* 15*s.*, e.r. 45*l.* 440

December 7.—By BAKER & SONS.

Harlesden.—4, Station-rd., u.t. 79 yrs., g.r. 11*l.*, r. 45*l.* 375

By CANE & CO.

Dulwich.—231 and 239, Crystal Palace-rd., u.t. 77 yrs., g.r. 12*l.* 12*s.*, r. 76*l.* 535
Clapham.—74, Southville, f. 660

By HERRING, SON, & DAW.

Balham.—Endlesham-rd., Telford House, u.t. 70¾ yrs., g.r. 10*l.*, r. 60*l.* 300
Brixton.—75 and 79, Brixton-hill, u.t. 65 yrs., g.r. 50*l.*, r. 160*l.* 830

By HENRY HOLMES & CO.

Hampstead-road.—9, Seaton-st., f. 1,700
Holloway.—31, Girdleston-rd., u.t. 77 yrs., g.r. 4*l.* 17*s.* 6*d.* 320

Contractions used in these lists.—F.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.		
Hard Stocks	1 16 0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1 12 0	,,	,, ,,
Smooth Bright Facing Stocks..	2 18 0	,,	,, ,,
Shippers	2 6 0	,,	,, ,,
Flettons.....	1 10 6	,,	at railway depôt.
Red Wire Cuts ..	1 15 6	,,	,, ,,
Best Fareham Red	3 11 6	,,	,, ,,
Best Red pressed Ruabon Facing.	5 5 0	,,	,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,,	,, ,,
Do., Bullnose	4 12 0	,,	,, ,,
Best Stourbridge Fire Bricks	4 4 6	,,	,, ,,
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,, ,,
Headers	12 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	17 0 0	,,	,, ,,
Double Stretchers	19 0 0	,,	,, ,,
Double Headers..	26 0 0	,,	,, ,,
One Side and two Ends	19 0 0	,,	,, ,,
Two Sides and one End	20 0 0	,,	,, ,,
Splays, Chamfered, Squints	20 0 0	,,	,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	22 0 0	,,	,, ,,
Quoins, Bullnose, and Flats	14 0 0	,,	,, ,,
Double Stretchers	15 0 0	,,	,, ,,
Double Headers..	14 0 0	,,	,, ,,
One Side and two Ends	15 0 0	,,	,, ,,
Two Sides and one End	15 0 0	,,	,, ,,
Splays, Chamfered, Squints	14 0 0	,,	,, ,,
Seconds *Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.		
Thames and Pit Sand	8 0	per yard,	delivered.
Thames Ballast	6 9	,,	,,
Best Portland Cement	38 0	per ton	,,
Best Ground Blue Lias Lime..	24 6	,,	,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube, deld.	rly. depôt
Bath ,, ...	1 7	,,	,,
Farleigh Down Bath ..	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,, ...	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale ,,	2 1½	,,	,,
Red Corsehill ,,	2 5	,,	,,
Red Mansfield ,,	2 4½	,,	,,
Hard York in blocks ..	2 10	,,	,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super.	at rly. depôt.
,, ,, 6 in. Rubbed Ditto..	3 0	,,	,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,
,, ,, 3 in. self-faced Ditto	0 5½	,,	,,

SLATES.

in. in.	£ s. d.		
20×10 best blue Bangor..	11 5 0	per 1000 of 1200	at ry. dep.
,, best seconds ,,	10 15 0	,,	,,
16× 8 best ,,	6 2 6	,,	,,
20×10 best blue Portmadoc ..	10 18 0	,,	,,
16× 8 best blue Portmadoc	6 0 0	,,	,,
20×10 best Eureka unfading green.....	11 2 6	,,	,,
16× 8 ,, ,,	6 15 0	,,	,,
20×10 Permanent green	10 0 0	,,	,,
16× 8 ,, ,,	5 12 6	,,	,,

TILES.

	s. d.		
Best plain red roofing tiles..	41 6	per 1,000	at rly. depôt
Hip and valley tiles....	3 7	per doz.	,, ,,
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles....	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles.....	4 0	per doz.	,, ,,
Valley tiles.....	3 9	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50 9	per 1,000	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles.....	3 8	,,	,, ,,

PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0 ,, ,,	,,
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens.....	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens.....	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens.....	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in. ..	14 0 0	15 0 0
Battens.....	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,, ...	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
¾ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	8 7 6	9 7 6
Compound Girders ,, ,,	10 5 0	11 10 0
Angles, Tees and Channels, ordinary sections	11 2 6	13 2 6
Flitch Plates	11 0 0	11 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	9 15 0	- - -
Staffordshire Crown Bars, good merchant quality	10 5 0	10 10 0
Staffordshire "Marked Bars" ..	12 0 0	- - -
Mild Steel Bars.....	10 10 0	11 0 0
Hoop Iron, basis price.....	10 10 0	11 0 0
,, ,, galvanised	16 10 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 0 0	- - -
,, ,, to 24 g.	12 0 0	- - -
,, ,, to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	13 5 0	- - -
,, ,, 22 g. and 24 g.	14 5 0	- - -
,, ,, 26 g.....	16 0 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	17 10 0	- - -
,, ,, 22 g. and 24 g.	18 0 0	- - -
,, ,, 26 g.	19 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 10 0	- - -
,, ,, 22 g. and 24 g.	14 0 0	- - -
Cut nails, 3 in. to 6 in..... (Under 3 in. usual trade extras.)	11 10 0	- - -
LEAD—Sheet, English, 3 lbs. & up.	19 15 0	- - -
Pipe in coils	20 5 0	- - -
Soil Pipe..	23 5 0	- - -

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.
ZINC—Sheet—		
Vieille Montagne ..... ton	27 0 0	- - -
Silesian..... ,,	26 10 0	- - -
COPPER—		
Strong Sheet..... per lb.	0 1 1	- - -
Thin ..... ,,	0 1 3	- - -
Copper nails ..... ,,	0 1 3	- - -
BRASS—		
Strong Sheet..... ,,	0 0 11	- - -
Thin ,, ... ,,	0 1 1	- - -
TIN—English Ingots ..... ,,	0 1 5	- - -
SOLDER—Plumbers' ..... ,,	0 0 7½	- - -
Tinmen's ..... ,,	0 0 9½	- - -
Blowpipe ..... ,,	0 0 11	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, ,, fourths.....	3d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths	5d. ,, ,,
Fluted sheet, 15 oz.	3¼d. ,, ,,
,, ,, 21 ,, ...	4¼d. ,, ,,
½ Hartley's Rolled Plate.....	3d. ,, ,,
⅜ ,, ,, ,, ...	3½d. ,, ,,
½ ,, ,, ,, ...	4d. ,, ,,

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes ..... per gallon	0 2 11
,, ,, ,, in barrels ..... ,,	0 3 0
,, ,, ,, in drums ..... ,,	0 3 2
Boiled ,, ,, in pipes..... ,,	0 3 2
,, ,, ,, in barrels ..... ,,	0 3 3
,, ,, ,, in drums ..... ,,	0 3 5
Turpentine, in barrels ..... ,,	0 2 9
,, in drums..... ,,	0 2 11
Genuine Ground English White Lead ...per ton	27 10 0
Red Lead, Dry..... ,,	24 10 0
Best Linseed Oil Putty.....per cwt.	0 9 6
Stockholm Tar ..... per barrel	1 10 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work.....	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

T. S. (Amounts should have been stated.) J. G. I (Too late: next week.)

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[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ANNAN (Dumfries).—For the supply of road metal for several parishes, for the District Committee. Mr. A. V. Hart, surveyor, Marchbank, Dumfries:—

			s. d.
Graham & Vivers	1,400 cub. yds.	at	4 10
,, ...	200	,,	5 4
T. Armstrong.....	550	,,	4 3
J. C. Bryson	900	,,	5 3
John Davidson	450	,,	4 10
John Armstrong	900	,,	5 0
,, ...	1,090	,,	4 3
W. Grant.....	830	,,	4 5
John Edgar	580	,,	3 6
T. Hill.....	500	,,	4 6

BRIGHTON.—For extending brick sewer, Lewes-road. Mr. F. J. C. May, C.E., Town-hall, Brighton:—

Field & Co.	£1,183	Burstow & Sons, 16, Gloucester-place* ..	£66
Cooke & Co.....	732		

[*See also next page.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Sewer	Hendon U.D.C.	Engineer, Public Offices, The Burroughs, Hendon, N.W	Dec. 17
Six Houses, Bargoed	Rhymney Brewery Company	T. Roderick, Architect, Aberdare	do.
Road Works, &c., Grange-road	King's Norton (Birmingham) U.D.C.	Surveyor, 23, Valentine-road, King's Heath	Dec. 18
Kerbing, &c.	Bury (Lancs) Corporation	A. W. Bradley, Civil Engineer, Bank-street, Bury	do.
Street Works, &c., Ralston-street	Paisley (N.B.) Commissioners	Burgh Surveyor, Municipal Buildings	do.
School, Mersey-street	Kingston-upon-Hull School Board	Gelder & Kitchen, Architects, Lowgate, Hull	do.
Alterations to Schools, Laira	Plymouth School Board	H. J. Snell, Architect, 11, The Crescent, Plymouth	do.
Additions to Office, Darwen Station	Lancashire & Yorkshire Rly. Co.	R. C. Irwin, Hunt's Bank, Manchester	do.
Sheds, &c., Victoria Station, Manchester	do.	do.	do.
Additions to the Academy, Elgin	Falkirk Parish School Board	Reid & Wittet, Architects, Elgin	Dec. 19
Additions to Schools, Laurieston	Benwell U.D.C.	A. & W. Black, Architects, Falkirk	do.
Road Works	Birkenhead Corporation	W. P. Pattison, Surveyor, Atkinson-road, Benwell	do.
Street Works, Mellor-road, &c.	Colne (Lancs) Corporation	C. Brownridge, Civil Engineer, Town Hall	do.
Additions to Market Hall	Kingston-on-Hull Co-op. Soc., Ltd.	T. H. Hartley, Borough Surveyor, Town Hall	do.
Additions, &c., to 37, De Grey-street	Beccles Feoffees	T. B. Thompson, Architect, 15, Parliament-street, Hull	do.
Six Villas, Hudderafield-road, Barnsley	St. Germans R.D.C.	H. Crawshaw, Architect, 13, Regent-street, Barnsley	do.
Works, &c., at White Lion Hotel	Shipley School Board	H. W. Bellward, Hungate House, Beccles	do.
Granite Kerb, &c., Garrett-street, Cawsand	Leeds Corporation	F. W. Cleverton, 4, Buckland-terrace, Plymouth	do.
Additions to Schools, Saltaire-road	Pemberton (Lancs) U.D.C.	E. P. Peterson, Architect, 48, Sunbridge-road, Bradford	do.
Bandstand Foundations, North-street	Midland Railway	City Engineer, Municipal Offices, Leeds	do.
Paving, &c., Ormskirk-road	St. Saviour's Guardians	P. Partington, Council Offices, Pemberton	do.
*Offices at St. Pancras	Tunbridge Wells Corporation	See Advertisement	Dec. 20
*Repairs at Christchurch Workhouse	Reading Town Council	G. D. Stevenson, Architect, 13, King-street, Cheapside	do.
Making-up Rusthall High-street	Ardsley U.D.C.	W. C. Cripps, Town Hall	do.
Street Works, Southcote-road West	Blaby R.D.C.	J. Bowen, Borough Surveyor, Town Hall	do.
Two Houses, Piercy-lane, Bridlington	Witham (Essex) U.D.C.	J. Shepherdson, Architect, 15, Manor-street, Bridlington	do.
Sewers, &c.	Dr. R. D. Evans	T. S. McCallum, Civil Engineer, 52, Corporation-st., Manchester	Dec. 21
Road Works, Oadby	Felixstowe U.D.C.	J. Turner, Surveyor, Saffron-lane, Glen Parva, near Leicester	Dec. 22
Granite Road Metal	Nottingham City Council	W. B. Blood, District Council Offices, Witham	do.
Additions to Dayle House, Llandilo	Churchwardens	D. Jenkins, Architect, Llandilo	do.
Road Works, Garfield and Bacton-roads	Halifax School Board	G. S. Horton, Surveyor, Town Hall	do.
Three Houses, Hudderafield-road, Salterhebble, Yorks	Lynton (Devon) U.D.C.	Horsfall & Sons, Architects, Halifax	do.
Police Station, Mortuary, &c.	Bradford Corporation	A. Brown, Civil Engineer, Guildhall, Nottingham	do.
Drainage Works at Cemetery, Long Ditton	Edmonton U.D.C.	A. J. Henderson, Civil Engineer, Council Offices, Thames Ditton	Dec. 24
Schools, Battinson-road	Hertford Corporation	C. F. L. Horsfall & Son, Lord-street-chambers, Halifax	do.
Market House, &c.	Ryde Corporation	W. H. Chowins, Surveyor, Town Hall, Lynton	do.
Tramcar Shed, Duckworth-lane, Manningham	Southgate U.D.C.	F. Stevens, Town Hall, Bradford	do.
*Asphalting and Tarpaving	Standing Joint Committee	G. Eedes Eachus, Town Hall, Lower Edmonton	do.
Road Works, Queens-road and others	Balby (Doncaster) School Board	J. H. Jevons, Civil Engineer, Town Hall	Dec. 25
*Esplanade and Sea Wall	Kettering U.D.C.	See Advertisement	Dec. 28
*Making-up Roads	Litherland U.D.C.	Surveyor, Council Offices, Palmer's Green, N.	do.
Police Station, &c., Falmouth	Rochford R.D.C.	O. Caldwell, Architect, Victoria-square, Penzance	Dec. 29
School of Art, Manor Drive, Falmouth	Dartford R.D.C.	W. Treweeke, Arwenack-street, Falmouth	do.
School, Little Moor-lane	Shrewsbury and Wem Brewery Co.	F. W. Master, 11, Priory-place, Doncaster	Dec. 31
Footpaths, &c.	Midsomer Norton (Somt.) U.D.C.	J. Bond, Market-street, Kettering	do.
*Sewerage Works, &c.	St. Germans (Cornwall) R.D.C.	W. B. Garton, Surveyor, 25, Sefton-road, Litherland	Jan. 2
*Isolation Hospital	Walker (Northumberland) U.D.C.	R. L. Curtis & Son, 119, London-wall, E.C.	Jan. 7
*Sewers	Stockton-on-Tees Corporation	See Advertisement	Jan. 28
Additions to Three Tuns Inn, Ironbridge	Lea Marston (U.D.) School Board	Daigleish & Lewis, Architects, 18, Talbot-chambers, Shrewsbury	No date
Alterations to Lord Nelson Inn, Merthyr	Messrs. John Smith, Ltd.	H. T. Thornley, Architect, 100, St. Mary-street, Cardiff	do.
Retaining Wall, Radstock-road		W. F. Bird, Surveyor, Council Offices	do.
Waterworks, Downderry		F. W. Cleverton, 4, Buckland-terrace, Plymouth	do.
Whinstone Road Metal		T. M. Sturgess, 5, St. Nicholas-buildings, Newcastle	do.
Drainage Works, Bramley, Yorks		Beall Bros., Hough-lane Estate, Bramley	do.
Auction Mart		M. H. Sykes, Borough Surveyor, Town Hall	do.
School and House, Minworth		F. Fowler, 185, Vauxhall-road, Birmingham	do.
Two Kilns, Rochford, Essex		G. Featherby, Gillingham, Kent	do.
Hotel, Castleford		A. Hartley, Architect, Castleford	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Applications to be in
*Clerk of Works	Ryde Corporation	3*l.* 3*s.* per week	Dec. 24
*Assistant	Islington Corporation	90*l.* per annum	Dec. 26
*Building Inspector	Willesden District Council	150*l.* per annum	Jan. 1
*Clerk of Works	Wirral R.D.C.	3*l.* per week	No date

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. —. Contracts, pp. iv. vi. viii. x. & xix. Public Appointments, pp. xvii. & xix.

BROMLEY (Kent).—For the execution of road works, Babbacombe and Lansdowne roads, for the Urban District Council. Mr. S. Hawkings, surveyor :—

Babbacombe-road.

Geo. Wilson	£1,125	J. Mowlem & Co.,* Westminster	£1,026

Lansdowne-road.

Geo. Wilson	£2,220	J. Mowlem & Co.,* Westminster	£2,036

CANTERBURY.—For drainage works, new sanitary fittings, &c., at the County Police Station. Mr. F. W. Ruck, County Surveyor, Maidstone :—

Denne	£550 0 0	Bateman	£398 0 0
C. Munn	522 0 0	W. Cozzens	377 0 0
Gentry	413 5 0	Ottewill & Son	370 0 0
Goodwin & Jeffrey	398 7 4	H. J. Smith, Maidstone*	369 18 0

CHELTENHAM.—For the erection of a building at the destructor works, Arle-road, for the Corporation. Mr. Joseph Hall, A.M.Inst.C.E., Borough Surveyor, Municipal Offices, Cheltenham. Quantities by Mr. T. Malvern :—

Smith & Co.	£1,040 4	A. C. & S. Billings	£763 0
Priest & Son, Ltd.	975 7	Collins & Godfrey, Cheltenham	719 0
Channon & Son	876 0		
Bowers & Co.	771 0		

CROYDON.—For the erection of a pumping-station at Waddon Fields, Beddington, for the Corporation of Croydon. Quantities supplied :—

Foster Bros.	£1,519	Stewart & Son*	£1,458

DARLASTON.—For widening, &c., the county bridge at James Bridge, for the Urban District Council. Mr. J. Cash Joynson, Surveyor, Public Offices, Darlaston :—

C. E. Carden	£910	W. T. Lees, Darlaston*	£490
Hammond Bros.	505		

DOVERCOURT.—For the erection of a villa, Marine Parade, for Mr. H. Gurney. Mr. J. W. Start, surveyor, Colchester.

H. Linzell	£1,880 0 0	Newton	£1,660 0 0
F. Dupont	1,769 0 0	E. West	1,623 0 0
Smith & Beaumont	1,691 10 0	E. Saunders, Dovercourt †	1,590 8 0

DURHAM.—For erecting a church, Durham :—

F. Smith & Co., Stratford, E.* £893

FRIMLEY.—For making up carriageway, &c., King's Ride, Camberley, for the Urban District Council. Mr. F. C. Uren, C.E., Council Offices, Frimley :—

W. & C. F. Coker	£420 10 0	Brixey & Co., Newtown, Parkstone*	£282 0 8
J. Knight	365 0 0	Free Bros. (kerbing only)	78 10 0
Thos. Turner	349 15 0		
Craig & Son	344 0 0		

[Surveyor's estimate, £325.]

GATESHEAD.—For paving, &c., Back Albert-drive and other streets, for the Corporation. Mr. J. Bowe, C.E., Town Hall, Gateshead. Quantities by Engineer :—

Back Hedley-street South.

Young	£578 5 0
W. Cumming	496 17 9
J. Wardlaw	496 17 6
J. Robson, Newcastle*	495 15 6

Back Albert-drive.

Young	£261 14 0
J. Robson, Newcastle*	249 14 6
J. Wardlaw	237 7 6

Back Street East of Eastbourne-avenue.

Young	£1,009 3 0
J. Wardlaw	818 12 6
W. Cumming	813 15 3
J. Robson, Newcastle*	759 13 0

Alkusen-terrace.

J. Wardlaw	£659 2 10
Young	617 17 2
W. Cumming	595 11 1
J. Robson, Newcastle*	504 4 6

John-street.

J. Wardlaw	£723 2 6
Young	644 2 3
W. Cumming	616 7 0
J. Robson, Newcastle*	584 18 3

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DEVIZES.—For erecting thirty-seven workmen's dwellings, Devizes. Mr. W. H. Read, architect :—

—	End House. A.	End House. B.	Plain Houses.	Gabled Houses.	Extra for bay windows.	Extra for bedroom extension.	Less for wire fence division.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Jos. Williams	—	—	277 0 0	—	12 0 0	26 0 0	—
R. B. Mullings	326 0 0	340 0 0	262 10 0	270 0 0	8 0 0	11 0 0	No diff.
Henry Ash.....	325 7 0	330 0 9	259 18 0	272 15 0	11 9 0	9 11 6	—
H. Hoskings	275 0 0	270 0 0	233 0 0	245 0 0	10 0 0	12 10 0	—
H. T. Holmes	235 19 0	235 19 0	217 1 8	227 15 0	11 0 0	14 0 0	—
Spackman Bros., Swindon*	233 15 0	233 15 0	198 15 0	203 15 0	7 10 0	12 10 0	1 15 0
Tydeman Bros.	235 0 0	230 0 0	197 0 0	203 0 0	4 10 0	9 0 0	1 0 0
A. J. Colborne	263 19 8	287 8 0	196 18 0	206 8 0	7 9 0	6 17 6	2 17 0
Bail & Rogers	222 10 0	222 10 6	195 10 0	202 10 0	15 10 0	30 0 0	2 0 0

HARROW (Middlesex).—For the construction of roads, sewers, flushing-tanks, manholes, gullies, &c., on the Northwick Park Estate. Mr. R. T. Wreathall, F.S.I., surveyor, 5, St. Martin's-place, Trafalgar-square, W.C.:—

G. Wimpey & Co. ..	£3,267	E. W. Hollingsworth	£2,650
Neave & Son	3,244	Clift Ford	2,542
Dunmore	3,219	Saunders & Son* ..	2,480

HASTINGS.—For the construction of underground convenience, Harold-place, for the Corporation. Mr. P. H. Palmer, C.E., Town Hall, Hastings:—
Mr. Horace Ditch, 2, Holloway-villas, Hastings £3,260

KEIGHLEY.—For the erection of eighteen houses, Spencer-street. Mr. J. Haggas, architect, North-street, Keighley :—
Masonry and Joinery.—H. V. Robinson, Keighley* }
Slating.—Wm. Thornton, Bingley & Key* } £2,925
Plumbing.—Midgley & Dinsdale, Keighley* }

LEEDS.—For excavators' work in the erection of new stores, Hawthorn-road, Chapel Allerton, for the Leeds Industrial Co-operative Society, Limited :—
Forth, Chapel Allerton, 2s. per cubic yard.

LEEDS.—For the extension of the electric lighting works, Whitehall-road, for the Corporation. Messrs. Milnes & France, architects, 99, Swan Arcade, Bradford :—

Masonry and Bricklaying.—Paul Rhodes, Leeds*	£42,977 17
Joinery.—Moulson & Son, Bradford*	4,000 0
Ironwork.—Phœnix Foundry Company, Derby*	17,975 0
Slating.—Atkinson & Son, Leeds* ..	330 0
Plumbing, &c.—Geo. Thompson, Leeds*	3,359 0
Plastering.—Cordingley & Sons, Bradford*	527 0
Concreting.—A. & S. Wheater, Calverley*	3,296 0
Painting.—J. W. Walton, Bradford*	478 16
	£72,943 13

LEIGH (Lancs).—For additions to library and technical school, Railway-road. Messrs. Banks, Fairclough, & Stephen, architects, Church-street, Leigh :—
J. W. Cowburn, Leigh, Lancashire† £3,367

LETTERKENNY (Co. Donegal).—For the erection of five lodging-houses, Ramelton-road, for the Urban District Council. Mr. M. O'Callaghan, Town Surveyor. Quantities by surveyor.

William Wilson	£888 16 6	Robert Kennedy,	
William Platt ..	869 15 0	Letterkenny*	847 10 6
D. McCaffrey ..	850 0 0		

LONDON.—For the erection of temporary iron building, for the Willesden Board of Guardians :—

Wrinch & Sons	£1,250 0 0	G. Ginger	£712 15 0
Keay, Ltd. ..	930 0 0	Lightfoot & Ireland	705 7 3
Hawkins & Co.	895 0 0	Cowley & Drake	700 0 0
Spiers & Co.	849 0 0	Smith & Co., Stratford, E.*	685 0 0
Humphreys, Ltd.	798 0 0	Priest & Son ..	675 0 0
Matthews & Sons	781 15 6	W. Pearce	670 0 0
Mitson & Co.	745 0 0	W. Cooper	647 0 0
Hadley & Sons	730 0 0	Smith & Co. ..	568 0 0
Hill & Smith	725 10 0		

LONDON.—For the erection of board-room and offices in Harrow-road, for the Paddington Guardians. Mr. F. J. Smith, architect, Parliament Mansions, Victoria-street, S.W. Quantities supplied :—

Foster Bros.	£24,492	A. Bush	£20,451
Leslie & Co.	23,416	B. E. Nightingale..	20,383
Hill & Co.	21,900	G. Neal	20,369
Willcock & Co.	21,875	F. J. Chinchen	20,247
J. Appleby	21,286	W. Wallis	19,997
Martin, Wells, & Co.	21,100	Bottrill & Sons	19,745
Parker & Co.	20,990	Stimpson & Co.....	19,480
Johnson & Co.	20,960	Smith & Co.	19,321
		F. G. Minter	18,790

LONDON.—For the erection of disinfecting chamber at Mile End, E. Mr. J. M. Knight, architect, 35, Bancroft-street, Mile End-road, E. Quantities by the architect :—

Gibb & Co.	£1,399	Wood & Co.	£1,055
W. Gladding	1,165	Foster Bros.	1,033
Perry & Co.	1,097	Harris & Wardrop..	1,031

MERTHYR TYDFIL.—For erection of large infants school, Merthyr Tydfil, Glamorganshire, for Merthyr Tydfil School Board. Mr. J. Llewellin Smith, architect, Aberdare. Quantities by architect :—

Williams ..	£5,980 0 0	S. Hawkins ..	£5,607 5 0
W. Brown....	5,837 5 1	J. Lloyd	5,430 0 0
D. Jones.....	5,780 0 0	J. Williams ..	5,000 0 0
Watkins & Co.	5,689 9 9		

MERTHYR TYDFIL.—For the erection of a large school, Brecon-road, for the School Board. Mr. J. Llewellin Smith, architect, Aberdare. Quantities by the architect :—

A. J. Howell	£4,670 0 0	David Davies,	
Lloyd & Tape	4,529 11 0	Cardiff*	£4,425 0 0
W. E. Willis..	4,467 8 11		

MORLEY.—For additions to Park Field Mills, for Messrs. J. Brumfitt & Son. Messrs. T. A. Buttery & S. B. Birds, architects, Queen-street, Morley :—

Masonry.—W. & H. Sykes, Westfield-road	£309 17 0
Joinery.—Neriah Holroyd, Fountain-street	84 10 0
Plumbing.—M. A. Naylor, Commercial-street	40 0 0
Slating.—J. May, Peel-street.....	27 17 11

OTLEY (Yorks).—For the construction of Approach-road, Hunger Hill, for the Urban District Council. Mr. John Waugh, C.E., Sunbridge-chambers, Bradford. Quantities by the engineer :—

Watmough & Preston	£1,682	Morley & Sons	£1,257
Eastwood & Co.	1,600	David Wood.....	1,076
Egan & Sons	1,517	Walter Barrand ..	1,039
Walter Binns	1,516	A. Dickinson, Jack-lane, Holbeck* ..	994
Wm. Brigg	1,476		
Hy. Wilson	1,310		

PETERBOROUGH.—For erecting an iron chapel at Peterborough :—
F. Smith & Co., Stratford, E.* £108

ROMFORD (Essex).—For new infants' schools at the Albert-road schools, for the Romford School Board. Mr. James Kennedy, architect, 25, Bedford-row, W.C. :—

Gibb & Co.	£5,848	J. S. Kimberley	£5,139
F. Wilmott	5,799	A. W. Robins	5,100
Foster Bros.....	5,666	Hammond & Son ..	4,997
E. West.....	5,375	P. Ranyard	4,850
A. Reed.....	5,362	Bell & Son.....	4,815
Martin, Wells, & Co.	5,358	T. Bruty	4,553
Thomas & Edge	5,297	Coulson & Lofts	4,200
S. Parmenter	5,289		

ROTHERHAM.—For supplying and laying cast-iron pipes, Woodhouse Mill, for the Rural District Council, Mr. Bernard Godfrey, engineer, 298, High-street, Rotherham :—

Sheepbridge Iron and Coal Co, near Chesterfield.....	£6 7 6 per ton.
J. Lister, Aston, near Sheffield,	0 7 6 per length.

SHOREHAM (Sussex).—For supply and delivery to Shoreham, Sussex, either to the L.B.S.C.R. Station or to the Free Wharf, Shoreham Harbour, of about 4,000 ft. run of 9 by 5 flat granite kerbing, to be dressed on top face and edges end jointed, and back edge pitched off to 9 in., for Mr. E. R. Harmsworth, Shoreham :—

	s.	d.	
Freeman, Ltd. Brighton*.....	1	2½	per ft. run.
Kaltenach & Schmitz, London	1	8	,,
Griffiths & Co., Ltd., London	1	5	,,
A. & F. Manuelle, London ..	1	6½	,,
Blichfeldt & Co., London	1	5	,,
L. Sommerfeld, London	1	6	,,
J. H. Dickson, Dunsford, near Exeter	1	4½	,,
Van Praagh & Co., Ltd., London	1	4½	,,
Goodchild & Co., London ..	1	4½	,,
H. L. Cooper, London.....	1	3½	,,
Sandell Bros., Southampton ..	1	2½	,,
Brunton & Son, Hull	1	2	,,

SOUTHAMPTON. — For new fireproof floor for methylating and naphtha rooms at Zion Hall Store, Southampton, for Messrs. Randall & Son, wholesale chemists. Messrs. Lemon & Blizard, architects :—

Golding & Ansell	£660	Stevens & Co.	£585
Jenkins & Sons	646	F. Walter, Parsonage-road Building Works, Southampton*.....	580
H. Cawte	602		

SURBITON.—For St. Matthew's Church Schools, Surbiton. Mr. A. Mason, architect, 82, Victoria-road, Surbiton :—

Lee	£2,696	Wheatley & Sons ..	£2,240
J. W. Brooking	2,687	Lane & Sons	2,217
Kirk & Kirk	2,520	Gaze & Sons, Kingston*	2,169
F. Hawkey	2,460		
F. & H. F. Higgs ..	2,250		

TWICKENHAM.—For rebuilding the Red Lion public-house, Twickenham. Messrs. Foulsham & Herbert Riches, architects, 3, Crooked-lane, King William-street, E.C., and Bromley-by-Bow, E. Quantities supplied :—

Dorey & Co.	£4,687	Sheffield Bros.....	£4,451
W. Slark	4,640	Courtney & Fairbairn*	4,297
Adamson & Sons....	4,515	W. H. Pearce	4,220
T. Grant	4,500		

WATFORD.—For the erection of technical school, Queen's-road, for the Urban District Council. Mr. W. H. Syme, architect, 4, High-street, Watford :—

Banyard.....	£7,998	Tonge	£7,500
Reed & Saw.....	7,980	Waterman	7,484
Clark Bros.	7,895	Tyler	7,250
Brightman.....	7,668	Eames.....	7,193
Dupont	7,600	Wiggs, Watford* ..	6,923

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect :—

The interiors of the following schools will be cleaned between December 15, 1900, and January 5, 1901 :—

AMBERLEY-ROAD :—

G. H. Sealy	£272 18	W. Chappell	£180 0
T. Cruwys.....	245 0	Bristow & Eatwell	179 0
R. S. Buckeridge..	195 0	F. Chidley	156 0
S. Polden	191 0	F. T. Chinchen* ..	148 10

CHISENHALE-ROAD :—

Chessum & Sons	£271 9 3	Elkington & Sons	£165 10 0
Barrett & Power	187 0 0	G. Barker.....	156 0 0
Silk & Son	170 0 0	S. H. Corfield*	150 0 0

COLUMBIA-ROAD :—

Elkington & Sons	£190 10 0	Stevens Bros. ..	£230 0 0
Silk & Son.....	254 0 0	G. Barker	229 10 0
J. Haydon	230 2 6	S. H. Corfield*	218 0 0

FLEET-ROAD :—

R. S. Buckeridge..	£350 0	Hodgson & Co. ..	£229 12
Bristow & Eatwell	341 5	Marchant & Hirst	214 0
W. Chappell	300 0	T. Cruwys*	210 0
F. T. Chinchen....	239 0		

GIFFORD-STREET :—

T. L. Green.....	£514	Stevens Bros.	£336
G. Kirby	382	Williams & Son*.....	389

GILLESPIE-ROAD :—

McCormick & Sons	£347 0	G. Kirby	£210 0
Jonnson & Co.	275 0	Stevens Bros.*	188 0
Grover & Son	246 0	C. & W. Hunnings	168 12
Barrett & Power ..	216 0		

GRAYSTOKE-PLACE :—

Johnson & Co.....	£89 0	W. Hornett*	£75 10
B. E. Nightingale ..	85 0	Barrett & Power....	75 0

HAGGERSTON ROAD :—

J. Grover & Son	£251	W. Martin.....	£217
W. Hornett	234	Snewin Bros. & Co. ..	216
G. Barker*	230	W. Silk & Son	204

HANBURY-STREET (B and G) :—

Gibb & Co.	£199 0	S. H. Corfield	£172 10
Heard & Co.	184 0	J. T. Robey	159 10
G. Barker	172 10	J. Kybett*	106 5

"LEWISHAM BRIDGE" :—

Lathey Bros.	£274	C. G. Jones*	£199
Hayter & Son	250	G. Kemp	139
E. Proctor	230		

LYNDHURST-GROVE :—

H. & G. Mallett	£399	Garrett & Sons	£254
W. V. Goad.....	285	Maxwell Bros., Ltd...	208
Baylis & Francis.....	279	Rice & Son*	203

MAGDALEN-STREET :—

E. Triggs	£75	Johnson & Co.*	£45
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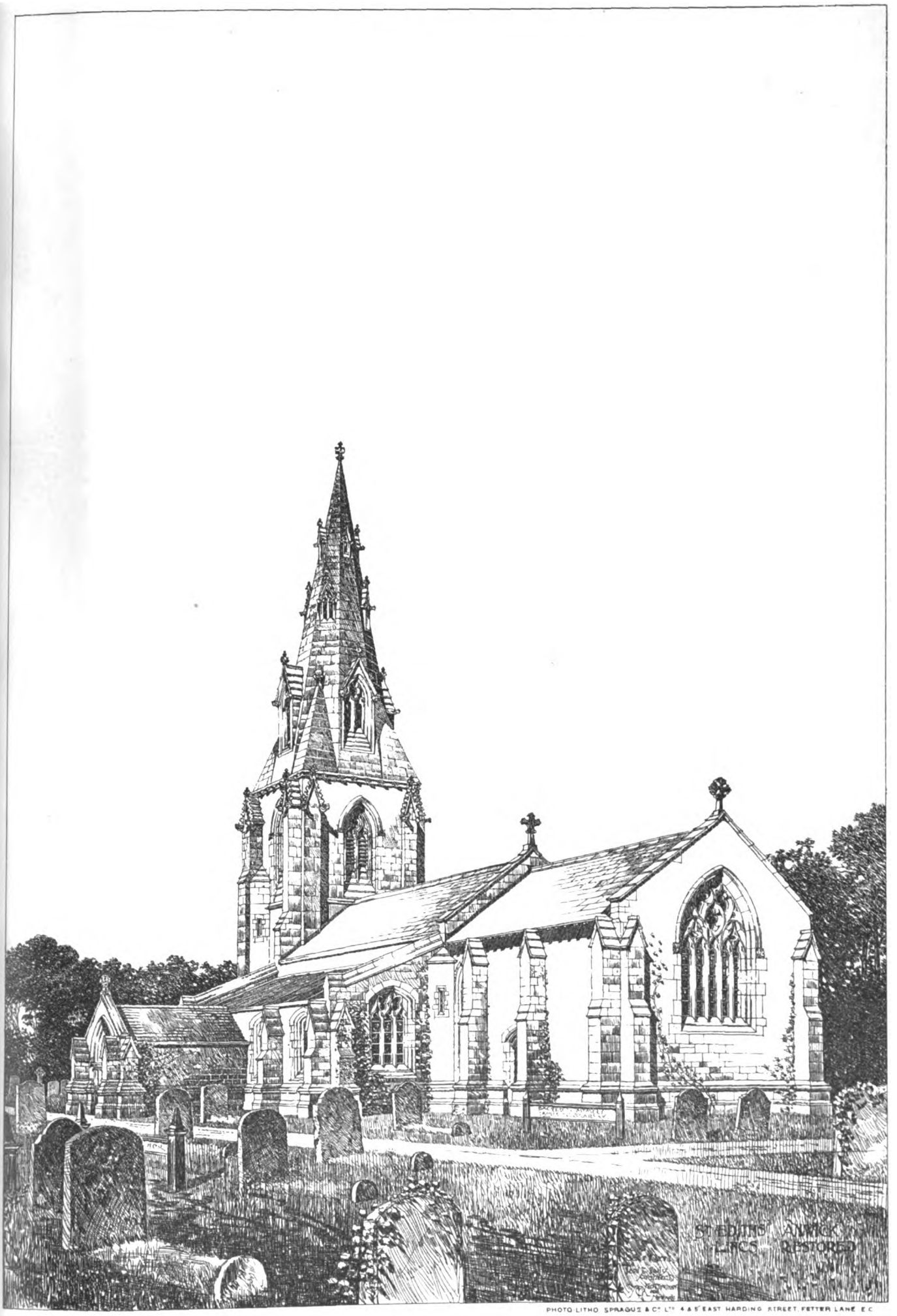

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The Builder.

VOL. LXXIX., No. 3020. DECEMBER 22, 1900.

ILLUSTRATIONS.

The Nativity: Cartoon for Wall Decoration for a Church.—By Mr. N. H. J. Westlake, F.S.A. ..... *Double Page Ink-Photo.*
Details of Recent Work by Mr. R. S. Lorimer, A.R.I.B.A. ..... *Double Page Ink-Photo.*
Royal Academy Silver Medal for Perspective, 1900: "Centre Portion of Banqueting House, Whitehall."—By Mr. G. T. Smith.. *Double Page Photo-Litho.*
Plan and Elevation of an American Frame House.—Illustrating paper by Mr. H. Budden ..... *Double Page Photo-Litho.*

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French Architects and Sculptors of the Eighteenth Century.

THE French architecture of the eighteenth century was, more emphatically perhaps than any other, an architecture of the aristocracy; of palaces and state squares and *places*, and princely mansions, in which the architect had a free hand, almost regardless of expense. In these works there is nothing of the highest grandeur or poetic suggestiveness of architecture; the age was too luxurious and too superficial for that; but there was a passion for stateliness and elegance in all the surroundings of the life of the privileged class to whose tastes and wishes everything else was subordinated, which naturally was reflected in the architecture erected at the bidding of this dominant class.

Whatever we may think, at the present day, of the gigantic and extravagant selfishness of the monarchical *régime* of Louis XIV. and Louis XV., when the middle and lower classes were pillaged with taxes to keep up the magnificence of the King and Court, one must admit that this luxury and display were all in favour of architecture, and that here, as in other epochs, despotism was a better friend to architecture than republicanism. In contradiction to Mark Antony's famous sentiment, the evil which Louis XIV. and XV. did does not live after them, having been purged away in the conflagration of the Revolution, and their benefits remain in a series of stately edifices and *places* and parks which are among the glories of France, however unwarrantably, in a sense, they came into being. Even Versailles, though—as far as the building is concerned—it is not what it might and ought to have been, is a wonderful possession, of which the present French Government ought to take much more care than they do; they are allowing the place to lose its finish and stateliness for lack of sufficient provision for its due up-keeping. But in addition to the palaces and their private parks and gardens, nothing is more remarkable or more characteristic of the time than the manner in which the embellishment of cities was undertaken out of sheer devotion to the magnificence of the monarchy. Did Louis XV. condescend to spend a few days in a provincial city, it must needs create in its centre a great ornamental *place*, with its architectural framework and probably its central statue or fountain, in memory of the auspicious event. Patte's folio of illustrations of "Monumens érigés en France à la gloire de Louis XV." brings before one in a collective manner the results of this mania for the architectural illustration of the imaginary greatness of a bad and selfish king. The "Place de Louis XV." now the Place de la Concorde, is the first example, with Gabriel's fine façade along its northern extremity; the square does not differ materially from its present arrangement except for the fountains and the obelisk, the latter now occupying the place where once stood the statue of which, or on which, it was written:

"Les Vertus sont à pied, le Vice est à cheval."

The Rue Royale still runs northward from the centre of the Place, but Constant's Church of the Madeleine, a domed edifice with a fine interior but a cold and conventional façade, as shown in Patte's engraving, has given place to the still more cold and conventional quasi-pagan building of Vignon, intended indeed by Napoleon as a Temple of Glory, though afterwards dedicated to religion. In 1730 was laid out the Place Royale of Bordeaux, from the designs of Gabriel, "architecte du Roi;" then we have the Place Royale of Rennes, the work of Legendre, a "Ponts et Chaussées" engineer, with a fine architectural composition at its upper end forming the back scene for a statue; and the place at Nancy, designed by Héré, with a monumental arch flanked by arcades finely placed at one end of the space, which in every respect is laid out with a remarkable feeling for stateliness of effect.

These memorial *places* in French towns were a special feature of the eighteenth century, belonging, however, rather to its earlier than later years; for after the King, who during his reign had gone through the three stages of being first loved, then feared, and then hated and despised, had arrived at the latter stage, it may be presumed that the taste for spending vast sums on monuments in his honour languished.

There remain monuments enough, however, in the shape of isolated buildings, more familiar mostly than the commemorative squares; many of them household words among architects. Lady Dilke has devoted about one-third of her very handsome volume* to the works of the architects, and given an interesting sketch of the subject, with the advantage that a great many references to books consulted are added in the footnotes, so that they form a kind of running bibliography of the subject. Whether the author has written altogether from personal observation of buildings or from illustrations is rendered rather doubtful by the remark in regard to Gabriel's Ecole Militaire—"Standing as we see it now from the Champ de Mars, in isolated dignity, it is impossible to imagine a more gracious and courtly building." The Ecole Militaire has certainly never been seen from the Champ de Mars since the commencement of 1889, when the Galerie des Machines was completed, so that one must conclude either that the author has been "imagining" a little too much, or that this book has been in hand more than eleven years, in which case, though the volume is a highly ornamental one and the bibliographical notes, as already remarked, very useful, the literary result would seem hardly commensurate with the time expended. The odd point in connexion with this is that the demolition of the Galerie des Machines is at this very moment being debated in Paris for the precise reason that it hides Gabriel's building from view; a motive to be seriously

* "French Architects and Sculptors of the Eighteenth Century." By Lady Dilke. London: George Bell & Sons; 1900.

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considered in Paris, though it would be ridiculed in London. One can imagine the spirit in which a proposal to remove the Olympia erection, supposing that it hid some fine building by Hawksmoor or Vanbrugh, would be received here.

Lady Dilke's sketch of the French architectural history of the century, however, though only a sketch, and hardly of special value to architects, shows far more appreciation of distinctions of architectural style and detail than we generally find in the writings of amateurs—especially, we fear we must add, those of lady amateurs. Her sketch has at least the literary value of picturesque and vivid expression; she brings before us the characteristics of the architectural life and spirit of the time, and the relation of the art to the social life of the day. We learn some facts not familiar in regard to the character and life of Servandoni, the architect of St. Sulpice, who, like Inigo Jones, owed a good deal of his reputation with his contemporaries to his talent in contriving temporary shows for festivals, a talent curiously in contrast with the severe taste shown in the almost baldly plain front of his great church, impressive nevertheless from its mass and boldness of treatment. The interior might be made fine with a good scheme of decoration; it is woefully bare and cold now, and what little decoration there is is of the most commonplace character. We fully agree with the author in her estimate of that admirable though simple building, the Petit Trianon, which, as we have already remarked,* is the thing best worth seeing among the buildings of Versailles, considered in themselves and apart from the general scheme. The building which is now devoted to the Legion of Honour, but was erected as a private hotel, is another which perhaps even more fully deserves the praise the author bestows on it; the effect of its colonnaded semicircular projection and dome, contrasted with the severely treated rusticated wall on each side, is a perfectly charming piece of architectural creation. When we look at a design such as this, we are led to ask seriously whether, after all, the classic convention in architecture is not the highest or at all events most refined and cultured aspect of the art? Lady Dilke suggests that indirectly the genius of Gabriel may perhaps be thanked for this building, since its architect, Rousseau, was the pupil of Gabriel's assistant, Potain. A considerable proportion of space is devoted to the Panthéon, and it is an interesting detail of architectural history that Patte, the author of the work before referred to, predicted that Soufflot's piers would be found insufficient to carry the dome; a prediction unfortunately realised, in spite of Soufflot's contemptuous indifference to the criticism.

The sculpture, as we have already indicated, is much more fully treated than the architecture, and in this respect the volume is a very valuable résumé of the characteristics of the French sculpture of the period, largely illustrated by many typical examples of the work of Bouchardon, Coustou, Houdon, Pajou, and others. As the author well observes, the feeling for style which distinguishes the sculpture work of the period is due largely to the loyalty with which the sculptors followed the indications given by the architects for whom they worked. "We find," she says, "their work invariably distinguished by the same precision of execution, animated by a nervous and instinctive elegance, and holding that admirably adjusted balance between the real and the ideal which results in absolute clearness of conception. In either case one cannot overlook the skill with which a certain calculated reponse is made to surrounding architectural conditions." Perhaps the characteristic which most strikes one in turning over the collection of illustrations in the volume is the remarkable life and vigour of the treatment, whether in portrait or in ideal figures. There is no classic conventionality in the sculpture of the period; even in a class of subject so trite as Baptiste Lemoyne's "Flore Baigneuse," a nude in the conventional attitude of affected modesty, the head of the figure is not that of a classic nymph with expressionless features; it has almost the individuality of a portrait. A more remarkable nude figure is the Venus by Coustou *fils*, at Potsdam; less individualised it is true, in the head, but characterised by a certain severity of line which is truly sculpturesque. Bouchardon's equestrian statue of Louis XV. is notable for the free and fine design of the pedestal, with its supporting draped female figures at the angles. Houdon's exquisite head of Diana, from the Hermitage collection, is perhaps the most beautiful work illustrated; and though it is more distinctly classic in its *tournure* than most of the works illustrated, it is still not wanting in that reality and intensity of expression which we have mentioned as a characteristic of the French sculpture of the period.

A great deal of interesting information as to the various sculptors mentioned will be found in the volume; but there has been a most unfortunate carelessness in placing the titles of some of the plates. The most important of these have a tissue-paper cover, on which, in accordance with a recent and rather unnecessary fashion, the title is printed, so as to leave the plate itself free from lettering. We presume that circumstances may have prevented the author from seeing herself to the correct distribution of these tissue-paper titles; but the manner in which they have been misplaced in binding shows incredible carelessness and ignorance on the part of those concerned in the make-up of the book. Caffieri's "Portrait of a Danseuse" has the title "Peter the Great," and its proper title is appended to Pajou's bust of Mme. Dubarry; Houdon's well-known seated statue of Voltaire is entitled "Diana, by Houdon"; Lemoyne's nude figure of "Flore Baigneuse" is entitled "Portrait Bust of a Woman," while the title of "Flore Baigneuse" is applied to the equestrian statue of Peter the Great! It is a great pity that a volume generally so finely got up should be disfigured by such absurd and bewildering mistakes; and if this has occurred in all the copies, it ought to be rectified in those still in hand, at whatever trouble or cost.

MEMORIAL WINDOW, ST. GILES' CATHEDRAL, EDINBURGH.—The design for the memorial window to Major-General Wauchope to be placed in St. Giles', Edinburgh, has been selected by the committee of contributors. The work is now being executed by Messrs. Ballantine & Gardiner.

*"Versailles under the Republic," in the *Builder* of August 26, 1899.

MORTAR ANALYSIS AND THE LONDON BUILDING ACT, 1894.

"The mortar to be used must be composed of freshly burned lime and clean sharp sand or grit, without earthy matter, in the proportions of one of lime to three of sand or grit.

The cement to be used must be Portland cement, or other cement of equal quality, to be approved by the District Surveyor, mixed with clean, sharp sand or grit, in the proportion of one of cement to four of sand or grit.

Burnt ballast or broken brick may be substituted for sand or grit, provided such material be properly mixed with lime in a mortar mill."

—By-laws, London Building Act, 1894.

ALL mortar used for building construction in London must conform to the requirements of the foregoing regulations, and it forms part of the duties of the District Surveyors to see that the provisions of the by-laws are duly observed.

In June, 1896, Messrs. Dibdin and Grimwood, the Chemists to the London County Council, communicated to the Society of Public Analysts a paper upon the analysis of mortar, with special reference to the Building Act by-laws. The authors of the paper say that from the provisions of the by-laws "it will be seen that an analysis of lime mortar or cement mortar, &c., can be conducted with a degree of accuracy sufficient to indicate very slight departures from the prescribed quantities of the materials used. Unfortunately, analyses which have been made from time to time by us have shown distinctly that it is only under exceptional circumstances that mortars which come within these regulations are employed."

On the other hand, district surveyors complain that mortars which from their physical condition are obviously unfit for building purposes are sometimes reported by the analyst to be of the prescribed composition, while mortars which appear to be of satisfactory strength are often condemned by chemical analysis.

The truth is that the vague and indefinite wording of the by-laws has rendered it very difficult, save in extreme cases, to prove that a mortar does not comply with the legal requirements. What, for instance, is the legal definition of the term "earthy matter?" Literally speaking, lime and sand are both forms of earthy matter. Presumably clay and garden mould are the two principal materials which would be prohibited as "earthy matter;" but the use of broken brick, which is but heated clay, and sand, is allowed, and garden mould may contain so little clay that it will not greatly raise the apparent proportion of "earthy matter." Thus, a mortar composed of 1 part grey stone lime, 1½ parts broken brick, and 1½ parts sand yielded 9·6 per cent. of earthy matter by the Dibdin and Grimwood test. Subsequently an addional 2 parts of garden mould were mixed in the mortar, and yet the proportion of earthy matter was raised only to 10·6 per cent. The high proportion of "earthy matter" in the original mortar is due to the presence of the broken brick, which is partly decanted off as earthy matter, owing to the fact that the finer portion of it does not fall to the bottom of the vessel containing the solution in which the mortar is agitated in the prescribed time limit of one minute. Yet the use of broken brick is permitted as a substitute for sand.

Again, what is lime? Chemically speaking, lime is oxide of calcium. But builders

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are well aware that pure oxide of calcium, technically known as "fat lime," must not be used for mortar manufacture. On the contrary, the lime should be made from an impure limestone containing a comparatively large proportion of earthy matter of a clayey character. It is well known to the builder that, though the sand should be free from clay, a good building lime often contains silicious matter commonly classed as earthy matter. If, then, the lime and sand are made into mortar, how is it possible to prove that any earthy matter which may be present was in the sand and not in the lime, or vice-versâ.

Mr. Hughes' test for soluble silica, published in the *Builder* in 1892, shows that all lime mortars of great strength contain a somewhat large proportion of silicious matter not soluble in hydrochloric acid, but which is a chemically active constituent of the mortar. Mr. Hughes and other workers appear to have overlooked the fact that silicate of alumina, the main constituent of clay, is more or less soluble in hot caustic soda solution, and that, therefore, before regarding the whole of the silicious matter found by Mr. Hughes' test as soluble silica, the soda filtrate must be examined for alumina. But whether the matter found by Mr. Hughes' test be silica or silicate of alumina, the fact remains that silicious matter is always present in much larger proportion in strong than in weak mortars.

Common flint from the chalk is a good example of that form of silica which is not soluble in hydrochloric acid, but which is soluble in caustic soda, and the great strength of old flint rubble walls is probably largely due to the occurrence of a chemical reaction between the lime and the amorphous silica.

To render chemical analysis the great assistance it might be to the District Surveyor, a committee of experienced architects and analysts should be appointed to determine the *minimum* proportions by weight of calcium oxide, of silica soluble in acid, and of silica soluble in alkali, which should be allowed in a mortar, and also the maximum proportion of silicate of alumina. These standard minimum figures should be sufficiently low to prevent interference with the present method of working of any builder manufacturing a mortar which can honestly be regarded as of fair strength.

If subsequently the by-laws relating to the composition of mortars were re-drawn in accordance with the recommendations of this committee, the District Surveyor would have no difficulty in proving his case when reporting adversely on an unsound mortar.

Under the present conditions a bad mortar made with fat lime may be shown by chemical analysis to meet the legal requirements, while another mortar of much better quality might, if analysed by the method adopted by Messrs. Dibdin & Grimwood, be condemned.

We believe that Messrs. Dibdin & Grimwood are correct in stating that a large proportion of the mortar used in London does not comply with the requirements of the by-laws; but under the existing law this is not surprising. In view of the fact that the terms "lime," "sand," and "earthy matter" are applied to substances of varying composition, magistrates are quite justified in not attaching much importance to the chemical analysis of a mortar.

Chemical analysis cannot be used as a substitute for physical tests, but may, nevertheless, be of great utility. It may, for instance, be stated with confidence that no lime or cement mortar should contain less than 9 per cent. of calcium oxide or less than 5 per cent. of silicious matter soluble in alkali, nor should a cement mortar contain less than 2 per cent. of silica soluble in acid. The minimum percentages which should be allowed would probably be higher than those mentioned, but that is a matter which might be determined by a competent committee.

NOTES.

Australian Coal.

MANY proposals have been made during the past few years to utilise Australian coal for the Navy at British coaling stations in the East. Except in a very limited way, however, these suggestions have not been adopted, it having been assumed that no coal was so suitable for steaming purposes as that in our South Wales coalfield. In a great measure that is correct so far as the assumption referred to extra-British coal generally. The brown coals, smoky coals, and others of a highly bituminous character found so largely on the Continent are of little use where a smokeless coal with high calorific properties is wanted. Our Admiralty, therefore, purchases enormous quantities of South Wales coal, not only for home consumption, but for coaling stations almost all over the world; and the quantity purchased increases materially year by year. Foreign Governments have also become enormous buyers of this coal. Add to this the increasing requirements of authorities in populous districts in England, where factories, electric lighting stations, and railway companies are not permitted to discharge large volumes of smoke into the air, and where the factories, &c., have in consequence to use a smokeless coal as far as possible, or make extraordinary provision for consuming the smoke from very smoky coal. The result is that the smokeless steam coal is being mined in South Wales to such an extent as to cause grave fears for our future supply. The remedy suggested is to prohibit the exportation of the coal, but there seems to be no hope of that view being carried into effect, and we should still use at home the bulk of what was raised. We turn to Australia, and we find that the question of the quality of the coal there has of late materially changed. Recent discoveries of coal in Queensland show that within seventy or eighty miles of Rockhampton, the chief town of Central Queensland, there is an immense area containing smokeless coal, and the seams are found to range from 9 ft. up to 15 ft. in thickness. The whole of the area has not, of course, yet been proved, but there can be no doubt of the existence of an enormous coalfield and of the kind of coal wanted. The region is traversed by the Central Railway, and water carriage is close by. Another excellent coal is at the Calilde Creek mine, not far distant from the port of Gladstone, where also the quantity available is enormous. And there are certain New South Wales coals very suitable for steaming purposes. There can be no doubt that if these Australian coals were more systematically called upon to furnish requirements at Aden, along the east coast of Africa, in India, the Straits Settlements, in the China seas, and on the Pacific station, the tension now existing in regard to our supply in Britain would be greatly alleviated.

The Workmen's Compensation Act Again.

LAST week we pointed out how much broader were the views of the House of Lords than the Court of Appeal on the construction of the Workmen's Compensation Act. Another instance is already to hand. The House of Lords has again reversed the Court of Appeal, which decided that where a workman had not been two weeks in an employer's service he could recover nothing, because, since compensation was to be calculated on the average weekly earnings, there was no average, and so no right to compensation. But the Lord Chancellor pointed out that by the Act the workman was granted compensation, and that the rule as to the average earnings was only one means of assessment, and that, therefore, where this means was inapplicable, another must be employed. Often no one can guess what was intended by the unintelligible language of this statute, but there can be no doubt that the House of Lords is acting on the best principle of construction. To limit the right of compensation by a narrow construction is unfair to the workmen who are affected by it, because there can be no question that the main exception to compensation was only to be when a workman had been guilty of gross and wilful negligence. The recent decisions of the House of Lords have thus all tended in the same direction, namely, to give the workman the right to compensation except when he has been grossly and wilfully negligent. The petty refinements of the Court of Appeal have been swept away. This spirit of liberality must necessarily affect the future construction of this Act.

Damage to Buildings by Vibration.

A WELL-KNOWN legal correspondent in the *Times* calls attention to the interesting fact that in the private Act of Parliament by which the Metropolitan Railway was incorporated there was a clause which gave house-owners a right to compensation for damage arising from vibration or similar causes if it occurred within three years from the beginning of the traffic on the railway. And he pertinently asks why such a clause should not be made a part of the general law. We would ask why it was not inserted in the Act by which the Central London Railway was incorporated. But having regard to the Extension of Electric underground railways it certainly seems desirable that there should be some general clauses applicable to all such undertakings which should necessarily and by virtue of this general law form part of the special Act. The new mode of transit should not be made at the loss of a number of house owners. Some inconveniences owners of property must suffer by the course of modern improvement, for which no compensation can be recovered. A residential street may become a trading street and so on, but loss from vibration caused by the working of an underground line is certainly a proper subject of compensation.

Gas v. Steam.

THE paper on "Power-gas and Large Gas Engines for Central Stations" by Mr. Humphrey, read to the Institution of Mechanical Engineers on Friday

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last week, is a most valuable one. It will give plenty of food for reflection for those engineers who are responsible for the design and erection of large central-power stations for the supply of electricity in bulk. Mr. Humphrey describes specially the power plant laid down at the works of Messrs. Brunner, Mond, & Co., at Winnington, Cheshire. In particular he describes an elaborate test on a combined gas-engine and dynamo which extended over two years. The gas was made by a Mond gas plant which converts cheap coal or slack into a clean gaseous fuel and recovers the ammonia from it. In the test the load was practically continuous, as the electric power was being utilised for electrolytic purposes. On one occasion the engine was run continuously without a single stop for 138 days. The final result of the experiment was that the average thermal efficiency of the gas-engine was 25·1 per cent. The working of this gas-engine is undoubtedly the best on record, and Mr. Humphrey is to be congratulated on his management of it. The fuel cost per unit of electricity generated at the switchboard was less than one-twentieth of a penny—a result which quite eclipses anything hitherto achieved at Niagara or elsewhere. One great advantage of the Mond producer is that no gasholder is required, as it responds immediately to any sudden increase in the demand for gas. At Winnington, for example, over a million cubic feet of gas are consumed per hour by the gas-engines, yet no storage of any kind is required. From each ton of slack the Mond producer is capable of getting 150,000 cubic feet of gas, which is sufficient to develop 2,000 horse-power hours when utilised in a gas-engine. The value of the sulphate of ammonia recovered from each ton of slack is eight shillings, and may be actually greater than the cost of the fuel. Mr. Humphrey brings strong evidence in support of his belief that the power-stations of the future will be run by gas-engines of two or three thousand horse-power which will utilise blast-furnace or producer gas. Numerous appendices are given which record the results of most careful and scientific experiments carried out for Dr. Mond by Mr. Humphrey. They will prove of the greatest value to engineers.

The Chambly Dam Failure.

A PORTION of the Chambly Dam, situated about eighteen miles from Montreal, was entirely washed away after midnight, on November 16. The section demolished was that containing the waste-gates, of which there were fifteen, measuring 6 ft. by 4 ft. each. As no one witnessed the accident, it is not perfectly clear whether the section was overturned, or moved downstream, but the fact is that this part of the structure was completely washed away from the rock upon which it was built, and that the remains were distributed along the bed of the river. Examination of the sectional dimensions of the dam does not suggest a reason for failure, as the height was only 27 ft., whilst the width was 27 ft. at the bottom and 8 ft. at the top. The sloping face in the downstream direction ended in a curve of 9 ft. radius, carried a little above the horizontal tangent to form a water-pocket. As the dam was built of concrete, the possibility of some imperfection in the material or workmanship is at once suggested; but on this point no evidence is at present forthcoming. It is certainly unusual for a dam properly founded on solid rock to slide forward on its base, and the alternative modes of failure are by overturning, or by crushing of the masonry. In connexion with the former of these alternatives, it should be remembered that if water finds its way even in very thin sheets under the foundation, pressure of the masonry will be decreased concurrently with a decrease of stability. In the case of Portland cement mortar, there is reason to believe that hydrostatic pressure may be communicated, almost undiminished, through a layer of such material 1 ft. thick. Looking at the circumstances, so far as they are known, it seems to be a warrantable conclusion that concrete construction is best avoided under such conditions as those stated above.

A Year's Boiler Explosions.

IT is satisfactory to note that the total number of boiler explosions during the year ended June 30, 1900, was less than the average, and particularly that the number of explosions of heating-apparatus boilers was only three. To one or two of these we have already referred in detail, and we need therefore only draw attention to the fact that two out of the three explosions were due to "excessive pressure consequent on freezing of water in the pipes," and that the third was due to the safety-valve being fixed with a stop-valve between it and the boiler. The two explosions due to frost occurred on February 10 and February 12 respectively, and resulted in one person being killed and four injured. Whether the small number of explosions was the result of greater care on the part of attendants, or to the mildness of last winter, we cannot say, but we are inclined to think that the latter is the more probable explanation, and that the next severe winter will show that the lessons of past winters have not yet been taken to heart.

Gas for Heating Bath Water.

ON the 13th inst. an inquest was held at Hammersmith on the body of a lad of fifteen years of age who was found insensible in a small bathroom provided with a gas apparatus of the "Geyser" type for heating the bath water. The jury returned a verdict of "accidental death from carbonic oxide poisoning through an unventilated bathroom in which gas was burnt." We understand that no flue was fitted to the gas-heating arrangement, and that, consequently, all the products of combustion escaped into the room. From the report of the evidence before us, it appears that an expert representing a prominent firm of gas engineers stated in evidence that "this kind of geyser did not want a flue," and that "there would be no fumes." It is quite time that the dissemination of statements of this character became a criminal offence. A gas burner need not, and should not, evolve carbonic oxide, but no burner yet constructed has been able to consume hydrocarbon gases, such as are found in coal gas and carburetted water gas, without evolving carbon dioxide. As carbon dioxide will not support animal life, and is evolved continuously so long as the gas burner is in use, it follows that unless the combustion products are led from the room as rapidly as they are formed, the air of the room must become less and less suitable for respiration. In addition the gas by combustion is ceaselessly withdrawing oxygen from the atmosphere, and for this reason also exerts a prejudicial influence in a badly ventilated room. The man who cannot resist striking a match to detect a gas leak will be always with us, and cannot be protected by legislation; but when a professional gasfitter or representative of a gas company fits a gas heater in a small unventilated room, and assures the householder that the provision of a flue is quite unnecessary, that person is either dangerously and culpably ignorant, or is guilty of a serious moral offence. Bath water may be conveniently and economically heated by gas without any degree of danger, but we advise readers to fit the gas-heating arrangement outside, not inside, the bathroom. Bathrooms are frequently small, and badly ventilated while in use.

Cantor Lectures.

IN his concluding lecture on Monday night, Dr. Fleming gave a résumé of the theory of electric waves and successfully showed many striking and novel experiments to a crowded audience. Our ideas of waves as a rule are got from surface ripples on water, but there are many other kinds, such as gravitational, distortional, and compressional waves. A wave carries energy from one body to another through space. All that we can say with certainty about electric waves is that they propagate electric displacement through space. Dr. Fleming showed experiments with apparatus which was a copy of that used by Hertz and illustrated the difficulties with which the distinguished German physicist had to contend. He also showed a marvellously simple form of apparatus which produced a ray of Hertz waves, and by means of which he was able to demonstrate their properties. When this ray fell on a Branly coherer—a small tube containing nickel filings—then it became a conductor, and a bell in its circuit began to ring. On diverting the ray and tapping the tube it became a non-conductor again, and the bell ceased to ring. With this simple apparatus, which was invented by the lecturer, he was able to show what substances were transparent and what were opaque to these waves. For example, a dry brick was transparent, but a wet brick was opaque. He created some amusement by showing that whilst a block of wood was perfectly transparent to the ray, his own head stopped it absolutely. The human body, although perfectly transparent to magnetic waves, is quite opaque to electric waves. In general, any substance which contains water is opaque to electric waves. By holding his hand in various positions he was able to reflect the electric wave wherever he wished, and he also showed that it could be brought to a focus by means of a lens of paraffin wax. He pointed out how his results showed why wireless telegraphy was successful over water or damp soil, and so frequently failed when tried over arid land, as in South Africa. Damp earth was opaque and reflected the waves, whilst dry earth was quite transparent. In conclusion he said that the electrical engineers of the future must also be ether engineers, for it is in this medium that the energy is transmitted.

The Working Men's College, Great Ormond-street.

AN appeal is made for contributions towards a sum of 4,000*l.* to complete the amount of 8,000*l.* which is needed for the enlarge-

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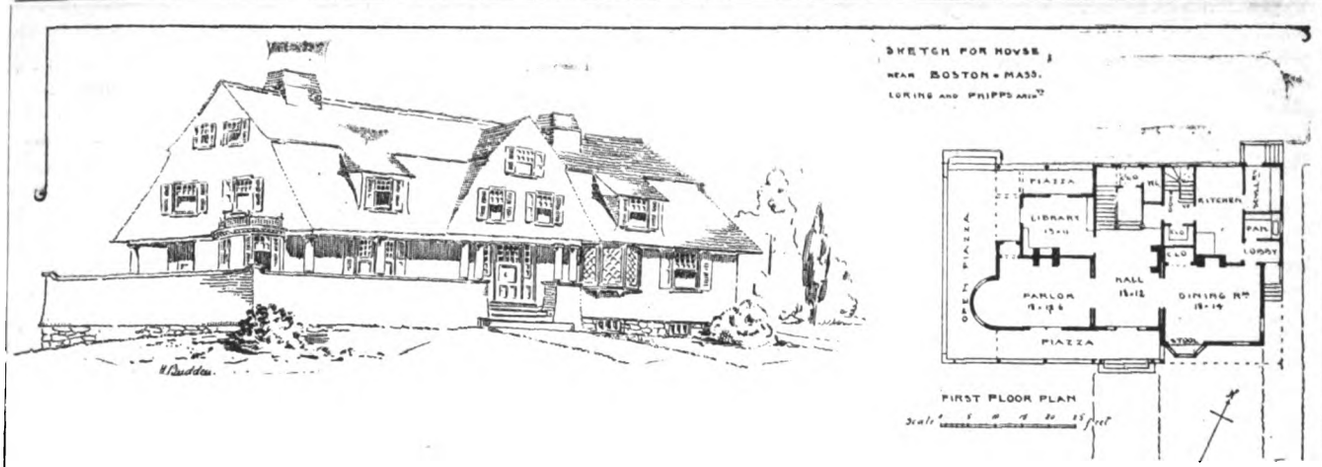

Fig. 1.

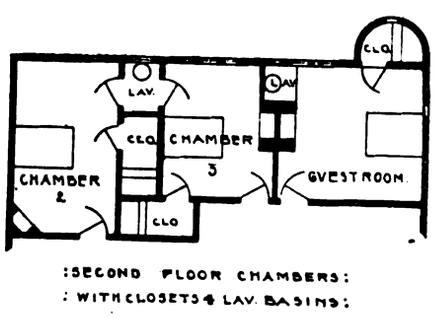

Fig. 4.

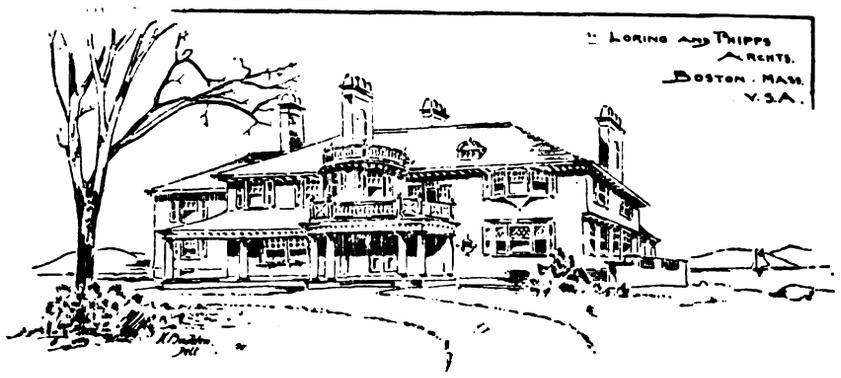

Fig. 2.

ment and reconstruction of the Working Men's College on its present site, as a memorial of the late "Tom" Hughes, who succeeded Maurice in the Principalship. The plans and designs will be prepared by, we understand, Mr. W. D. Caröe. The College was founded in 1854 by the joint efforts of Frederick D. Maurice (the first Principal), Ruskin, Thomas Hughes, J. M. Ludlow, and Charles Kingsley, "to provide instruction for working men at the smallest possible cost in the subjects with which it most concerns English citizens to be acquainted," and to be to them what his college is, or might be, to the University undergraduate. William Morris exerted a warm interest in the aims and well-being of the College, and, together with Rossetti, Burne-Jones, Bowen, Lord Avebury (Sir John Lubbock), Sir John Gorst, and others, took share in the lectures and teaching. The house, lately renumbered 46, is distinguished by its handsome iron railings and contains a fine main staircase; it has been identified with that which Lord Thurlow occupied and whence in the night of March 24, 1784, thieves carried off the Great Seal, having entered from over the wall of the garden that then lay open towards St. Pancras.

AN AMERICAN FRAME HOUSE.

By HARRY BUDDEN, A.R.I.B.A.

IT is a great pity that few English architectural students consider a trip to America at all necessary to their general experience.

I do not propose filling a column or more with a justification of this remark. It would be wasted on those who will disagree with me, whilst to any one who would act upon the suggestion a little practical information would be much more acceptable on what may at first sight appear a far greater undertaking than in reality it is, and it is with a hope of helping in a small way those energetic ones that these notes are given. Assuming—indeed, hoping—that the traveller is dependent on his own efforts, I propose dealing with a subject he will meet very early in his experience, "The Frame House," the most common in any office, and yet as peculiarly American as anything except, perhaps, the steel-framed "sky-scraper," which is not likely to be given to the stranger, for in that the construction and figuring is beyond any but the first-class American draughtsman, who by training is as familiar with this New-World material as the Englishman is with his Old-World stone.

First, as to those you will meet in an American office, I cannot speak too highly of their kindly and friendly assistance, ready always to help a stranger through a difficulty, to explain how something is constructed "here," how this is shown and that is figured; and this spirit is probably responsible for that hearty co-operation which helps the work on. The first thing the stranger will learn—at least nine out of ten will learn—is that he is not so quick a man as he would like to be, and, indeed, soon *must* be, if he would hold his own in an American office. The American works hard and, moreover, he is fast, draws well, is keen on freehand, and will take on any work. The stranger will do well to adopt similar tactics.

Naturally so many differences exist in materials, construction, and methods of drawing and detailing that it would be impossible to enumerate all without making this a glossary of terms, of materials, stock-sizes, &c., but it is believed that the drawings and descriptions following will do much towards this, and as the illustrations have been selected from actual working drawings from various sources they will have a wider scope than otherwise, though it must be remembered that in so large a country differences exist in methods as in manners, and what holds in the East may not altogether be accepted in the West. The method of framing adopted only as far West as Ohio differs from that of the Eastern provinces, but it is generally accepted (especially in those provinces) that the East leads in all matters connected with art, and that Boston is the Mecca of architecture; and, believing that, I adopt the Eastern methods throughout, with an occasional comparison of the Western custom; but the student need never go beyond Chicago for his experience—indeed, not out of Greater New York.

The so-called "Colonial" style is much in vogue now, just as the "later Renaissance" is in England; they are the same precisely; the old houses erected in the early days were modelled on those of England, and possess a simple classic character that would not be unfamiliar to the Englishman here, though we may marvel that so much is wood (indeed, that everything *may* be of wood), and this will account for many modifications and novelties that will be interesting as the outcome of wooden construction. The so-called "American Romanesque" style, I am glad to say, is dead; but one man, its originator, Richardson, ever could design in it, and he succeeded in public buildings rather than domestic, though of course his numerous imitators never thought this any restriction to their efforts. But one is not likely to work again in such a style, and therefore, it is outside of our present study. It would certainly be worth while to study the original "Colonial" works of the East coast, say at Salem, Mass., for a few days, to fully realise what the term means; and this, supplemented by a few visits to works in progress in any good suburb where modern designs in the style are easily found, will add considerably to the information gleaned herefrom.

The preliminary work on a design will probably have been finished and approved before the stranger is put on to help to make the working drawings, but as this differs little from the custom in England it needs no description; $\frac{1}{16}$-in. scale plans are often traced freehand on paper, and mounted, together with one or two perspective views, to show the clients; and he who can make a pretty sketch in colour will meet with approval. Every assistant is able to get one up in pencil or ink, and many more than in England are good water-colour men. Such a preliminary scheme is that for a house near Boston by Messrs. Loring & Phipps (fig. 1), a typical little cottage in a picturesque and inexpensive treatment. The other and larger design (fig. 2), by the same firm, is a good example of the "Colonial" style. And here I would remark that both of these are "framed" houses, so the term will be accepted as a broad one. The excellent design for the Massachusetts State Building at the World's Fair, which many will have become familiar with from illustrations, is the typical colonial design much imitated in the East; it was designed by Messrs. Peabody & Stearns, whose work will be found in every important town, always worth study, and to them I am indebted for much information.

The frame house we take for example is not selected for any special merits of its own in design or arrangement, but because it is a good type and the drawings are complete.

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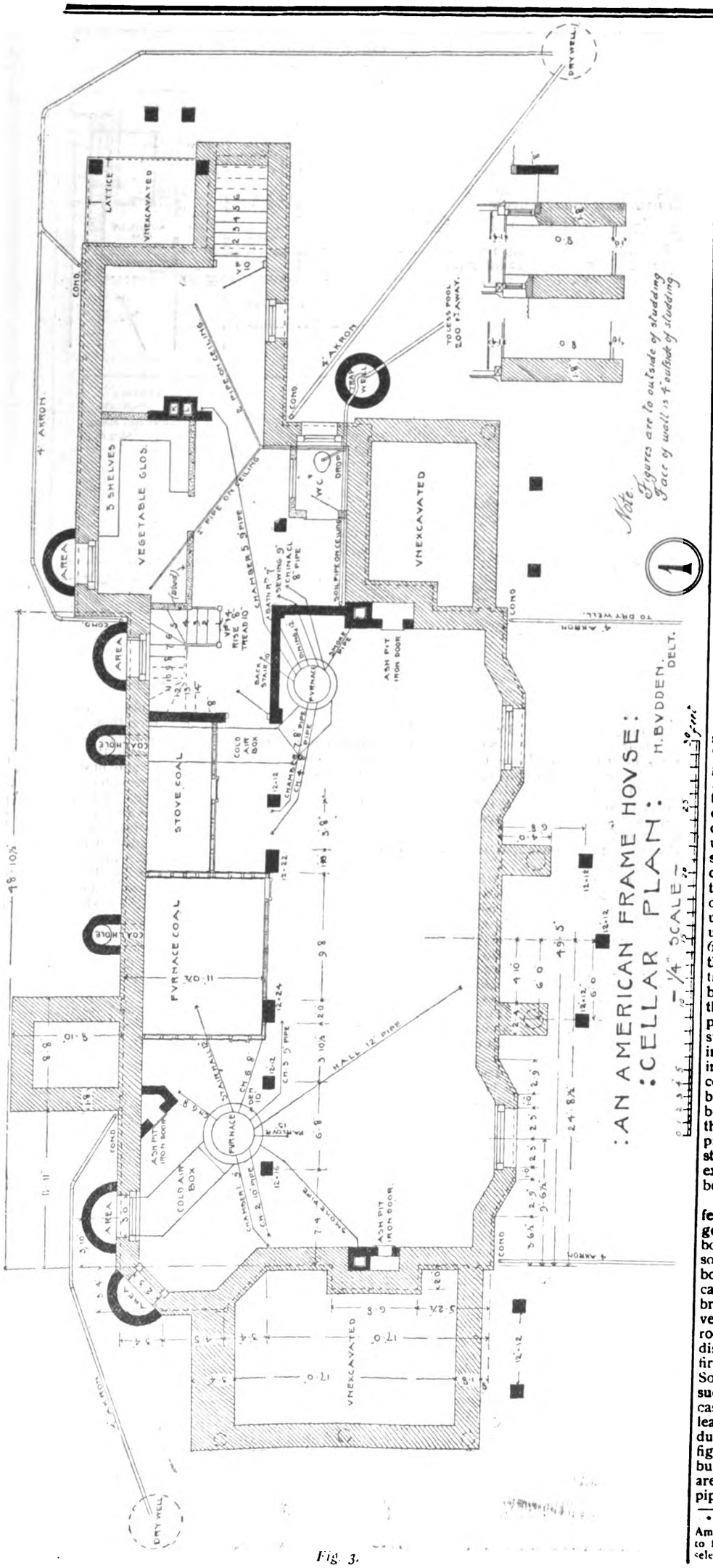

Fig. 3.

One naturally would expect our first example to be executed in wood, but the second and larger one scarcely suggests that material to the "Britisher," and so our example being between the two will, I trust, explain the one and make the other possible.

The "Grade Plan"—our Plan of Levels—will be supplied by a surveyor, and the working drawings must invariably be prepared to ¼ in. scale. Usually they are not intended to be inked in, and so lines are not "run through," but stopped at all returns to make the tracing easier. The system generally adopted is briefly this:—The working drawings are prepared to ¼ in. scale finished in firm pencil, and but sparsely coloured or figured. From these the "frame" drawings are made in ink on tracing cloth and are carefully figured throughout, and at the same time the specification is written, probably by the "construction man." The office copy of working drawings is then traced on cloth from the pencil originals, and these are completely figured up &c., as described hereafter. Sun-copies are made of all, and these are used by the contractors to "bid" upon; the tracings are signed as contract drawings, and the sun-copies are supplied to the builders, the original pencil drawings being put away for reference only, though sometimes signed and stowed with the agreement in the safe. In a large office the draughtsman will not do much of the "figuring," nor will he make the "frame" drawings; his pencil originals will be traced by the juniors and handed to the "construction man" to figure all dimensions, scantlings, and detail notes, &c., which go to make up so complete a set of drawings as those under our consideration now,* but in a small office the draughtsman will have to carry out or help upon all of these processes, and under any circumstances he should know what is expected throughout, and so the whole will be followed in detail now.

The definite outline of the first floor must be laid down first in red ink—here shown dotted (fig. 3)—and remember that "first floor" corresponds to the English ground floor, and "second floor" to the English first floor, and so on. But before the cellar walls can be shown, the detail of water-table or bell-cast of shingles must be decided upon to fix the projection of wall under, and a section is run out adjoining, as shown on our plan. The common projection of 4 in. beyond *face of studs* is taken here, and the 20 in. rubble wall carried round this outline. The footings, of course, will depend upon the nature of the site, though with the usual 20 in. rubble wall a 12 in. course with 6 in. off-set each side is all that is required, and this would be shown dotted on. In this particular instance there are no footings, the bottom being a good hard gravel, and, besides, the weight of a frame house is nothing in comparison to a similar construction in brick or stone. The piers, spaced to accommodate the interior walls of first floor, are often of brick instead of stone, in which case remember the common American brick is only 8 in. by 4 in. by 2¼ in. In verandahs the shingles or clapboarding may be carried down to "grade," then a section should be set up showing the piers set back plumb with the studs, as instanced under the servants' porch in this example, where lattice filling is adopted between the piers.

The furnace is, perhaps, the most important feature on the cellar plan (see fig. 3); it is generally an iron frame containing a fire-clay box and covered with a sheet-iron air-case rising some 4 in. or 5 in. over the fire. The fresh air box leads from an area to the bottom of this case, and from the crown of it metal air ducts branch and run along the ceilings, to rise at convenient points to the registers in the various rooms, each duct being fitted with a valve to disconnect it at the furnace if desired. The fire draws its supply of air from the cellar. Sometimes hot-water heating is combined with such a furnace by a very simple method, in which case the supply-pipes will be shown in colour leading to the radiators on plan. The rising ducts to the second floor are of tin, of sizes figured for the registers they lead to, all being built in the walls as shown on plan. Our pipes are shown circular, but the square or oblong pipe is in common use, being easier to work

* Mr. Budden sent us the whole set of drawings of an American frame-house, but it was absolutely impossible to find room for them all. We have made a sufficient selection to explain the system.—ED.

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into a wall; the joint is a socket and soldered tight.

The drainage of an American house will present many novelties and will repay study as well as any section, for, indeed, improvements on the English methods are sorely needed. We may not take kindly to soil pipes and wastes running down through inside walls, and the pipes being collected within the house, but since all are lead-caulked cast-iron pipes and access is provided to every joint and junction, these objections are minimised, and the great advantage is realised of the security it affords against freezing, a danger greater here than in England. So then the "S. P.'s" will be traced down from the pans above, as also the other wastes, and carried along the cellar ceiling or "drop" under its floor, as most convenient, all to be collected and carried along a small pipe duct to the trap well, or "clean-out" as it is often called, and there ventilated and connected by earthenware pipes (called "Akron," after the place the approved ones are made in), and buried not less than 4 ft. 6 in. below the surface and connected to the drain or cess-pit as may be.

The many fixtures throughout the house require some care as to arrangement of wastes, &c., for the boon of fixtures in bedrooms is realised in America, though in this particular example not taken advantage of, and the conveniences of the system compared to our "wash-hand-stands" cannot be over-estimated; besides, any saving in housework is a consideration in America and soon will be in England. Since this feature is not shown in our example, the accompanying sketch plan (fig. 4) shows a typical arrangement of lavatory and closets between the family chambers, whilst, of course, guest-rooms have a similar convenience in each.

Touching this subject, it may be well to caution the stranger never to show "casing" to any fixture; the Americans know better. The basins are let into marble slabs supported on nickel-plated brackets or standards, and the trap with its vent-pipe, waste are all exposed below, a picture in well-finished nickel-plated brass. Nothing could be more inartistic than a display of English sanitary fittings, whereas the American counterpart would attract all who can appreciate good finish and proportions in a purely utilitarian article. The extra cost over our fittings is considerable, but the compensation comes when furnishing, for no such fitted bedroom requires either washhand-stands nor chest of drawers.

When the other drawings are sufficiently advanced to fix the position of rain-water pipes, these will be shown on the cellar plan and are named "conductors." The drainage system for these will be shown to sewer, street kerb, or dry wells, as provided, or they may be simply finished at "grade" and surface drainage arranged for.

The chimney-stacks are seldom carried down solid, but the pocket utilised as an ashpit, fitted with iron doors, and the flues are usually shown running right down to convey ashes from the fireplaces to this pit, or it is merely gathered over just under the first floor back-hearth, and there a 4-in. or 6-in. opening is provided for those ashes only as fires are seldom lit in the second-floor rooms. "Flue linings" are in common use; these are of ½-in. to ¾-in. fireclay in about 2-ft. lengths, and of brick dimensions inside, 12 in. by 8 in. for ordinary fireplaces, 12 in. by 12 in. for larger ones (kitchen, furnace, &c.), though for these 16 in. by 12 in. are sometimes used. These will be indicated by a double line to flues on plan. A bulkhead must be provided to the cellar with either wide steps or rolling way for convenience in removal of ashes from the pits, &c.; this may be roofed over, though usually folding doors cover the entrance, and are given a slight fall outwards to throw off the water, as in this example. The figuring and printing will be referred to later on when our drawings are supposed to have reached the second stage, that of tracings for sun-copying.

The first and second floor plans—English ground and first—carry 6-in. walls throughout, except where sliding doors or heating flues are to be accommodated. No studs or door and window posts or frames are shown, nor floor joists or trimmers, these all being covered in the frame plans hereafter, and this simplifies our work considerably. To prevent settlements and cracks in plaster the framing is carried round all brickwork of chimneys, &c., and only a narrow breast projected to take the tiles or mantels. The specification provides for 3-in. studs kept 1 in. clear of brickwork, which is cement rendered one coat, so our frame wall should show in all 5½ in. thick round brickwork. A half-brick wall is often considered enough between the flue and the framing, excuse being found in the flue linings, the air space between the two materials, and the cement rendering on all inside brickwork. Should any special posts be required to take girders, support roofs, &c., over cross walls, these are shown on plan and marked "post," as frame drawings of interior walls are not often prepared. Any elaborate cornice or ceiling panelling would be dotted on plan, as is customary with us also.

As to stairs, my experience is that in America the rise may be from ⅞ in. to ½ in. steeper than is generally considered a good proportion in England. Many a flight in their public buildings would surprise an English audience. This may be accounted for by the common use of "elevators" in every kind of building; even a modern three or four-storied town house has its elevator, and then the stairs become of secondary consideration as a means of ascending, though in design it retains its old importance.

Every one knows how complete the closet accommodation in an American house must be to be habitable, and after once proving this convenience the wonder is how a house can be managed without it. Each chamber must have its closet large enough for a set of drawers at least 3 ft. long with shelves over, and for hook-rails on spare wall space; the specification will provide for width and spacing of shelves, hooks, &c., and in the best closets panelled "drop-fronts" to the shelves. Direct light is not required to any chamber-closet, partly on account of the possibility it would make for damp air, but the door should be hung so that it will not block the light when standing open. The back stairs is another feature insisted upon to every house, with doors arranged to lock it off from the main part.

The combined bathroom and water-closet is too common a feature even in first-class houses in America, and cannot be approved, but accepting it excuse may be urged in the good fittings previously referred to, and in the fact that one register serves to prevent freezing in all the fittings, whilst in the better and separate arrangement two would be required. However, it is not our object so much to criticise arrangements as to notice how such are shown on drawings. The first-floor plan usually carries the drives, walks, gates, &c., as these will probably be "called for in bid," that is, taken in the estimate. Many suburban houses have neither gate nor fence to road, nor, indeed, between adjoining properties.

The heating flues, soil pipes, posts, &c., previously mentioned, will be followed through each plan and shown, as also the registers if these are in the floor. The custom in some offices is to have them in the walls just above "base," that is, skirting, in which case the position will be indicated and the size figured.

(To be continued.)

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

SOME TENDENCIES OF THE MODERN SCHOOL OF ARCHITECTURE.

AN ordinary meeting of the Royal Institute of British Architects was held at 9, Conduit-street, on Monday evening. Mr. W. Emerson (the President) being in the chair.

Mr. A. Graham (hon. secretary) announced with regret the decease since the last meeting of two Fellows: Mr. John Butler, elected 1887; and Mr. James Buckley Wilson, of Swansea, elected Associate in 1872 and Fellow in 1888.

The Chairman, in calling upon Professor Beresford Pite to read the paper of the evening, mentioned that Mr. Pite had recently been chosen as a Professor to the Royal College of Art, South Kensington. He felt sure they all warmly congratulated Mr. Pite on the honour.

Professor Beresford Pite said he was very much obliged for the congratulations conveyed to him. He then proceeded to read his paper, which dealt with "Some Tendencies of the Modern School of Architecture." In his opening remarks, he said he proposed to divide the large and rather indefinite subject into a series of somewhat genealogical chapters, commencing with the close of the well-worn battle of the styles. They would review severally the close of that campaign, then the alliance and combination of the rivals and their devotion to a doctrine that all old work was sacredly beautiful, which issued in a revolt against style in a new and unexpressed manner. They would then consider the effective results of the Gothic revival in stimulating the subsidiary arts and crafts, specially under Wm. Burges and Ed. W. Godwin, also the influence of Wm. Morris upon the purely decorative crafts. The ideal of a revival of the building crafts and J. D. Sedding's influence towards that end would follow. The present usefulness of the work of Wm. Butterfield to the student would be noted, and the potent influence of Mr. Philip Webb, now combining with the school of Mr. Norman Shaw, would bring the review near to its limits, and he would close with a short appreciation of Mr. Bodley's work and with an opinion upon the artistic tendencies of competition designs.

A generation had arisen untrained in the orders and systems of proportion of the art of architecture. The published curricula of the centres of architectural education, together with the Royal Institute of British Architects Examinations syllabus, offered no evidence of a tendency to pursue classic methods of dimension, proportion, and conformity to type upon which the school of the early part of the nineteenth century based its ideals of architectural beauty. The old Classic school was dead. But it died a school, and left existing its concrete methods, its parts, proportions, principles, and orders accurately systematised and available for the use of all inquirers. Its great and chief antagonist had also fallen, for but little life remained in the Gothic school that once dreamed of universal sway. But, asked the lecturer, is the Gothic revival dying with the dignity, traditions, and possibilities of renascence of the older school which it displaced? Does it leave methods, principles, and styles, construction, mouldings, and decorations in such order as to be practicable instruction material for future generations? Or have its motives and principles been merely the reflection of ephemeral sentiment, leaving nothing reproductive and capable of development and progressive tradition? Reviewing the tendency of the Gothic movement, the lecturer glanced at the training and methods of the school, its standards of taste and criticism, its earnestness and enthusiasms, and the spirit in which its students sought to solve the architectural problems of their day. The student was instructed by constant and repeated observation and study to drink in the spirit of the old work, and to design his new buildings while under its exhilarating influence. The mediæval spirit as it was, as it worked, as it drew, was all of system, principle, or method that the modern architect could need. The Gothic revivalist was a craftsman and builder with concrete opportunities, instead of an abstract theorist, and he built upon his discoveries and enthusiasms, and therefore sketched and measured with eyes eager for piquant solutions of the daily difficulties of practice, and found nearly all he wanted. There was a wealth of material indeed, a yet unexhausted store of energy and enthusiasm in the students; but when the change came and the lamp went out there was no residuum of framework, method, or principle, only the inchoate notion of the wild but real beauty of all old work, and a new delight in picturesque draughtsmanship. These were the two main resultants of the Gothic revival at the time of its effective decease, and these effects have since formed the staple tendency of most pursuers of the art of architecture in England. The lecturer then proceeded to discuss their progress and attained results, and the future that may be expected of so narrow an equipment. Is, he asked, the love of beauty stronger than the power of truth? Or is the truth of construction that is dictated by the motto, "Build in Truth," only an exhibited hypocrisy of simplicity, and an anachronism untrue alike to the day and civilisation in which we move?

The progress of the doctrine that all old work is beautiful has been steady, and a limit has scarcely yet been formed for juvenility of the subject of beauty. Yet it must be presumed that the quaint conceits of partial ignorance, with added charms of romantic history, ruin, decay, lichen and ivy growth, have entered unconsciously into the current estimate of the beauty of old work. Apart from these accidents, there is little that

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can be described as good or even tolerable design in much old work that has been considered admirable because it is charming. We have lost our way amid the beauties of English antiquity. We pursue no definite ideal now, but wander aimlessly among the enchantments of quaintness, originality, and unrestrained, though demoralising, freedom of design. Breadth of view, sympathy with Nature, a recovered poetry of architectural idea, and a genuine appreciation of the historic element in old buildings, have been gained in our wanderings. We are still enthusiastic, and can talk with earnestness, if not intenseness, of the artistic values and importance of the most trifling elements of everyday buildings. We have around us, in nearly all the branches of architectonic and graphic art, proofs of living vigour of movement, power, and genius. Painting, sculpture, the decorative arts and crafts, are instinct with growth and development; and architecture, which has led the advance and quickened the allied arts into life and power, seems to have exhausted, not her forces, but the material upon which they act, and, burning with suppressed poetic purpose, to have disdained and forsaken her various forms of speech, with all their necessary members of form, detail, order, and group, as unworthy and incapable of sufficient expressiveness of the new light that burns within. The lecturer expressed his conviction that under the seeming voicelessness of the new sound there is present an intelligence and a purpose of expression sincere, earnest, and useful. The hardly developed tongue is one of protest against thoughtless repetition and meaningless quotation in a dead language, and a resolute endeavour underlies it to speak for itself on behalf of liberty to be free from convention in its architecture, and for its attempt to oust the affectation of style by an unaffected stylelessness of difficult simplicity. Ornament in the ordinary acceptation is an abomination to it, while architectural features, methods, and terms must be scoured out of their arrogance, put away, and forsaken. An inquiry whether we shall in the course of elimination and abnegation attain to the simplicity of Stonehenge or of the Great Pyramid in our everyday architecture may indicate the danger, if not absurdity, of striving to make a complex civilisation, as reflected in a necessary art of civilisation, unnaturally simple.

The lecturer went on to show that almost the same tendency had been produced by another road, viz., through the genius, the efforts, and achievements of such leaders of the Gothic school as William Burges, Edward W. Godwin, William Morris, and J. D. Sedding.

In the modern school we have the fruit of seed sown by the great architects of the Gothic movement, viz, the revival of the building and decorative crafts. The starting point of the early leaders was romance, taste, and association. Pugin discovered the riches of ecclesiastical decorative art, and in vestments, furniture, and altar fittings, opened up a new world of form springing from natural and refined craftsmanship. With the advent of William Burges a truer insight and completer grasp of the range of mediæval art was obtained. With scholarly completeness and patience he worked away from the modern architect's standpoint down, or up, to the craftsman's level. Burges had no notion of sacrificing architecture, as the art of beautiful building, to craftsmanship of detail, but he obtained a mastery in both, a mastery found on the pathway of enthusiastic antiquarian research. His was a living art; any example of his works, whether in building, goldsmiths' work, decoration, or furniture, would be attractive and beautiful to us now. Edward W. Godwin had a very similar genius. His architectural outlook was freer, but in the faculty of insight into every craft, and of discerning the essential workmanship of his detail, he was quite his equal. He had the genius of a true antiquarian, and laid hold of the life of the men who produced mediæval art, being drawn out to them with an artist's sympathy, even to their costume. His facility and success in original Gothic design, however, did not betray him into forsaking his true grasp of the realities of architectural art. He took full advantage of the liberty the "Queen Anne" movement offered of release from the traditions of so-called style, and felt his way and worked as a building designer of simple villa houses and economical artists' studios with a rare and refined originality. Present day æstheticism has not carried us beyond the point he attained in his houses at Turnham Green and studios in Tite-street, Chelsea, now twenty years old.

William Morris, himself a fruit of the Gothic movement, and in the sum-total of his life-work mediæval in the truest sense to the end, represents the link between the Revival in architecture and the Pre-Raphaelite movement in painting. His influence and power are working at the present moment upon most, if not all, of the decorative arts. His practical alliance of artists and craftsmen, especially in early days, was an experiment which has left a permanent success as its result. We may still be in doubt as to the practicability of depending for architectural design upon the workmanlike intuition of our artisans, but we cannot avoid recognising that Morris himself was such an intuitive workman artist, and that the zeal which instructed him into that insight was kindled in the generation of Gothic revivalists, and is a veritable and beneficent influence of power in our midst to-day. Principles, however, which seemed obvious in Morris's hands when dealing with decorative art have proved difficult to carry to any extent into the practice of architectural building. Artistic enthusiasm in the craftsmen of brick-work and of masonry is, under present conditions of civil life and business, almost impossible. The attainment of a commonplace standard of honest, sound work is all the architect can hope for, and there are not as yet symptoms of any development among the craftsmen themselves of an enthusiasm for the artistic possibilities of their work which can be allied with the similar movement in the decorative arts stimulated by William Morris. Still, these difficulties have not hindered the achievement of much interesting experimental work.

Touching the late J. D. Sedding, the lecturer said that his manifold gifts peculiarly qualified him for carrying an arts and crafts crusade into the midst of the architectural world. Practical contact with the crafts closely allied to his ecclesiastical work as an architect doubtless drew him to feel the force of Morris's teaching, and he unhesitatingly bounded towards the brilliant vision that seems almost impossible of attainment to us, of a living revival of the building crafts as a basis for all architectural design. He delighted in setting conventions at nought with the subtle play of an able humorist in design, the serious side of his character being bent upon the crafts with which he supplied beauty into his architectural scheme. He obtained assistance from artists and craftsmen all more or less imbued with the new teaching. Holy Trinity Church, Sloane-street, is the best illustration of his methods. The general design aims at and achieves original impressions and effects, not altogether with certain success of scale and grandeur, but with the great interest of freshness in every part. The crafts are contained and displayed within the architectural enclosure of the building, and in the screen wall, pulpit rails, gates, table, and other fittings assert their presence and independence vigorously.

The friends and followers of Sedding have considerably extended the tendencies of his school. They are good craftsmen in charcoal, paper, and pastels; in fact, in all the resources of the architectural draughtsman's palette; and herein lies to a great extent the secret of their power. Is it irony of fate, perversity of nature, or idiosyncrasy of genius which compels so gifted draughtsmen and architects to become exponents of doctrine which disowns draughtsmanship and avoids architecture?

Of the actual effect in a monumental or public building of the new teaching, we have as yet no serious examples. But in a smaller class of buildings, in some interesting domestic instances, we find the enthusiastic architect more or less successfully breasting the tide and importing by the sheer force of his own character the interest of some one or other of the building crafts into his work.

The application of the doctrine of craftsmanship is practically confined to the origination of ornament. The architect can allow the craftsman as much liberty as the employer cares to pay for, with results of really valuable work from accomplished and well-known craftsmen. But the major crafts of walling and construction are still dependent upon the master architect's training, and upon his paper and pencil, for their usefulness or their beauty. Considering, however, the progress and ultimate achievements of the mediæval craftsman in brick and masonry, is not the movement which induced that vitality capable of repetition in a new day of light and progress?

The lecturer went on to give his conception of the architect's relation to the building art, *i.e.*, as the designer and master craftsman; the architect released from a sketchy pseudo-antiquarianism, and the master builder also, delighting in his building craft and designing with the end of expressing his delight in the wonderful resources of each and the sweet harmony of all the elements of constructive craftsmanship. He trusted this was not the empty vision of an unpractical ideal, without examples or instances of achievement. There is, for those who would seek it, abundant encouragement in unlooked places; efforts, sometimes crowned with conspicuous beauty, have been made by earnest men, profoundly dissatisfied with the prevailing want of true ideal, building upon the basis of building art, with simple and beautiful form, devoid of the shibboleths of style, and in many cases rising with them through the level of past art to new life and true modernity of beauty. Of architects whose work may be considered to have attained this quality, the author mentioned the late Wm. Butterfield, Mr. Philip Webb, Mr. Norman Shaw, and Mr. Bodley, passing their works in review, and noting the distinctive merits and tendencies of each. The genius will growingly be appreciated by which Butterfield discerned and seized the essential motive of mediæval building art, and forthwith strove to think for himself and express his own thought in his material for its modern purpose, with absolute new art. His brickwork, stonework, ironwork, mouldings in tracery, shafts, or archivolts—in every way all is as freshly modern as, in its day, was the work of the mediæval masters. In the field of domestic building Mr. Philip Webb occupies a somewhat similar position; the same aloofness from the current standards of architectural "style" characterises his work as Mr. Butterfield's. His houses in Lincoln's Inn-fields and Kensington Palace Gardens are excellent examples of his art. In internal detail and decoration he has in his leading works maintained the essential quality of the building craftsmanship of the architect's art, and been foremost in the revival of the decorative crafts. His work should receive earnest attention by those who seek encouragement from current buildings of real life and progress. Mr. Norman Shaw's creations are too present to be correctly estimated. His grasp of the superficial beauty of old work has been combined with an equal internal completeness, and an amazing versatility qualifies him in later English Classic as in the earlier barbaric, crooked Gothic. He seems to know and feel for each phase alike. Why and how does this genius charm? Is it the man rather than the work? The artist-architect or the architect-builder? The building that provokes the one question is promptly answered by another of the opposite tendency, and yet all are of one spirit. Is this spirit modern? or does it rise with the charms of an apparition of a departed beauty upon our dreams? or is it a living nineteenth-century actuality, typical of our attainment in life and art? Mr. Norman Shaw's school leaves us in little doubt; its members are among the most earnest and successful exponents of the craftsmanship doctrine. In ecclesiastical art of the Modern School, Mr. Bodley, with his complete and perfect sympathy for the crafts of religious art, has been enabled to maintain a useful and effective guidance. In his work, and in that of his immediate followers, there is a sense of satisfaction with the restrained and refined development of later Gothic and Perpendicular for which he has such feeling. The charm is that of perfected fifteenth-century art, revived with the completeness of the original, and infused with its motive and spirit.

Referring, in conclusion, to our civil architecture, the lecturer said that the system of competitions had produced a habit of reckless originality, of tawdry picturesqueness, of ill-digested unscholarly design which was having an alarming influence. Here the lack of tradition and of a school of settled orders and proportions has the most damaging effect. In domestic and ecclesiastical art we have survived the Gothic revival and its repression of classicism with some success, but in civil architecture our architects are sadly and truly demonstrating their demoralisation, and sadly needed the advice and remonstrances of such a master as Sir Wm. Chambers.

Mr. J. M. Brydon, in moving a vote of thanks to Professor Pite, first congratulated him on the

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honour that had been conferred upon him by his selection as Professor of Architecture at South Kensington. If his eloquence, his knack of putting things in an interesting manner, were any criteria of what a professor should be, he ventured to say that Mr. Pite would be an ideal professor. Passing on to consider the paper just read, he remarked that it was headed "Some Tendencies of the Modern School of Architecture." They would forgive him (Mr. Brydon) for saying that it was pleasing to him to find that there was a school at all, and pleasing, secondly, that there was any tendency at all. Professor Pite, who had wandered somewhat from his text, instead of giving what he (the speaker) would have characterised as a description of the modern school and its tendencies, had given them a description of several revivals in the nineteenth century, and of the great men who had taken part in them. Certainly they had had some references to craftsmen, which was one of the tendencies, and to the want of style, which was another, but really he felt some doubt as to what the "tendency" was, except that all traditions were to be abandoned, and every one was to do what pleases him in his own eyes. He (the speaker) was, to a certain extent, all for that. Wherever tradition was found to hamper a man, throw it overboard; but to throw it overboard for the sake of throwing it overboard was not likely to help a man. This was an age when a knowledge of proportion was disregarded. If, for example, it was going to increase the beauty of a column to dwarf it to the proportion of a sausage or draw it out to the proportion of a gas pipe, one could, of course, do so, but he questioned the excellence of the result. If, on the other hand, it was thought that to improve the entablature of a column, that half of it should be omitted—that sometimes the frieze, sometimes the architrave, and the cornice should be dumped down on top of the column—if that was the tendency he doubted very much whether it was likely to improve architecture either in proportion or detail. Again, if it were an improvement to omit the volutes of an Ionic cap and merely to put the abacus and some mouldings in, he very much questioned whether, if that was the tendency, it was going in the right direction. Again, in regard to the principal doorway of a building, there used to be an idea that it should be somewhat higher than its breadth, but the modern tendency seemed to be to make it rather wider than its height, and to limit the width, so that a tall person had difficulty in entering. That might be an improvement on the old method, but that was not his opinion, nor did he think it an improvement that all manner of bay windows should be stuck where none were wanted and where it was difficult to see from. He thought that the followers of that tendency ought to go back to school for a little longer and study in the school of tradition and the works of Sir Wm. Chambers, Cockerell, and Barry, for instance. He yielded to none in his admiration of the men whose names had been mentioned by the lecturer, for they were artists in the best sense of the term, and they all, more or less, found out the limitations of all so-called revivals. If the tendency of the modern school could be directed to take up the thread of the old English architecture that was broken in the attempt to revive the Greek exotic, the foundation might be laid of an advance which, in the coming century, might be of great value to English architecture. It was appropriate that they should have had a paper like that at the last meeting of the Institute this century, and he would suggest that Professor Pite should give them a paper critically reviewing the architecture of the nineteenth century—not the men who did the work, but the work itself. Possibly we are too near the execution of the work to classify it properly, but the study would be a most interesting one. There seemed to be an architectural chaos, for architects seemed to be groping about and trusting to the crafts.

Mr. H. H. Statham, who seconded the motion, said it was somewhat difficult to speak on the paper because he could not exactly understand what the Professor was driving at—what he advised them to do. One or two points, however, struck him. In reference to Mr. Butterfield's architecture of which Professor Pite spoke with an admiration with which he (Mr. Statham) quite sympathised—it was remarkable that, although we had got tired of most of Gothic revival work, Mr. Butterfield's churches still retained their interest; they were not merely revived Gothic; he put always something original and his own into them. With regard to the influence of competitions on architecture, Professor Pite seemed to think they had had a bad effect on modern architecture. He (the speaker) did not share that extreme view. A great many architects sent in to competitions very curious and eccentric designs in order to attract attention to their originality. As one who had examined many of these, he observed that these designs were never the selected ones. The best chance in a competition was to send in a good plan and a design in tolerably close adherence to conventional lines. The eccentric designs were always, as he had said, unsuccessful, therefore it was hardly fair to charge the competition system with encouraging this eccentricity in architecture. As a reverse to eccentricity, they now found architects who made what he might call an ostentation of simplicity; all architectural detail was eliminated. Surely they could find a medium between a gimcrack ornamentation and no ornamentation at all.

Mr. H. G. Ibberson thought there was a good deal in the arguments that had been made by Professor Pite. The whole of the paper had been intensely interesting and very suggestive. He sympathised with the extreme difference there was between craftsmen of the decorative arts and craftsmen of the more structural and simpler forms. As to competitions, he did not feel that they had encouraged fantastic work, though they may have encouraged commonplace designs. One had to pander more or less to popular taste, and that was intensely commonplace.

Lieut.-Col. Prendergast said the question dealt with in the paper, as he understood it, was—Have we or have we not made progress during the nineteenth century in the art of which that building was the home? He was old enough to recollect the beginning of the Oxford Movement and its corollary—the Gothic movement. He recollected that old Henry VI. chapel at Eton with its fifteenth century roof. An architect—he was not sure whether he was a member of the Institute—must needs secure the great cusps to those beams in order to satisfy the Gothic mania. The history of the work of great architects during the past century had been gone into in such detail that it would be quite unnecessary for him to follow on, but this he would say, that the gist of it was—Who were the great men in the century to whose work we might look back upon? He had had to spend many hours in what he considered the greatest building in our time—the Houses of Parliament. Unfortunately, he did not have the benefit of hearing the instructive paper read before the Institute by Mr. Brydon on Cockerell's work, but what it taught must have been that in the architects of the century they had had great men. With the two or three words Mr. Brydon said against breaking the thread of tradition he entirely agreed. They had travelled over an enormous field—from Queen Anne to Morris—and the truth was they must put up with this turmoil of taste, but they could not deal with architecture as they would deal with millinery and let fashion decide. They must put down their foot somewhere, and it must be at breaking the thread of tradition. Architecture, they must remember, was thousands of years old, and he hoped its traditions would remain for many thousands more.

Mr. E. T. Hall remarked that some of the preceding speakers seemed to have failed to see where Mr. Pite's paper was leading them. For himself, he regarded the paper as a very good exposition of the tendency of modern architecture, and, at the same time, it had as its text that architects should not be slaves to style or simply copy old traditions, but should think out their own problems and, with the knowledge that the older architects had given them, proceed in the way they did. Let them then think out their own problems and evolve their own style. Mr. Pite said: Do what thirteenth century Gothic architects did for themselves. They were not tramelled by style, and they had to think out their own problems and evolve a new style. If those architects had gone on the lines Mr. Brydon suggested we should never have had past styles to help us now.

Mr. E. W. Hudson believed that the speeches of Mr. Brydon and Mr. Hall both contained germs of truth. For himself he regarded Professor Pite's paper as giving some wonderful analyses of the phases of architecture during the greater part of the century. One phase of modern architecture which had not been dealt with was that which had developed in the colonies. The name of Burges had been mentioned that night; that name was always received there with a great deal of pleasure, and it must be very agreeable to the Chairman. He remembered drawings published in the journals at the time, and they impressed him very much as being delightful adaptations of Gothic works to the needs of our colonies. He would mention the cathedral of Allahabad as one example; a building of which the chairman himself would know a great deal. He thought there had been a distinct improvement during the past three quarters of this century, and the thing to be considered was, What is to be the outcome of all this, and what is to be the future of architecture? They now had ladies in the profession, and ladies had done wonderful things in the past. An American lady at the Paris Congress answered the question he had put by saying that the architecture of the next century must express "the liberty of man, the dignity of woman, respect for work as work, love of justice, and universal peace." If that was to be the position of architecture in the twentieth century, he for one would not be entirely in despair.

Mr. G. H. Fellowes Prynne regarded the paper as an excellent incentive to them to start well with the twentieth century. Now that Gothic architecture was so much despised by students of the present day—by despised he meant not sought after and a disposition not to regard it as the ground-work of architectural studies—he thought they could not have much progress in the next century unless their students built upon a foundation of this sort. They must have their foundation, whether that was Gothic or Classic, and with it they would be nearer in gaining their end than by the new style of so-called simplicity.

The Chairman said he felt some difficulty in arriving at a conclusion as to what the Professor thought the tendency of the moment was. At the same time, one of the speakers had, he thought, hit the nail very happily when he said that the present position was a "turmoil of taste." It was rather curious that there should be a turmoil of taste. In the past the works most admired had been by those men who had closely studied old work and followed on its lines. At the same time, if architects were true to themselves, endeavoured to educate themselves, and instil into their work their own instinctive feelings, they would produce something which must be interesting for generations. From remarks made that night, and from one's own observations, it was perfectly certain that art was not confined to one school. In the same breath were mentioned the works of Cockerell, Burges, Barry, and Butterfield, entirely different in themselves, but whilst different they found beautiful things in all these works when the architects had imparted into them truth and personality. The turmoil of taste had, he thought, caused a great many of the complicated problems which architects now had to solve. In olden times the problems were not so complicated as now. When they thought what, in the metropolis, an architect had to arrange in designing a big building, it was clear that they would come to the conclusion that neither Gothic nor Classic in themselves would be suitable to solve those problems. In the next century they might find a solution of the problems, and perhaps, while adhering to simplicity and originality, they would not neglect going back to the models of ancient times.

The motion having been heartily agreed to,

Professor Pite, in reply, said that by the expression "Modern School" he did not mean the future school—he meant the architecture current during the latter part of the century. His object was to review tendencies one with another. He would conclude by inviting them to study Sir William Chambers. But he looked with terror and amazement at any attempt to take up English architecture at the moment it was left by the Greek revival. They must get back themselves and learn the alphabet and the syntax of architecture before they entered upon the composition of the finished works, such as were shown by architects in the last century. The future lay in the next century, and he hoped those who followed them would have a more satisfactory review to make, though he thought they would not have a more striking range of talent to deal with than we had in looking back on the nineteenth century.

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The Chairman said that was the last meeting of the century, and before they parted he desired to wish them a happy Christmas and prosperity during the first year of the coming century.

THE SURVEYORS' INSTITUTION:

FUTURE OF THE LONDON WATER SUPPLY.

THE following is the conclusion of Mr. R. E. Middleton's paper on "The Future of the London Water Supply," read before the Surveyors' Institution on the 10th inst., as mentioned in our last issue, when we gave the first portion of the paper:—

Sources of Supply.

"Having estimated that at some date or another, which for the sake of argument has been called the year 1901, the population to be supplied will number 19½ millions, that the rate of supply, which, supposing waste be prevented, may provide for much cleansing of streets and for public fountains, will be 35 gallons per head, and that the quantity of water to be supplied, including a reserve of 5 per cent., will be 717½ million gallons a day, it is required to show from what sources this enormous quantity of water, which is nevertheless half of the average flow of the Thames, can be drawn.

The Thames.—The area of the Thames basin down to the intakes of the water companies at Hampton is 3,548 square miles, and the water run off from this area during the last sixteen years has measured 8·22 in. of rain, or 1,166 million gallons a day; the average rainfall during the same period has been 26·36 in., or 2·14 in. less than the 28·5 in. which the late Professor Symons determined to be the general average rainfall in the drainage area of the Thames above London. It is not easy to determine what proportion of the 2·14 in. deficiency of rainfall during the last sixteen years would, on the general average of years, find its way into the river; but it is not likely to be less than two-thirds, which would make the general average run off over a long period of years 9·64 in.—say, 9·70 in. If the average run off be 9·70 in. of rain, the average flow is 1,376 million gallons a day. The Report of Lord Balfour's Commission puts this figure at 1,350 million gallons daily. The run off of the Thames, measured at the same point, has been, on the average of three dry years, 970 million gallons a day, and during the driest year 616 million gallons daily. Speaking generally, the amount of water drawn from the Thames during any year will approximate to the average supply; the proportion of the flow of the river taken for this purpose will therefore be, on the average of years, 30 per cent., and on the average of three dry years 40 per cent. nearly. During the driest year the quantity of water drawn from store is so large in comparison with that drawn direct from the river as to amount probably to some 90 million gallons daily, and the average quantity drawn from the river during such a year will not exceed 310 million gallons a day, or 48·17 per cent. of the river's flow. In the Welsh rivers, supposing the proposed reservoirs to be of sufficient capacity, and a quarter of the average available flow of three dry years to be given as compensation, the proportion drawn for purposes of supply would be, on the average of years, approximately 55 per cent., on the average of three dry years 72 per cent., and during the driest year 98 per cent. It does not require any very elaborate calculation to show that the supply which is only 48 per cent. of the flow of a river, during the driest year for more than 80 years, is better secured than when 98 per cent. of the whole flow of the drainage area has to be taken to satisfy an almost identical supply. Although it is herein accepted that, under the conditions of storage recommended by the Royal Commissions presided over by Lords Balfour of Burleigh and Llandaff, the maximum supply to be drawn from the Thames is 400 million gallons a day on the average of a year, it must not be concluded that the capabilities of the river for purposes of supply are thereby exhausted, but that it becomes a serious question whether it is economically desirable to further increase the supply to be drawn from this source.

River Lea.—Lord Balfour's Commission decided that, with the introduction of adequate storage, which is in course of construction, 52½ million gallons a day can be obtained from the River Lea. Twenty-two and a half million gallons daily are taken by the New River Company without storage, 5,400,000 gallons daily must be provided for the use of the Lea Navigation and 30 million gallons per diem are, under the above conditions, available for the East London Company. The average flow of the River Lea, as measured at Feilde's Weir, is about 120 million gallons daily, or 7·11 in of rain run off from an area of 422 square miles. The average rainfall in the Lea Valley is 26·50 in. (Sir John Evans says 26·24 in.), while the average for the last sixteen years has been 23·91 in., or a deficiency of 2·59 in The average run off for the same period has been 6·31 in. of rain, equal to 106½ million gallons a day. The average flow of the Lea during the three dry years 1897, 1898, and 1899, was 78·4 million gallons daily, and during the driest year 42·3 millions. The rainfall for the years 1862-3-4 was 21·80 in., and the run off was at the rate of 4·79 in., or 80·8 million gallons a day. For the years 1863-4-5, the rainfall was 22·88 in., and the run off 4·48 in., or 75·6 million gallons daily. The average ratio of the run off to rainfall is 20·7 per cent.

For the years 1893-4-5, the rainfall was 23·28 in., and the run off was 4·89 in., or 82·5 million gallons a day. The rainfall for the years 1897-8-9, was 23·56 in., and the run off 5·23 in., or 88·2 million gallons per diem. The average ratio of the run off to rainfall is 21·2 per cent. These figures are corroborative one of the other, and it is shown that there is no falling off during the later period in the proportion of the rainfall which finds its way into the river.

Wells in the Lea Valley.

In the Report of Lord Balfour's Commission it is stated that on the average of three dry years 56 million gallons of water may be pumped daily from the chalk basin of the Lea Valley without injury to any material interests, and that during the driest of three dry years 47 million gallons a day may be pumped. In corroboration of these figures, if the average rainfall be 26·5 in., and the loss by evaporation so high as 16 in., the available rain will be 10·5 in., or 177,240,000 gallons a day, but the average run-off of the river is 120 million gallons daily; there is therefore a quantity of 57,240,000 gallons a day which passes down through the chalk basin, and does not find its way into the visible river. Should the loss by evaporation be 15 in. instead of 16 in. per annum, as seems probable, the available rainfall will be 11·5 in. or 194,120,000 gallons daily, and the quantity passing down through the chalk basin 74,120,000 gallons per diem.

Having shown that the available water in the chalk basin is certainly as much as 57 million gallons daily, and may be 74 millions, it is unnecessary to follow the argument further, especially as these figures confirm the conclusions arrived at by Lord Balfour's Commission. Even supposing the pumping during the driest year to exceed the available supply due to the rainfall of that year, a contention negatived in the Report of Lord Balfour's Commission, the reduction in the level of the water in the area below the pumping station due to pumping would be very small, and in the area above the pumping stations it would be non-existent. It is not possible to estimate with any degree of accuracy either the area of the chalk basin below the pumping stations which might be affected by excessive pumping nor the capacity of the chalk for parting with the water contained in its pores and fissures, but it is not unreasonable to calculate that a reduction of level of 1 ft. over the whole area would mean the removal of some 50 million gallons of water daily; thus excessive pumping to the extent of 10 million gallons a day continued for a year would mean a reduction in level of one-fifth of 1 ft. or 2·4 in. Obviously the level is not reduced, if it be reduced at all, regularly over the whole area, but is at its maximum in the line of the wells, decreasing to nil at a short distance above the highest pumping station and laterally from the same station, and widening out lower down in the area: the depression may therefore extend to many inches at the well, although when extended over the whole area it is very trifling. Whatever the reduction of level might be in one year of great drought, in the next year of excessive rainfall it would be made up again and something over.

As regards the area above the pumping station, a little consideration will, it is thought, show conclusively that the effect of pumping cannot extend beyond a limited distance. What that distance is must depend on the nature of the material in which the well is sunk, on the depth of the well, and the level to which the water is reduced in it when pumping.

In a purely chalk formation it is believed that the effect of pumping is seldom felt at a greater distance from the well than a quarter of a mile calculated on the level. When the well is situated at the foot of a steep escarpment, this distance is likely to be exceeded, and the same holds true of a chalk area covered with gravel charged with water, and it is known that the effect of pumping has been felt at a distance of a mile.

Given a well sunk to the bottom of the chalk on to the impermeable stratum below it, given engine power sufficient to pump the well to the bottom, and to continue pumping without intermission from year's end to year's end, not always at the same rate, but so as to keep the pumping level of the water in the well as near the bottom as is practicable, continuance in pumping will not extend the area of absorption, which will only vary from season to season with the level of the water in the surrounding strata. If the level of the water in the district rises, so will it rise in the well; if the level of the water in the district sinks, the water in the well cannot sink lower, for it is already at the bottom; the diameter of the cone of absorption will therefore be reduced and the quantity of water pumped from the well will be decreased. The same principle may be applied to a visible and uncanalised river, and an illustration drawn from such a source may appeal more readily to the mind than where underground and invisible sources are to be considered.

Let a well be sunk in the middle of an uncanalised river, and let pumping machinery be provided of sufficient capacity to lift the whole of the water running down to the pumping station at any time and to transfer it in some other direction. Below the pumping station the bed of the river will be dry for some distance until enough water accretes from the banks, from the bed, and from tributary streams to renew the flow to some limited extent. At the pumping station the depth of the water will be reduced from what it was when the river flowed naturally down its bed. Above and near to the pumping station the velocity of the stream will be increased and its depth reduced, but at some distance, varying with the volume of the water and the depth of the river, the original conditions will be restored. The quantity of water to be pumped may be at the greatest 20,000 million gallons in a day, and at the least 200 million gallons, but this quantity will not be affected by the presence of the pumping station, nor will the flow of the river be altered even fractionally by the pumping, how long soever it may be continued, but will depend as heretofore on the rainfall in the drainage area.

What is true of pumping from a visible river is true also of pumping from wells sunk into the chalk. In the river the depth of the water is limited; but its flow being only resisted by surface friction the gradient of approach is flat; in the chalk the depth of the well may be great, 400 ft. or more, but the water having to pass through innumerable small fissures, the resistance to its approach to the well is great and the gradient of approach is steep, probably one in ten or thereabouts; but whatever the gradient may be it remains constant so long as the vertical distance from the surface to water near the bottom of the well remains the same.

There is an undoubted popular belief, which is not however founded on any scientific data, that the flow of the rivers and streams in Hertfordshire is being gradually reduced in volume, the loss being ascribed to the pumping of the New River and East London Companies. When, however, it is found that a supposed falling off in the flow of the river Ver is mentioned in monastic times, that Mr. Homersham speaks of the same thing in 1852, and is again referred to in or about 1864, all being dates antecedent to the pumping of any considerable quantity of water from the chalk basin, some other explanation of the phenomenon, if there be one to explain, must be looked for, and is to be found, in the meteorological conditions of the later period referred to. Mr. Homersham probably had in his mind some former period of drought, as the year 1852 was near the termination of a period of wet seasons; but the year 1865 came at the end of twelve years of less than average

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rainfall, and the year 1899 terminated a similar period extending over sixteen years. As the river Ver, for instance, fluctuates in the position of its source by five miles, and other rivers fluctuate in a similar manner, though to a less degree, between high and low water periods, it is not perhaps to be wondered at that what happened in 1883, and again in 1897, when these rivers rose at their highest points, is lost sight of, and when some years later the source is miles lower a fear is aroused that what happened in 1883 and 1897 will never happen again. Exactly the same fear was felt and given expression to in 1891-2-3, yet its falsity was set forth so soon after as 1897; nevertheless, so wedded have the people become to an unfounded belief that the same story is produced in 1898 and 1899. Some words of apology are necessary for the length to which this argument has been followed, but as it is desired to show conclusively that the districts from which the water supply of the Metropolis is to be drawn will not be injuriously affected by its abstraction, it is necessary to go into the matter in some detail.

Wells in the Thames Valley.

The chalk area in the Thames basin above the intakes of the water companies is 1,005 square miles, which may probably be increased to 1,400 square miles by areas which drain on to the chalk. Following the figures of the basin of the Lea, where the area contributing to the chalk is 352 square miles, if this area can afford 47 million gallons a day during the driest year, 1,400 square miles will supply 187 million gallons a day; but the rainfall in the Thames Valley is 28·5 in., or 2 in. greater than that of the Lea, and the yield of the chalk area must be raised in the same proportion to 201 million gallons a day. The Report of Lord Balfour's Commission says that any such abstraction will probably be at the expense of the springs and streams feeding the Thames. Against this contention it may reasonably be argued that the conditions in the two valleys are identical, and on this basis it can be shown that this or a larger quantity is available.

The area of the Thames basin is 3,766 square miles, the average rainfall 28·50 in., and if the loss by evaporation be taken on the average at 16 in., the run off should be 12·5 in.; the actual run off is, however, 9·7 in., therefore there are 2·8 in. of rain on an area of 3,766 square miles, equivalent to a quantity of 422 million gallons a day absorbed into the ground, but which does not find its way into the river, and is therefore available for supply without injury to the river.

On the average of three dry years the rainfall will be 24·5 in., and taking evaporation at 14·8 in. the run off should be 9·7 in.; it is, however, about 6·8 in., therefore 2·9 in. or 437,000,000 gallons a day are available.

During the driest year the rainfall is about 21·00 in., and taking evaporation at 14 in., the run off should be 7·00 in.; it is, however, 4·3 in., therefore 2·7 in. or 437,000,000 gallons a day are available for supply, and it is shown that the estimate of 200,000,000 gallons daily, derived from a comparison of the Lea Valley with that of the Thames, is a conservative one. From the Kent Company's district Lord Balfour's Commission estimated that 27½ million gallons a day may be pumped, and from the chalk area of Kent outside the Kent Company's district 123,000,000 gallons daily.

Besides the areas referred to above, there are others in Sussex, Surrey, Hampshire, and Wiltshire, from which an additional supply might be procured, which would considerably augment the available sources to which special reference has been made and which are:—

	Million gallons a day.
From the River Thames	400
From the River Lea	52½
From wells in the Lea Valley ...	47
From wells in the Kent Company's district	27½
From wells in Kent outside the Kent Company's district, say	110
From wells in the Thames Valley ...	200
Total	837

The sources of supply tabulated above, without consideration of those which exist in Sussex, Surrey, Hampshire, and Wiltshire, are therefore sufficient for the supply of a population of nearly twenty-four million persons with 35 gallons of water per head per diem, and are much more than sufficient to supply the population which, on the basis of calculation adopted by Lord Balfour's Commission, might possibly have to be provided for in the year 1961, or more than sixty years hence.

It is hoped that sufficient has been said to prove that the sources of supply within a moderate distance from London are more than enough to provide water for any population which may reasonably be expected to be congregated within the Metropolis, while providing amply for the requirements of the areas other than those above the intakes of the companies, from which the supply will be drawn. When the population to be supplied numbers, say fifteen million persons and is still growing, it will be time enough to consider whether an additional quantity of water should be looked for from Sussex, Surrey, Hampshire, and Wiltshire, from Wales or elsewhere.

It has been shown that the population above the intakes of the water companies will not be injuriously affected by the requirements of the Metropolis, however large they may become, while the interests of the inhabitants within the area of supply and to the eastward of the intakes are safeguarded along with those of Metropolitan London itself.

It can be proved conclusively that the bringing of water from Wales of different quality, but no better than that which can be provided from the neighbourhood of London, would be very much more costly than to extend the sources already brought under contribution, while it seems more reasonable to use up the nearer supplies first, rather than to go for a limited supply to Wales and then be obliged to supplement it from the Thames and from wells afterwards.

I cannot but feel that the paper I have ventured to submit to your suffrages is inadequate, that it is already long, even to the extent of tediousness, and yet I have been obliged to omit much of the proof from my arguments. I believe, however, that the more this momentous question is investigated in a spirit of pure research, the more fully will the conclusions which I have submitted be confirmed in all their bearings."

The Chairman said he thought it would be but fair to the reader of such a valuable paper to adjourn the discussion until another date, so as to give members an opportunity of thoroughly studying the paper.

Mr. Rickards, Q.C., said he desired to propose a vote of thanks to Mr. Middleton for his paper, and he agreed that as the subject was of considerable importance, as the paper contained so many figures, and as the subject had so many sides to it, it was desirable to defer the discussion until another date.

Mr. H. Lovegrove said he heartily seconded the vote of thanks, although he did not agree with some of the conclusions of the author. The subject was of the greatest importance to the inhabitants of the metropolis, especially if the population were to increase to anything like the extent estimated. For his part, he doubted whether it would, and there were already indications that it was not increasing so rapidly. He was not in favour of using the Thames as the chief source of the water supply of London. Although clever chemists told them that the water supply from the Thames was absolutely pure, how could that possibly be the case with such a large population on the banks of the river, and when the river was used in so many ways and as a place of discharge for all sorts of filth? It seemed to him that London would have to go to Wales for a pure water supply. Glasgow was quite a model place as regards its water supply, for although the waste was great the supply was pure. As to waste, that was a matter which should be dealt with by the Local Authorities, who should see that the fittings were of the proper character. There was a great deal of waste in London in consequence of defective fittings and cisterns. As to the "lavish supply" of water in Paris, he had always thought there was a shortage there.

Mr. W. Whittaker, of the Geological Survey, said the question was a peculiar one, because London was placed in a peculiar position, because there was no other large town in England, as far as he knew, which got its supply from its own watershed. London was lucky in being able to get, as it had up to the present, its supply near by. Mr. Middleton said that if it could be shown that the same sources of supply which had been sufficient in the past could, if adequately guarded and under proper treatment, be made sufficient for the future requirements of the population, it would be agreed that no anxiety need be felt for the immediate future. That was all very well, but as the supply was under human control the supply was likely to be inadequately guarded. Opponents to the Thames supply would, at all events, say, "Let us get our supply where there is not the same necessity for guarding." In regard to the water supply of Kent, he thought Kent was perfectly well able to supply itself, and perhaps help neighbouring counties, but the case with Essex was different. It was most difficult to get water in Essex, for, excepting the Lea area, Essex had to depend on wells, and sometimes the supply was not good. Mr. Middleton said that the supply in Essex would suffice for a population of 100,000 in 1961, but only recently two Bills were introduced into Parliament, the projectors of which estimated that long before 1961 the need of Essex would be 14,000,000 gallons a day, and that implied, of course, a good deal more than 100,000 people. Figures were capable of a good deal of interpretation. As to whether the people below the intakes would suffer from any abstraction of water from the river, he did not think the point had been settled. As to waste, he did not think Mr. Middleton need go so far as America, Glasgow, or Paris for his illustrations. The question of waste was one of the most important in connexion with water supply. He believed that there was a great deal of waste in London and in many large towns, and in his opinion 35 gallons a day per head were, for present uses, a great deal more than was necessary in London, and a good deal of those 35 gallons was wasted. Some steps should be taken to stop that waste; perhaps by giving the companies more power in the matter. Mr. Middleton seemed to think that, should the water companies be transferred to a trust, this waste would be put down with a strong hand; that seemed to him (the speaker) to be one of the strongest arguments that could be urged for giving the control to a trust, when any measures taken to stop waste would have the effect of making the water go further. He believed that Mr. Middleton was quite right in the matter. In considering the real value of the Thames for water supply they must remember that the Thames did more than give a water supply. The Thames was not only a river, but it was also a great water park—a great recreation ground for a teeming population, and a very good use for a river, too, though that conflicted to some extent with water supply. In reference to Mr. Middleton's remarks as "to the arguments used against the continued use of the Thames and the Lea," he (the speaker) thought that the argument was rather against the continued extension of the use; very few people would be found to advocate entirely giving up the Thames and the Lea. Mr. Middleton had to acknowledge that there were organic impurities in the water, and of course there were more or less in all waters, but, as a general rule, it was more often found in rivers which flow through a polluted area than streams which were more or less moorland, and which ran through sparsely populated districts. As to Mr. Middleton's remarks as to the existing divisions of the country into counties, unions, and parishes, of course the existing divisions were not made on scientific principles, nor with any regard to water supply, but purely in a territorial manner. It would be a very difficult matter to alter these territorial boundaries, and would be troublesome in many ways. Of course, in the area of the Staines reservoirs it was not a question of area, and if the engineers chose to deepen the reservoirs they could do so with less area. Mr. Middleton spoke of two Royal Commissions, but those were not the only Commissions that had been held, and now we are apparently getting ready for another. He (the speaker) would like to see something practical come out of them. The average flow of the Lea during the driest year was 42 million gallons, and we were now getting, in the case of that river (if we had not already got), to the limit to which water could be got from it. Calculations based upon rainfall and the quantity of water that went into the chalk were not sufficient to enable one to estimate what could be got out of the chalk. As to the wells in the Thames valley, Surrey could take all the water it could get from that source, and it was no use to think of getting water from Surrey for outside purposes. The area of chalk in Surrey was not particularly large,

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while the population was; and they were also strong enought to look after their own interests. Any one who tried to get water out of the basin of the Wandle would find it a rather costly proceeding. As a matter of fact he thought Surrey would have to look for an extension of the London supply in order to cope with its own demands. Any extension of the London supply would have to consider the areas at present considered outside the boundaries of the London Companies, and the big scheme would have to help the little ones.

Mr. Chatfeild Clarke, on behalf of Professor Henry Robinson, moved the adjournment of the discussion.

The vote of thanks having been agreed to, and Mr. Middleton having briefly replied, the discussion was adjourned until January 14.

Illustrations.

THE NATIVITY: DESIGN FOR WALL-PAINTING FOR A CHURCH.

THIS design, which needs no explanation, is from a cartoon by Mr. N. H. J. Westlake, made for execution as a decorative painting on the walls of St. Matthew's Church, Sheffield. It is entitled "Gloria in Excelsis Deo." We are indebted to Mr. Westlake for enabling us, by the loan of it, to present our readers with an illustration specially suited to the present season.

DETAILS OF VARIOUS WORKS BY MR. R. S. LORIMER.

THIS collection shows various designs for small things recently carried out by Mr. R. S. Lorimer, of Edinburgh; a chamber-organ case, two bits of heraldic sculpture, an iron gate and pier, a lodge, and a column to be placed in a garden. The following is a brief description by the architect:—

Gate-house, Balcarres.—This gate-house was erected two years ago at the entrance to a new approach leading to Balcarres House. The work was done by local contractors. The gate was made by Houston & Stewart, Edinburgh; and the stone carving by Mr. Stodart, of Edinburgh.

Organ-case, Ellary.—The organ-case shown was made of oak. The doors were inlaid with a simple design in the form of a diaper. The pipes were of block tin, and the centre pipes diapered with a pattern.

Heraldic Carvings, Minto. — The animals shown are the supporters of the Minto arms, and sit on the ends of the parapet of a bridge in the grounds of Minto House.

The bridge is a single large arch all built in the clean built rubble work customary in the Galashiels district, the only hewn work being the cope and the ends shown.

Pillar in a Garden.—This pillar is the central feature of a small enclosed garden. It is of stone, and wreathed with honeysuckle. The figure is carved of teak wood painted and gilded and screwed on to the top of the pillar with a copper bolt. The figure was carved at the studio of Messrs. D. & J. Clow, of Edinburgh.

PORTION OF THE BANQUETING HOUSE, WHITEHALL.

THIS subject was set by the Royal Academy for the competition in architectural perspective drawing, and the illustration is taken from the drawing by Mr. George Thow Smith, for which the silver medal of the Academy was awarded. We may congratulate the author on having made a very careful and conscientious piece of work, which is valuable as an illustration of the proportions and treatment of a famous example of English Renaissance architecture.

PLAN AND ELEVATION OF AN AMERICAN FRAME-HOUSE.

THESE drawings form a portion of the illustrations to the paper on the American frame-house by Mr. H. Budden, printed on another page, in which they are fully explained.

CHURCH, NEW HINCKSEY, OXFORD.—The new Church of St. John the Evangelist, New Hinckesey, was opened recently. The architects were Messrs. Bucknall & Cowper, Westminster, and the builders Messrs. Kingerlee & Sons.

BLACKBURN POLICE-COURTS AND FIRE-STATION COMPETITION.

THIS limited competition has now been settled by the Corporation adopting the award of the assessor, Mr. A. N. Bromley, of Nottingham. Six firms of architects were invited to compete, each firm being promised a fee of seventy-five guineas if, in the opinion of the assessor, the design was in accordance with the conditions. A hundred and seventy-five guineas, however, were to be paid to the authors of the successful design "should the work for any unforeseen reason be abandoned," but otherwise they would be employed to carry out the work for "the ordinary commission of five per cent." The Corporation—very wisely, we think—did not bind the competitors to a slavish adherence to the schedule of accommodation, but suggested that each should "use a reasonable discretion in preparing his design." The particular portions of the site to be allocated to the different buildings were not specified, this also being "left to the discretion of the competitor." Notwithstanding the latitude allowed, the grouping of the buildings is very similar in all the designs except that by Mr. Hare.

The scheme includes a court house, containing a police-court and a police and sessions court, with all the usual rooms for magistrates, clerks, solicitors, witnesses, and others; and a police department with rooms for the chief constable and other officers, as well as for the police generally, cells for prisoners, mortuary, post-mortem room, ambulance house, &c. In the fire station accommodation was required for seven engines, stable for eight horses in addition to two isolation loose boxes, together with storerooms, workshops, recreation-rooms for the firemen, hose-tower, fire-escape accommodation, inspector's office, &c. A superintendent's house was also required and nineteen houses for firemen. Part of the site was to be used for "a spacious drill-yard," and another part, containing 2,200 square yards, was to be left vacant at the back corner of the site.

The cost of the whole work was limited to 40,180*l.*, namely, 36,000*l.* for the police-courts and fire station, and 220*l.* each for the firemen's cottages. "If a competent builder cannot be found to carry out the work within 10 per cent. of the successful competitor's estimate, the Corporation shall not be bound to remunerate the competitor of the discarded design in any way whatever, and shall be at liberty to employ another architect." This is a reasonable stipulation, and we may say, without any reference to the possibility of its application to this competition, that it would be a good thing if such a condition were sometimes acted upon. Unsuccessful competitors, who have studied economy in their designs, would not then have so often to grumble at the acceptance of a design which cannot be built within 50 per cent. of the stipulated cost.

The site is an irregular pentagon, with the principal frontage (about 400 ft. long) to Northgate; the return frontages are to Blakey Moor on the left and Duke-street on the right, and each of these frontages has a salient angle at about the middle of its length, the rear lines of these angles meeting at a point at the back of the site. Without exception the competitors have placed most, if not all, of the firemen's cottages in Duke-street, and the fire station in the right-hand portion of the front in Northgate, and all (with one exception) have placed the court house in the left-hand portion of the same frontage.

Design No. 1, by Mr. H. T. Hare, is the one which shows most variation from this type. He has placed the court house in the centre of the Northgate frontage, with the police department to the left and the fire-station to the right, the whole forming a continuous building with the tower of the court house for central feature. All the other competitors have designed the fire-station as a distinct building, at a greater or less distance from the court-house block.

By utilising the whole of the frontage in this manner Mr. Hare is enabled to reduce the depth of the front buildings, and to provide a better-shaped drill-yard than any other competitor, but the design as a whole is hardly equal to the author's usual work. The principal entrance of the court house is in the centre of the front, and is approached by a flight of eight steps. The entrance hall is 18 ft. wide and about 100 ft. long, extending to the right and left of the entrance, and would form a convenient promenade for weary witnesses and briefless barristers. Directly opposite the entrance, a top-lighted corridor, 8 ft. 6 in. wide, leads to a back corridor parallel with the front hall, and behind this corridor the magistrates' and recorder's rooms, clerk's offices, and grand jury room are placed, together with a staircase leading down to the magistrates' private entrance in the drill yard. The two courts are placed longitudinally between the entrance hall and the back corridor. The galleries of the courts are aproached by separate entrances from Northgate, but there appears to be no access to these galleries or to the stairs leading to them except through these external doorways. The fall of Northgate from right to left is utilised by placing the police department at a somewhat lower level, and two stories are therefore obtained in this part of the building, although the main cornice is in line with that of the court house. Apparently the charge-room and parade-room must be used as passages from the court house to the rest of the police department. The fire station forms a somewhat similar continuation to the right of the court house, having also two stories, the upper of which contains the firemen's recreation-rooms. The superintendent's house is at the extreme right of the front. The hose tower is placed in the back portion of the front block, and is approached by a passage from Duke-street; we did not notice any provision for the fire-escape, and the stables are only top-lighted. Thirteen cottages front Duke-street; the other six are placed in the centre of the site, and form part of one side of the drill yard. The cottages are planned the wrong way about, the principal entrances (in Duke-street) opening into the sculleries, while the back entrances open into the parlours.

There are many good points in the plans, but they are more than counterbalanced by the defects and by the unsatisfactory grouping of the buildings on the site. The external design is also far from pleasing, the long, low frontage having a monotonous effect, and the central tower being heavy and not worthy of its author.

Messrs. Cheers & Smith (No. 2) submit a design in Mr. Cheers's usual type of German Renaissance—somewhat too exuberant, but undoubtedly effective. The court house, which (with the police department) forms a detached building in the left-hand half of the principal frontage, has a central raised portion with high-pitched roof surmounted by a clock turret, and has low domed towers at the ends and picturesque gables between. The principal entrance to the courts is in the centre of the group, and is approached by right and left external flights of twenty-four steps. It opens into a hall 48 ft. by 21 ft. 6 in., from which the two courts, summons office, and other rooms are entered. Separate external entrances are provided for access to the galleries of the courts, but the position of the courts on the first floor necessitates a great number of steps for access to the galleries. The magistrates', clerk's, and other rooms are to the left and back of the courts, while the police department is principally on the ground floor, an entrance being provided under the principal entrance. The fire station is in the [illegible] hand portion of the frontage, with the hose-tower and fire-escape shelter to the left of the engine-room, and the superintendent's house in the right hand corner of the site. The stables are at the back of the engine-room, opening, of course, directly into it at the head of each stall, and are well lighted from the back. The firemen's cottages are all arranged along Duke-street, and are conveniently planned. The corridors of the police department are inadequately lighted, and there is no airing-yard for the prisoners; but the design as a whole is a good one, both as regards plan and elevations.

Design No. 3, by Mr. J. Glenn Gibson, of London, shows careful planning in the court-house block; the police department on the ground floor of this building is especially meritorious. Two airing yards are provided for male and female prisoners respectively, and the waiting-rooms for prisoners are conveniently placed at the foot of the stairs to the docks, and are separated from the corridor by iron railing and gates. The end of this block towards Blakey Moor has a segmental central projection after the manner of Mr. Mountford's design for the Liverpool Museum. The elevations are of a rather heavy type of English Renaissance, and the effect of the central portion (comprising the two courts), which is

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carried up as a plain attic behind the balustrade over the front cornice, is not pleasing. The fire station as a whole is less satisfactory in plan. The Superintendent's house is on the first floor over the engine-room, and three of the cottages are in the central yard, forming (with two loose boxes, &c.) a detached block.

Design No. 4 is a credit to its authors, Messrs. Sames & Green, of Blackburn, the exterior of the court-house building (in a good type of English Renaissance) being one of the best submitted. The front has a central projection with coupled columns and pediment, and the principal entrance is in this projection and has rusticated columns and a segmental pediment broken in the centre, above which is a window with arched head. The cornice extends at one level along the whole of the front and is surmounted by a balustrade. The plan has several features in common with the successful design, notably the method of arranging the public galleries of the courts as a series of steps rising from the floor of the court, and not as proper galleries. The entrance hall is on the same level as the courts, but the corridors to the right and left of the hall are raised eight steps above this level, and entrance to the galleries of the courts is obtained from these corridors. The arrangement of the fire station is good, but does not call for particular comment. Only eighteen firemen's cottages are provided.

The accepted design (No. 5) is the joint production of Messrs. Briggs & Wolstenholme and Messrs. Stones & Stones, of Blackburn, and there can be little doubt that it is the best design submitted. The plans and elevations are good, the necessary accommodation has been provided (and a little more), and the architect's estimate is 27*l.* 10s. below the limit of cost. The court house block is in the left-hand portion of the front, and the principal entrance is in the centre. This entrance takes the form of a recessed porch, from which flights of five steps lead to right and left vestibules of the same width as the steps; behind these is the entrance hall, 54 ft. long and 19 ft. from front to back. From the back of the hall a wide flight of six steps leads down to a lobby, on either side of which are the principal entrances to the two courts. This lobby has windows opening into an area which separates the back parts of the courts. The galleries of the courts are on the same level as the entrance hall, and are entered therefrom. The witnesses' waiting hall is small, and forms a passage from the entrance hall to the chief constable's Department on the right. There is only one solicitors' room, but this can easily be divided by a partition into two rooms of suitable size. The female witnesses' room and conveniences are in the basement, and adjoining them are other conveniences, presumably for male witnesses and others. The front of the building has two other entrances, one on each side of the principal entrance, that to the left being for the magistrate's clerk and other officials, and that to the right being the entrance to the chief constable's department. The magistrate's private entrance is well placed at the end of the building, in the street known as Blakey Moor. The grand jury room is on the first floor over the entrance hall and vestibules. The chief constable's department is to the right of the courts and corresponds externally with the magistrate's department to the left of the courts. The principal portion of the police department is, however, in a detached building in the rear of the courthouse, but parallel to it, and approached (on the first floor) by a bridge from the chief constable's corridor. The police-van entrance is from Blakey Moor along a passage or yard between the courthouse and the detached police block. The cells are well arranged, and attached to them is an airing-yard for prisoners, with a photographic-room overlooking one corner of it, so that snapshots of the prisoners can be taken without their being aware of it. To the right of the courthouse building is a range of store-rooms, &c., with the end to Northgate, and then follow, in order, the entrance to the drill-yard, hose-tower, and fire-escape shelter, superintendent's house, engine-room, and two firemen's cottages of rather better class than the seventeen in Duke-street. The cleaning shed is placed behind the hose-tower and superintendent's house. The stables are behind the engine-room, and have windows along the back, and over the stables are a hay-loft and the firemen's recreation-rooms; a sliding pole leads down from the large recreation-room to the stables.

According to the author's report, which, by the way, is the only report exhibited with the drawings, the design is in a "somewhat restrained English Renaissance style." The court-house block consists of a central recessed position of rusticated masonry on the ground story with five equal arches, the central one being for the porch of the principal entrance. The upper story is of brick with stone columns between the windows, stone dressings to the windows, and stone cornice and balustrade. On either side of the central portion are projecting pavilions with segmental pediments, and covered with eight-sided cupolas or domes, surmounted by ventilation-turrets. At the two extremities of the front are the one-storied buildings of the magistrates' and chief constable's departments. The fire station is scarcely so satisfactory, but the general effect is decidedly good and is admirably shown by the clever wash perspective.

The sixth design, by Messrs. Woodhouse and Willoughby, of Manchester, is not equal to their usual work. The corridors on the lower ground floor are almost entirely dark; what would be the use of the prism-lights, shown in the floors of the almost equally dark corridors above we really cannot say. The external design is more satisfactory than the planning, but is, we think, somewhat too ambitious for the amount of money to be spent. The arrangement of the buildings on the site follows in the main that adopted by the majority of the competitors.

It will have been gathered from this brief review that the designs as a whole reach a high standard of merit, and the Corporation of Blackburn is, we believe, thoroughly satisfied with the result of the competition. The assessor, Mr. Bromley, has carried out his duties remarkably well.

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION OF IRELAND.—The third Technical Demonstration was held at Sir Richard Martin's large timber stores, Rogerson's Quay, Dublin. About forty members attended and were received by Mr. Alston, who proceeded to give a most instructive lecture on the varieties and qualities of timber. His remarks on the conversion of the log into market sizes were illustrated by numerous diagrams, and practical information as to the defects in timber was conveyed by specimens obtained for the purpose. With reference to the difficulty of obtaining widths of over 13 in. in softer woods, Mr. Alston showed some examples of fir from British Columbia 2 ft. 6 in. wide and 6 in. thick, and almost 40 ft. long. A hearty vote of thanks to the lecturer for his interesting remarks terminated the demonstration, which lasted two hours.

SHEFFIELD SOCIETY OF ARCHITECTS.—On the 14th inst. Mr. H. Stannus attended the usual meeting of the Sheffield Society of Architects and Surveyors at the School of Art and gave a lecture on "Athenian Buildings." Mr. J. Smith presided. A vote of thanks was accorded to Mr. Stannus, on the motion of Mr. C. Hadfield, seconded by Professor Anderson. A ballot was taken and the following gentlemen were elected:—Fellows, Messrs. W. J. Hale and H. L. Paterson; associates, Messrs. G. R. Morris and H. W. Inott; students, Messrs. H. W. Wilson and J. Miller. Three gentlemen were nominated for membership.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—At the meeting of this Society, held at the Westminster Palace Hotel, on December 14, the Chairman, Mr. Percival Marshall, A.I.Mech.E., presiding, a paper on "The Metallurgy of Tin" was read by Mr. J. H. Davy James, Member, of Swindon. In briefly reviewing the history of the subject, the author remarked that tin was without doubt one of the articles of commerce of the Phœnicians, who obtained it from Britain and from that part of the British Isles now known as Cornwall and Devon. Several charters were given to the Cornish mines, and in the reign of Edward I. the Stannary laws were instituted, some of which are even now in force. England enjoyed the monopoly of the tin trade up to the eighteenth century. In the early part of that century tin was discovered in Bohemia and in the island of Banca. Mines of tin are fairly widely distributed over the earth's surface, being found in the Malay Peninsular, Australia, United States, Mexico, Chili, and Brazil. Europe contains workings at Saxony, Austria, Gallicia, and Vauby in France. The chief mining district in England lies between Truro and Land's End in Cornwall, the most important mine being Dolcoath, which is now 600 fathoms deep and employs 1,500 hands. Although retaining a great deal of old-fashioned plant, it has kept well up to date, and now possesses effective batteries of Californian Stamps and about forty Frue Vanners for dressing the ore. The chief ore of tin, "tinstone" ($Sn.O_2$, sp. gr. 6·9), is found in regular veins or lodes, and also in alluvial formations. The author described some of the appliances peculiar to Cornish tin mining, viz., ladder-ways, man-engines, cages, and skips. The dressing of ores, including stamping, washing, and calcining, were next treated, special reference being made to the Californian Stamp, which was gradually displacing those of the old Cornish type, the main features of both, however, being similar. The important advantages obtained by the use of Frue Vanner concentrating machines, as compared with the old processes of buddling and racking, were pointed out. Calcining was effected in a Brunton's calciner, in the form of a reverberatory furnace, the bed being a circular cast-iron table, 10 ft. diameter, and revolving three or four times per hour. The process of calcination eliminated arsenic and sulphur, the former condensing in flues which were cleaned out every three or four months, the white arsenic formed being saleable. Ores containing wolfram received special treatment, being roasted in a furnace with sulphate of soda, forming sodium tungstate, which was then dissolved in water, leaving tin as a residue. The author then proceeded to describe the reverberatory furnace in which the ore is melted after being mixed with anthracite and a little lime. The first operation took about seven hours. The metal was then tapped, but was still in a very impure state, and had then to go through the refining processes of liquation and boiling. A description of the blast-furnace used in Saxony followed, and it was stated that the loss by this method was about twice as great as that by the English method. The Cornish method of assaying tin ores was then touched upon, and the various properties of the metal were dealt with, including tenacity, ductility, and conductivity, with reference to heat and electricity; its industrial applications were considered; the process of tin plating was described, and reference made to tests applied to tin plates to ascertain their quality. The various alloys of tin and copper were fully dealt with—bronze, gun-metal, bell-metal, speculum metal, &c. Phosphor-bronze and its uses in engineering were entered into, and the paper concluded with questions relating to the application of tin to the manufacture of fusible alloys. A discussion followed the reading of the paper, and a vote of thanks having been accorded the author, the proceedings closed with the announcement of the ensuing meeting on January 25 when a paper on "Railway Construction" would be presented by Mr. Alexander Ross, engineer to the Great Northern Railway.

CIVIL ENGINEERS' ASSOCIATION, ABERDEEN.—At a meeting of those interested, held in Gordon's College on December 14, it was agreed to incorporate the members of the civil engineering profession in the city and district into an association. Mr. James Barron, C.E., presided, and the leading resolution was proposed by Mr. G. Gordon Jenkins, C.E., and seconded by Mr. R. G. Nicol, C.E. Mr. W. Simpson, assistant harbour engineer, Aberdeen, was appointed hon. secretary.

COMPETITIONS.

ALMSHOUSES, GILTBROOK, NOTTS.—In a limited competition for almshouses, Giltbrook, Notts, the design submitted by Mr. A. R. Calvert, Nottingham, has been placed first by the assessor, Mr. A. N. Bromley, and the trustees have accepted his award. The first block of eight houses are to be proceeded with immediately.

SCHOOL, DALKEITH, EDINBURGH.—A new Burgh school is to be erected on the site of Mushet's Iron Works, Dalkeith. Mr. T. T. Paterson, of Edinburgh is the architect.

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WORKING RULES FOR BRICKLAYERS IN THE LONDON DISTRICT.

THE following is the complete list of the working rules for bricklayers recently agreed upon between the London Master Builders' Association and the Operative Bricklayers' Society :—

"1. That the working hours in summer shall be fifty per week for forty weeks.

That during twelve weeks of winter, commencing on the second Monday in November, the working hours shall be for the first three weeks and the last three weeks forty-seven hours per week, and during the six middle weeks forty-four hours per week.

HOURS OF LABOUR.

SUMMER.	WINTER.
For Forty Weeks.	*For Twelve Weeks.*
First five days of each week, 6.30 a.m to 8 a.m., 8.30 a.m. to 12 noon, 1 p.m. to 5 p.m. Saturdays, 6.30 a.m to 8 a.m., 8.30 a.m. to 12 noon. Equal to fifty hours per week.	For three weeks commencing the second Monday in November :— First five days of each week, 7 a.m., to 8 a.m., 8.30 a.m. to 12 noon, 12.30 p.m to 4.30 p.m. Saturdays, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon. Equal to forty-seven hours per week.
	For the next six weeks :— First five days of each week, 8 a.m. to 12 noon 12.30 p.m. to 4.30 p.m. Saturdays, 8 a.m. to 12 noon. Equal to forty-four hours per week.
	For the following three weeks :— First five days of each week, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon, 12.30 p.m. to 4.30 p.m. Saturdays, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon. Equal to forty-seven hours per week.

2. That the present rate of wages shall be advanced *one halfpenny* per hour, *commencing on January 1, 1901.*

3. That overtime when worked at the request of the employers, but not otherwise, shall be paid at the following rates, namely :—From leaving-off time until 8 p.m., time and a quarter ; from 8 p.m. to 10 p.m., time and a half ; after 10 p.m., double time. No overtime shall be reckoned until each full day has been made, except where time is lost by stress of weather. On Saturday the pay for overtime, from noon to 4 p.m., shall be time and a half ; and after 4 p.m., and Sunday, double time. Christmas Day shall be paid for the same as Sunday.

Workmen engaged on a night gang shall be paid one penny per hour in addition to the ordinary rate of wages.

4. That one hour's notice be given or one hour's time be paid by either side, on determining an engagement. All wages due shall be paid at the expiration of such notice, or walking time if sent to yard.

In the event of more than *ten per cent.* of the workmen of the trade employed at the job giving notice to leave during any one day (except Saturday), they shall not be entitled to receive their money until noon on the following day.

5. That men who are sent from the shop or job including those engaged in London, and sent to the country, shall be allowed as expenses, 6d. per day for any distance over six miles from the shop or job ; exclusive of travelling expenses, time occupied in travelling, and lodging money.

6. That payment of wages shall commence at noon, or as soon thereafter as practicable, on Saturday, and be paid on the job. But if otherwise arranged, walking time at the rate of three miles per hour shall be allowed to get to the pay table at twelve noon.

7. That employers shall provide, where practicable and reasonable, a suitable place for the workmen to have their meals on the works, with a labourer to assist in preparing them.

8. That wages earned after leaving-off time on Friday, and Saturday only shall be kept in hand as back time.

9. That the term "London district" shall mean twelve miles radius from Charing Cross.

10. That if application be made to any employer by the Central Committee of the Operative Bricklayers' Society to discharge any workmen on the ground that such workman is obnoxious, and the employer refuses to accede, no strike shall be sanctioned, but the question shall be referred to the decision of the Board of Conciliation. Provided always that no such application shall be made in consequence of such workman belonging or not belonging to any trade society.

CONCILIATION RULE.

(*a*) For the adjustment of all disputes and to avoid stoppage of work, it is agreed that upon a difference arising between an employer, or upon the works of an employer, and any of his workmen from any cause whatever, notice shall be given by the Association or Society of the complaining party to the Association or party representing the other side, and the subject matter of dispute shall thereupon be referred to the Board of Conciliation which shall be summoned within seven days, and, if practicable, shall give its decision within the next six working days, proceeding in the following manner :

(*b*) For all purposes of the foregoing rules the Board of Conciliation shall consist of three members nominated by the employers and three by the workmen. Each party shall send to the other within one week from the date of signing these rules and within one week from January 1 in each year, the names of six persons from whom three shall be selected to act as their representatives on the Board of Conciliation for the current year ending December 31, and in the event of the death or resignation of any member, either party shall appoint another member within one week, notice being given thereof. The number of representatives of the employers and of the workmen on the Board of Conciliation shall always be equal and shall be so maintained during the sitting

(*c*) The Board of Conciliation so constituted, if unable to agree, shall make application to the Board of Trade under the "Conciliation Act, 1860," or apply for the appointment of a person to act as conciliator.

The Board of Conciliation shall have power to decide all questions arising between the employer and the workmen, including any questions between one trade and another as regards demarcation of labour or other matters, provided that for the decision of any question involving claims or rights of other sections of the building trades a Joint Conciliation Board shall be constituted of the three representatives nominated by each trade involved and by a similar number of representatives of the employers, so that members on the Joint Conciliation Board may be specially represented on such board, and so that the number of representatives of the employers and of the workmen on such Joint Conciliation Board shall be equal and be so maintained during the sitting.

(*d*) A Joint Conciliation Board shall have the like powers as a Conciliation Board and shall be regulated in the same manner.

(*e*) The Conciliation Board or a Joint Conciliation Board shall have power to make such rules and regulations for the transaction of business as they may approve.

(*f*) In the event of an application being made to the Board of Trade or a person being appointed as Conciliator the decision of such person or the Conciliation Board shall be final and binding on both parties.

N.B.—Throughout these rules *Employer* means a Member of the London Master Builders' Association, and *Workman* means a Member of the Operative Bricklayers' Society.

11. That six months' notice on either side shall terminate the foregoing rules.

Signed on behalf of the Bricklayers on December 11, 1900.

Signed on behalf of the L.M.B.A. on December 11, 1900.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday in the County Hall, Spring-gardens, Alderman W. H. Dickinson, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend the Battersea Borough Council 7,800*l.* for street improvement, 3,305*l.* for paving and sewer works, and 20,000*l.* for electric lighting purposes ; the Woolwich Borough Council 20,000*l.* for electric lighting and dust destructor works ; and the Paddington Guardians 5,900*l.* for the provision of a home for children.

Rise in Wages.—The same Committee reported that they had received a request from the Footway Masons' and Carriageway Paviors' Trade Protection Society, asking that the Council's list of rates of wages and hours of labour might be amended by increasing the rate of wages of granite sett paviors from 9d. to 10d. per hour. There was, the Committee stated, no association of paviors' employers, and no rate had been agreed upon by masters and men, but from inquiries made they had ascertained that the rate in practice obtained for this description of work was 10d. per hour. They therefore recommended that the Council's list of rates of wages and hours of labour be amended by increasing the rate of wages of granite sett paviors from 9d. to 10d. per hour.

This was agreed to.

The Works Department.—The Finance Committee brought up the half-yearly return of works completed by the Department. These showed an estimated cost for eighteen works of 53,148*l.*, and a final cost of 53,303*l.*—a deficit of 155*l.* The approximate expenditure on estimated works for the half-year was 152,000*l.* Out of the eighteen works completed during the past half-year, ten have been executed at less cost than the respective estimates as finally revised, and the resulting saving to the Council works out at 2,746*l.* 13s. 4d. On the other hand, eight jobs have cost altogether 2,901*l.* 15s. 4d. more than the final estimates. It was stated that the amount of work done by the Department since its creation had cost 1,137,242*l.* 14s. 2d., or 64,694*l.* 17s. 11d. above the final estimate. The works commenced under the direction of the present management and completed during the past three and a half years show the following result :—Final estimates, 278,577*l.* 11s. 2d. ; actual cost, 272,018*l.* 4s. 4d.—showing a saving of 6,559*l.* 6s. 10d., or 2·35 per cent.

At the present time the Department has twenty-four works in progress (exclusive of jobbing works), representing a total estimated cost of 571,056*l.*, the principal items being :—

Work.	Amount of Estimate.	Approximate Expenditure to Sept. 30, 1900
	£	£
Horton Asylum.....	288,745	 22,330
Hackney-wick	127,800	 93,824
North Woolwich drainage	48,000	 50,438
Barking sludge tanks	20,550	 19,886
Six fire brigade stations...	45,397	 28,074
Artisans' dwellings (Wellesley Buildings)	17,450	 9,470

There are also nine other works not begun on September 30 ; the estimates for these works amount to 43,266*l.*

Mr. Bruce suggested that the discussion might be adjourned pending complete Reports from different Committees.

Mr. Cousins said that while the apparent deficiency was not large, yet there had been many instances where the Works Department had refused to do the work because they considered the estimate too small ; and yet, when given out to contractors, a saving on the architect's estimate had been effected. Yet, bearing in mind that the Department only took work where they considered the architect's estimate sufficient, still there was a deficiency of 155*l.* In seven works out of the eight carried out for the Main Drainage Committee there was a loss amounting to about 2,000*l.*, while on the eighth job there was a profit of 1,900*l.*—a very useful balance. On the whole of the work carried out since the inception of the Department there was a loss of 64,600*l.*, so that now the Department stood in the position of an undischarged bankrupt.

Mr. Dew contended that the Report was satisfactory, inasmuch as a great deal of the work was done under a schedule of prices which was framed years ago, when both materials and labour were much cheaper.

The Report was then adopted.

Asylums and Drainage By-Laws.—The Public Health Committee recommended that the Local Government Board be informed that in the opinion of the Council no useful object would be served by exempting lunatic asylums in London from the Council's proposed by-laws as to drainage, and that it should be pointed out to the Board that the drains of those buildings would, even if exempted from the by-laws, still remain subject to the control of the sanitary authorities under the Metropolis Management Act, 1885.

This was agreed to after discussion, as also were the following recommendations :—

"That the Local Government Board be informed :—

(*a*) That the Council has nothing to add to its letter of November 13, 1899, with regard to Mr. Mark Judge's letter respecting the drainage by-laws.

(*b*) That in the opinion of the Council it is not desirable that the confirmation of the by-laws should be delayed in order that they may be considered by the Councils of the metropolitan boroughs, seeing that the vestries and district boards were given the opportunity of making suggestions on the draft, and that their observations have been carefully considered."

Housing Poor Persons.—The Housing of the Working Classes Committee recommended—"That the estimate of 12,500*l.* submitted by the Finance Committee be approved, and that the Council do acquire, under Part III. of the Housing of the Working Classes Act, 1890, a site consisting of about 1¼ acres abutting on Wedmore-street, Holloway-road, Islington.

Mr. Beachcroft moved as an amendment to add the following words :—"For the erection of dwellings to accommodate persons resident in the immediate neighbourhood whose earnings did not exceed 30s. a week."

Dr. Forman seconded the amendment.

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Mr. Waterlow (Chairman of the Committee) said that the suggestion was impractical.

The amendment was defeated and the recommendation agreed to.

The Archbishop's Park.—The Parks and Open Spaces Committee recommended, and it was agreed, that the Council do approve the estimate submitted by the Finance Committee, and do authorise a further expenditure of 2,277*l.* for the completion of the laying out works at the Archbishop's Park, in order that the grounds may be made fully available for use by the public next year.

Homes for Female Inebriates.—On the recommendations of the Inebriates Acts Committee, it was agreed that 20,000*l.* should be spent in the construction of additional buildings for the accommodation of eighty female inebriates on the Farmfield Estate.

Site Values (London) Rating Bill.—Mr. Cornwall moved the adoption of the Joint Report of the Parliamentary and Local Government and Taxation Committees, which recommended that the Sites Values (London) Rating Bill be approved and introduced in the next Session of Parliament. He said that the Bill was for the taxation of ground values. The estimated site value of the County of London was 16,000,000*l.*, and that Bill proposed to levy a rate of 2s. in the £ on the persons enjoying the income from site values. If the Bill was brought into operation, it would mean an income of 1,600,000*l.* per annum. The occupying ratepayer of London paid last year 11,000,000*l.* in rates, and a large portion of that went to maintain the high value of sites. It was proposed by the Bill to use the existing machinery of the Assessment Committees as far as possible, and those Committees would determine the gross rateable value of the sites.

Mr. P. Harris said the Bill must apply to all towns, and was one which must be drafted by the Government. The Government had considered the matter, and had appointed the Royal Commission on Taxation, which would, no doubt, formulate practical proposals. He considered that it was not the time to move in the matter, and he characterised the Bill as a "humbugging Bill." He moved, as an amendment, "That, inasmuch as the Bill lays down no rules to guide the valuer in fixing site values, and does not define the person on whom the rate is to be levied, whether freeholder, leaseholder, or occupier, and overrides existing contracts, the Bill be referred back to the Committee for further consideration."

Mr. Cousins seconded the amendment, which, after a long discussion, was defeated, and the recommendation was agreed to.

Theatres, &c.—The following recommendations of the Theatres and Music Halls Committee were agreed to :—

Deviations as to plans, Athenæum, Shepherd's Bush (Messrs. J. T. Wimperis & Arber).

Alterations for purpose of erecting an organ in the large hall, Battersea Town Hall (Mr. J. T. Pilditch).

Formation of an electric meter chamber by utilising part of the gentlemen's lavatory on the prompt side of the pit level at the Camden Theatre, High-street, Camden Town (Mr. W. G. R. Sprague).

Enlargement of the porter's box at the Coronet Theatre, High-street, Notting Hill-gate, by utilising a corner of the adjacent dressing-room (Mr. W. G. R. Sprague).

Cigar-counter, corner of the o.p. side of the stalls, Euston Theatre of Varieties (Messrs. Wylson & Long).

Restoration after fire of the Grand Theatre, Islington.

The Imperial Hall proposed to be erected at Grove-vale, East Dulwich (Mr. J. W. Brooker).

An alteration in the position of the step leading from the pit to the ladies' lavatory, and also a proposed alteration to the o.p. corridor from the stalls at the London Pavilion, Piccadilly (Messrs. Wylson & Long).

The new Gaiety Theatre, which it is proposed to erect at the junction of the Strand with the west spur of the proposed new road from Holborn to the Strand. The theatre will have seating accommodation for about 1,250 persons, and the plans show that the regulations will be complied with in all respects (Messrs. E. Runtz & Co.).

An artist's room and a private box for the use of the management at Paddington Baths, Queen's-road, Bayswater (Mr. E. B. B. Newton).

An alteration to the pit refreshment saloon at the Tivoli Music Hall, Strand, by cutting off a portion of the counter and building a 9-in. wall across to form a cellar space (Mr. W. Emden).

Tramways.—Replying to Mr. Baker, Mr. Benn said the Highways Committee had not received any reply from the North Metropolitan Tramways Company as to the price at which they would be prepared to sell their lease to the Council.

It was agreed, on the recommendation of the Highways Committee, to advertise for an Electrical Engineer, at a salary of 1,000*l.* a year, to superintend the reconstruction for electrical traction of the whole of the tramways under Dr. Kennedy.

Street Improvement.—It was agreed to contribute one-third of the net cost of the widening of Great Church-lane, between Fulham Palace-road and No. 61, Great Church-lane, such contribution not to exceed the sum of 4,300*l.*

St. Martin's-place.—The Improvements Committee reported as follows :—

"The Council, on November 27, 1900, had before it a Report submitted by us upon a proposal for the widening of St. Martin's-place by the alteration of the steps in front of St. Martin's Church. We recommended that, subject to the Council of the City of Westminster agreeing to retain the platform in the steps on the southern side of St. Martin's Church, the London County Council should contribute, on the usual conditions, one-third of the net cost of the reconstruction of the steps in front of St. Martin's Church in such a way as to increase the width of the footway on the eastern side of St. Martin's-place to about 9 ft., as proposed by the Local Authority, such contribution not to exceed the sum of 270*l.* The Council, however, after debate, did not adopt our recommendation, but passed a resolution as follows :—'That in view of the Report of the Royal Institute of British Architects, this Council is not prepared to take the responsibility of sanctioning the proposed alterations of the steps of St. Martin's Church by contributing any part of the cost.'

We communicated this decision to the Council of the City of Westminster, who have now informed us that they 'have authorised the Surveyor to complete the work subject to the platform on the steps upon the southern side of the church being retained.' It will be observed that the action of the Council in taking the opinion of the Royal Institute of British Architects has not been without effect. We report the facts for the information of the Council."

Tenders.—Tenders for the following works have been accepted :—

Trial boring on the Claybury Estate.—Messrs. Isler & Co., 825*l.*

Supply and erection of an iron and glass roof at the chief Fire Brigade station.—Messrs. Helliwell & Co., 149*l.*

Axles and wheels for steam fire-engines.—Messrs. Shand, Mason, & Co., 222*l.* 14s.

Electric light lamp-standards, Victoria Embankment and Westminster Bridge.—Messrs. Macfarlane & Co., 178*l.* 10s. 6d.

Repair of pumps, Western Pumping Station.—Messrs. R. Moreland & Son, Limited, 243*l.* 18s.

Supply of two propeller tail shafts for the s.s. *Barking.*—Messrs. Clayton, Goodfellow, & Co., Limited.

The Council rose at a quarter to eight and adjourned until January 22.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

AT the meeting of the London County Council on Tuesday the following applications under the 1894 Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated :—

Lines of Frontage.

Islington, South.—A wall and railing to the goods yard on the north side of Barford-street, Liverpool-road, Islington (Mr. R. Venner for the Royal Agricultural Hall Company, Limited).—Consent.

Fulham.—A house on the north side of Gunterstone-road, Fulham, to abut upon Glazbury-road (Mr. W. Cave for Messrs. Squire & Potter).—Consent.

Peckham.—One-story shops in front of Nos. 168, 170, and 172, Rye-lane, Peckham (Mr. W. L. Dowton).—Consent.

Wandsworth.—A block of residential flats, with shops on the ground floor, on the south side of Lower Richmond-road, Putney, at the corner of The Platt (Messrs. Palgrave & Co. for Mr. G. Crowden).—Consent.

Woolwich.—That the application of Mr. R. Stewart, for an extension of the periods within which the erection of eighteen houses on the north side of Bexley-road, Eltham, eastward of Eldersliie-road, was required to be commenced and completed, be granted.—Agreed.

Hackney, North.—Eight houses, with bay windows, on the east side of Upper Clapton-road, Hackney, between No. 174 and Moresby-road (Mr. G. H. Paine for Mr. C. C. Paine).—Refused.

Woolwich.—Four houses at the south-east end of Elm-grove, The Slade, Plumstead (Mr. A. E. Habershon for Mr. J. Stevens).—Refused.

Projections.

Poplar.—A lamp at the side of the Horns and Chequers public-house, Thames-place, Limehouse, to overhang the public way of Thames-passage (Mr. J. R. Johnston for Messrs. Taylor, Walker, & Co.)—Consent.

Dulwich.—The retention of a wood and tile portico at the entrance to No. 11, East Dulwich-road, Dulwich (Mr. G. Kemp for Mr. J. H. Keene).—Consent.

Dulwich.—Wood and tile pents over the entrances to Nos. 1, 3, 5, and 7, Victoria-gardens, Croxted-road, Dulwich (Mr. F. N. Kemp for Mr. F. H. Morley).—Consent.

St. George, Hanover-square.—A bay window and balcony in front of No. 1, Charles-street, Berkeley-square (Mr. R. G. Hammond, for Mr. J. Garlick.—Consent.

St. Pancras, North.—Balconies and four-story bay windows to twenty-four blocks of residential flats in Lissenden-gardens, Highgate-road, St. Pancras, some of which bay windows will exceed in height the width of the street (Messrs. Boehmer & Gibbs for Mr. A. W. Armstrong).—Consent.

St. Pancras, West.—A bay on the flank of No. 10, Cambridge-terrace, Regent's Park, St. Pancras, to abut upon Cambridge-place (Mr. W. D. Caroe for the Misses Batron).—Consent.

Westminster.—A wood and glass porch at the entrance to No. 137, Victoria-street, Westminster (Mr. E. Stones for Mr. A. Simner).—Consent.

Greenwich.—An illuminated sign and two arc-lamps overhanging the public way at the Parthenon Theatre, Nevada-street and Croom's Hill, Greenwich (Mr. E. E. Fetch for Mr. G. C. Best).—Refused.

Width of Way.

Hoxton.†—A boundary fence in front of a workshop on the north side of Hobb's-place, Hoxton-street, Shoreditch, such boundary fence to be at less than the prescribed distance from the centre of Hobb's-place (Mr. G. R. Cherry).—Consent.

Fulham.—The rebuilding of Nos. 9 and 11, Fane-street, North End-road, Fulham (Mr. W. L. Eves for Mr. W. Garner).—Consent.

Fulham.—Additions to the Walham Green Sanitary Laundry at less than the prescribed distance from the centre of Garden-row, Fulham-road, Walham Green (Mr. A. Howard for Mr. A. Chubb).—Refused.

Deviation from Certified Plan.

St. George, Hanover-square.—Deviations from the plan certified by the District Surveyor, under Section 43 of the Act, so far as relates to the proposed rebuilding of No. 1, Charles-street, Berkeley-square (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

Line of Frontage and Width of Way.

Kensington, South.—A two-story workshop in Thurloe-mews, Alfred-place East, Kensington (Mr. H. P. Drew for Messrs. W. D. Hodges & Co., Limited).—Refused.

Gangways Across a Street.

Southwark, West.—The erection across Pump-court of two iron gangways to connect at the first and third floor levels, Nos. 120 to 128 with Nos. 114 to 118, Union-street, Southwark (Messrs. F. Chambers & Son for the General Electric Company, Limited).—Consent.

Width of Way and Construction of Buildings.

Wandsworth.—A covered loading-stage and other buildings at Gothic Wharf, Brewhouse-lane, Putney, with such loading-stage and two of the buildings and the boundary fence at less than the prescribed distance from the centre of Brewhouse-lane (Mr. S. J. May for Messrs. Carlo Gatti & Stevenson).—Refused.

Formation of Streets.

Clapham.—A variation from the plan sanctioned on May 22, 1900, for the formation of a new street, to be named Navy-street, to lead from Manor-street to Elmhurst-street, Clapham, so far as relates to an alteration in the trace of such street (Mr. C. Grey St. John).—Consent.

Clapham.—A variation from the plan sanctioned on May 3, 1898, for the formation of a new street, to be named Voltaire-street, and to lead from Manor-street to Elmhurst-street, Clapham, so far as relates to an alteration in the trace of such street (Mr. C. Grey St. John).—Consent.

Hampstead.—That an order be issued to Mr. C. J. Bentley sanctioning the formation or laying-out of a new street for carriage traffic, to lead from Haverstock-hill to Glenilla-street, Hampstead (for Mr. J. C. Hill and Mr. Bentley). That the name Glenloch-street be approved for the new street.—Agreed.

Dwelling Houses on Low-lying Land.

Greenwich.—Five buildings, to be used wholly or in part as dwelling-houses, on low-lying land situated on the east side of Glenforth-street, Lower Woolwich-road (Mr. E. Houle, for Mr. J. Ludgett).—Consent.

The recommendation marked † is contrary to the view of the Local Authorities.

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METROPOLITAN ASYLUMS BOARD.

THE fortnightly meeting of this Board was held at the offices of the Board, Thames Embankment, on Saturday, Sir E. Galsworthy presiding.

The Works Committee reporting upon Bridge School, Witham, stated that on November 17 they were instructed to consider and report to the Board as to the discrepancy between the surveyor's estimate (650*l.*) and the tender accepted (255*l.*) for cleaning, painting, and other works. The surveyor now wrote that the extraordinary difference in prices was probably due to the fact that the work in question, being largely of a repairing character, it was difficult to estimate with any degree of accuracy, especially as time did not permit of quantities being taken out. The Committee pointed out that the tender accepted and the two next lowest tenders were from country builders, and that the prices at which they would tender at this season would probably be considerably below the normal London prices on which the surveyor was accustomed to estimate. The average amount of the ten tenders received, which ranged from 255*l.* to 627*l.* 18s., was 445*l.* The report was adopted.

BOOKS RECEIVED.

ART CRAFTS FOR AMATEURS.—By Fred Miller. (H. Virtue & Co.)

PRACTICAL LESSONS IN METAL TURNING. By Percival Marshall. (Dawbarn & Ward.)

THE EMPLOYERS LIABILITY ACT AND WORKMEN'S COMPENSATION ACTS. By Alfred H. Ruegg, Q.C. Fifth Edition. (Butterworth & Co.)

EVERY MAN'S OWN LAWYER. By a Barrister. Thirty-eighth Edition. (Crosby Lockwood & Son).

WORKS IN ARCHITECTURE OF ROBERT AND JAMES ADAM. Reprinted by E. Thézard. Book II.

ARCHITECTURAL POTTERY. By Leon Lefèvre. Translated from the French. (Scott Greenwood & Co.)

HANDBOOK FOR TRAVELLERS IN LOWER AND UPPER EGYPT. Tenth edition, revised. Edited by Mary Brodrick, Ph.D. (John Murray.)

A SHORT HISTORY OF RENAISSANCE ARCHITECTURE IN ENGLAND. Abridged edition. By Reginald Blomfield, M.A. (Geo. Bell & Sons)

Correspondence.

To the Editor of THE BUILDER.

ROYAL ACADEMY ARCHITECTURAL DESIGNS.

SIR,—With reference to your remark on the absence of the points of the compass on the plans for "a country parsonage," may I point out that the criticism of the visitor or instructor is made on the original sketches, where the points are shown. In working out the final drawings (sometimes to a large scale) the students often neglect to show them, apparently forgetting that they are the principal element in determining the real value of the plan.

R. PHENÉ SPIERS.

OLD ST. DUNSTAN'S-IN-THE-WEST.

SIR,—To the interesting particulars set forth in the "Note" in your last number, page 533 *ante*, might be added a reference to your own columns of April 25, 1885, containing the late Wm. Loftus Brock's remarks upon the earlier foundations, with an illustration after that of 1737 in West and Toms's "Perspective Views," and to the almost identical cut in the *Mirror*, Vol. XIV. The alcove for the two bells and the two "wild men" was erected upon the flat roof of the St. Katharine's chapel which Thomas Duke built in or about 1421. The clock, the alcove with the figures and bells, and two statues from Lud Gate were re-erected at "St. Dunstan's," outer circle, Regent's Park, built in 1833-6 by Decimus Burton for the Marquis of Hertford, who bought the relics for 200 guineas. The bells may still be heard and, at this season of the year, seen from the park. The "1327" of Mr. Arthur Hawley's account is, of course, an error in transcript for "1237." Richard of Barking was Abbot of Westminster in 1222-46, and prompted Henry III. to build the Lady Chapel there.

D. M.

THE LATE FRANCIS CHAMBERS.

SIR,—The obituary notice of the late Mr. Francis Chambers, in your issue of the 15th inst., includes Paul's Wharf, Upper Thames-street, amongst the list of his works.

These premises have, however, been recently rebuilt for Messrs. Alex. Cowan & Sons, Limited, from our own designs, and it is East Paul's Wharf (No. 26, Upper Thames-street) which should have been ascribed to his firm.

STOCK, PAGE, & STOCK.

LOCAL BUILDING SOCIETIES.

SIR,—Do any of your readers know of any building societies of good standing who are prepared to open branches in country towns under a resident local secretary and with a local surveyor?

BUILDING ENQUIRER.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

21. LIGHTNING—THE ACTION OF LIGHTNING CONDUCTORS—THE PRINCIPLES OF THE LIGHTNING ARRESTERS USED IN TELEGRAPH, TELEPHONE, ARC LIGHTING, AND TRACTION WORK.

IF the inside and the outside of the base of a glass bottle be coated with tinfoil, we get what is called a Leyden jar. On connecting the two coatings to the terminals of a frictional machine, they receive equal and opposite charges of electricity. If now the end of a wire connected to one coating be brought near the end of a wire connected to the other coating, a spark takes place between the two, accompanied by a loud snapping noise. It is universally admitted that lightning is similar to this spark, but, of course, on an enormously larger scale. One of the coatings of the Leyden jar represents the earth, the other an electrified cloud. According to this theory, the difference of electric pressure between a cloud and the surface of the earth during a thunderstorm is measured by millions of volts. When this pressure gets above a certain amount the air gap between the two gets broken down, and a disruptive discharge takes place, diminishing the difference of pressure between the earth and the cloud. The lightning in its course follows the path of least resistance, and what this path is we have now to consider.

If the lightning flash be the same as the spark from a Leyden jar, then it is reasonable to assume that the phenomena which ensues when a Leyden jar is discharged will be likely to happen when a lightning flash strikes a lightning conductor. The following experiment illustrates what happens in the neighbourhood of a metal rod carrying a sudden discharge. Suppose we discharge a Leyden jar through a long thick wire whose other extremity is in contact with the outside coating of the jar. On presenting a knuckle near the rod a spark will often be got from it. If we have a coin fixed on a stick of sealing wax and hold it, insulated in this manner, near the wire a spark will take place between it and the wire when the discharge passes. Again, if we put a piece of thin wire near the thick wire then the discharge will spark from the thick wire to the thin wire and then back again to the thick wire, showing that the discharge prefers to travel by the thin wire for that portion of its journey.

If we only take into account the ohmic resistance of the wire, and neglect its inductance and capacity these phenomena are quite inexplicable. It was neglect of these considerations that led the Lightning Rod Conference of 1882 into several serious errors. For example, they state that "a man may with perfect impunity clasp a copper rod an inch in diameter, the bottom of which is well connected with moist earth, while the top of it receives a violent flash of lightning." Everyone who has received a shock from touching a thick copper rod carrying a Leyden jar discharge, can bear witness that to touch a lightning conductor during a thunderstorm would almost certainly be a fatal experiment. For electric discharges it is the inductance of the path that we have principally to consider and not its resistance. If we have a divided path, the resistance of one branch being millions of ohms and of the other only a minute fraction of an ohm, yet if the latter have the greater inductance, the lightning discharge will take place along the path of higher resistance. This is proved from some of the recommendations of the Lightning Rod Conference. Why, for example, do they insist that the lightning conductor must have no abrupt bends, unless it is because they recognised that the lightning discharge would not go round the corner, but would spark across from one point of the rod to another, so as to avoid going by the more inductive path?

It is owing to the inductance of a circuit that a current cannot be established in it instantaneously. This property of electricity is very similar to the inertia of matter. A finite velocity cannot be given to a body in an infinitely short time. If the barrel of a gun be full of snow it can easily be pushed out with a ramrod, but if we fire it out we run a risk of bursting the gun as the inertia of the snow makes it offer a tremendous resistance to any rapid change in its state. So the inductance of a circuit, although quite negligible when the current is slowly changing, yet offers enormous resistance to any rapid variation of the current. For example, in alternating current work a pressure of 10,000 volts may only produce a fraction of an ampere in the primary of a transformer although the ohmic resistance be only a few ohms.

It is known that the discharge of a Leyden jar is in many cases oscillatory and Lord Kelvin has shown theoretically why this should be the case. The question arises, is a lightning flash oscillatory? but, unfortunately, we have no direct observations on this point. The spokes of a wheel revolving a thousand times a second appear absolutely stationary when illumined by a lightning flash, but this merely proves that the flash is over or the flashes are over in less than the hundred-thousandth part of a second. Neither do the well-authenticated cases where a flash has apparently continued for a second or two prove that it was oscillatory, although it would certainly be easier to explain on this supposition.

Dr. Lodge has proved that there are two important classes of lightning flashes that take place in practice, and it is necessary to distinguish between them, as lightning rods which will protect from one class of flash may not be able to protect from the other class. In the first class of discharge the difference of pressure is gradually established between the cloud and the earth. In this case pointed conductors are very efficient protectors, and can protect conductors at greater altitudes than they are themselves. The stream of electrified air from the point seems to prepare the path of the discharge to itself. He has also shown that a column of heated gases like that proceeding from a kitchen chimney is a likely path for this kind of lightning flash if there be no pointed conductor near. In the second class of discharge the difference of electric pressure is established instantaneously. This case might arise if a flash of lightning took place between two clouds altering the pressure of one of them so much that it instantaneously discharged to earth. In this case he proved that points are not efficient protectors unless they were higher than every other part of the building. Dr. Lodge, of course, did not experiment with actual lightning rods and during actual thunderstorms. His experiments were with Leyden jar discharges and model lightning conductors. The differences between the two kinds of discharge, however, were so marked, and the phenomena observed were so similar to those recorded during actual thunderstorms that we are justified in adopting his conclusions.

Dr. Lodge's experiments prove that the function of a lightning-rod in actual practice is two-fold. It has either to conduct the charge to earth when struck or to prevent a lightning flash at all by the discharge from the points gradually equalising the pressure between the earth and the clouds. That this second action is appreciable is shown by the fact that the erection of a large number of lightning conductors in a neighbourhood diminishes the frequency of lightning flashes. In electrical storms, when the air is dry, such as sometimes happen in America, all pointed objects, such as lightning conductors, trees, &c., make an audible fizzling noise and have brushes of light on them. This shows that all points energetically try to equalise the pressure. When the lightning is accompanied by rain then this action is negligible, and if a flash occur, it is probably an impulsive rush that will strike the highest object in the neighbourhood.

Some soils seem particularly liable to be struck by lightning flashes. Heavy damp soils, such as loam, are the most likely to be struck, whilst a dry chalky soil is rarely struck. In a recently-published United States bulletin the

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relative frequency of strokes on different soils is given as follows:—1 in chalk, 2 in marl, 7 in clay, 9 in sand, and 22 in loam. A house built on a dry, chalky soil, therefore, has not the same need of protection as a house built on damper or heavier ground.

The most frequent fatalities in this country from lightning are to people standing under trees which are struck. In this case the lightning often "side flashes" from the tree to a person, the thickness of the tree offering more inductance to the discharge than the human body. Trees whose roots are near water are particularly liable to be struck. Again, a person in the centre of a field, or crossing the brow of a hill, might possibly be struck, as he would be the highest object in the neighbourhood. In America wire ropes are often used to hang clothes on to dry, and there are many fatalities every year to people taking the clothes off these wire ropes at the beginning of a thunderstorm.

There is not much danger of town houses being struck by lightning, as the gutters and rain-water pipes seem to afford them considerable protection. If, however, they are lofty or in specially exposed positions, then it is advisable to protect them with a lightning conductor. The lightning conductors used in this country are made of copper, but abroad and in America they are generally made of iron. Theoretically, there is not very much to choose between the two. It is stated in most books that the section of an iron rod ought to be eight times thicker than the section of a copper rod; but this is quite unnecessary. The statement was founded on the idea that an iron rod would offer eight times the resistance of a copper rod to an impulsive discharge. It can easily be proved experimentally that it offers practically the same resistance. Tape or stranded conductors are better than solid rods, as they have less inductance. In this climate iron, unless it be extremely well galvanised, does not last well.

The spear or top of a lightning conductor ought to terminate in four or five well-gilded or platinised points, and the lower end should make good and permanent earth by means of an earth-plate, which ought to be buried in a moist spot, and surrounded with a load of coke. The end is sometimes soldered to the water-pipes, which, of course, makes good earth through the water-mains. In one case the lightning conductor was earthed in an artificial pond full of gold-fish, with the result that when the first thunderstorm came all the fish were killed.

Important buildings are usually elaborately protected by means of lightning conductors. Yet even in this case there is a possible danger from side flash to neighbouring conductors, like gas pipes or stove pipes if they happen to run parallel to a lightning conductor. The Hôtel de Ville at Brussels, which is protected by a perfect network of wires, had a narrow escape from being burned down during a thunderstorm, as a spark from a lightning conductor to a piece of metal set fire to an escape of gas.

The question of whether we ought to connect all masses of metal such as lead roofs, rain-pipes, hot-water systems, &c., to the lightning conductors needs special consideration in each case. To connect a metal balcony to the lightning conductor is obviously inadmissible, as a person standing on the balcony would then be a lightning conductor. All vanes, finials, ridge ironwork, &c., on the roof ought to be connected to the conductor. Particular care also ought to be taken that there is a conductor near the kitchen chimney. It must be remembered, however, that the question has to be considered whether it be more advisable to ensure a building against damage from lightning at a trifling cost or to set up a system of lightning conductors which do not necessarily ensure absolute safety, and may possibly be a source of danger unless they are inspected every year.

Telegraph and telephone apparatus are peculiarly liable to be damaged by lightning. During a thunderstorm currents are induced in the overhead wires, which surge backwards and forwards, and the pressure driving them, being high, often sparks through the insulation of the coils of the instruments, creating a short circuit and ruining the instrument. The first lightning protector, or "arrester," as this class of apparatus is generally called, was the comb protector. We have two metal combs, with their points facing and very close to one another where the line joins the instrument. One of these combs is connected to the line, the other to the earth. In ordinary working nothing happens, as the metal combs, not touching one another, have practically an infinite resistance. When, however, electricity surges towards the instrument in a thunderstorm, then there is a divided path for the rush of current either to spark across the combs or to go round through the instrument, which has a high inductance. We have seen that in these circumstances the impulsive rush goes by the path of least inductance, and therefore sparks across the comb. Most other forms of arrester are made on the same principle. The Siemens' arrester, used by the General Post Office, consists of two metal plates separated by a washer of mica, giving a layer of air about one-thousandth of an inch thick. It has in addition a fuse so as to prevent the line being permanently earthed. In telephony Varley's form of arrester is often used. It has two sparking points *in vacuo*, but the principle of it is the same as the others, namely, that the electric rush will go by the path of least inductance.

When overhead wires are used for electric lighting special precautions have to be taken to prevent the electric surges set up during a thunderstorm from either piercing the insulation of the dynamo and so starting a short circuit that might burn out the machine, or sparking to earth, and the high pressure behind the spark maintaining an arc and so creating a dead-short circuit on the whole system. One of the earliest and most effective safety devices employed was the Thomson-Houston. In the Thomson-Houston system of arc lighting the arc lamps are arranged in series, and the pressure may be two or three thousand volts. Hence, if an arc were formed by a spark, the high pressure would maintain it, and there would be a risk of a breakdown of the whole system. The safety devices consist of two strips of copper close together at their lower ends and much farther apart at their upper ends. One of these is connected to the earth and the other to the line. If there is an impulsive rush, it will find its path of least resistance to earth by sparking across at the lowest point of the copper cheeks in the safety device. An arc will be formed at this point, but by means of a strong magnetic field produced by an electro-magnet it is blown upwards until its length is too great for the available pressure to maintain it, and consequently it goes out, leaving the line insulated from earth.

In order to protect the dynamos in the power-house of an overhead system of traction, numerous lightning arresters have to be fixed on the overhead trolley wire. Where thunderstorms are frequent sometimes as many as four arresters to the mile are fixed. The principle of the Ajax arrester is the same as the principle used in the devices we have described for protecting telegraph circuits. We have a path to earth of high resistance and low inductance. In this case two pieces of No. 26 silk insulated brass wire are twisted together, their ends being kept free so that there is no metallic connexion between the pieces of wire; one is connected to the trolley wire through a fuse, and the other is connected to the earth. The twisted portion is protected from the weather by means of a piece of glass tube. When an electric wave is set up in the wire it sparks across the silk insulation and gets to earth. The large current started to earth immediately blows the fuse, and so the trolley wire is insulated again. The melting of the fuse causes a carbon ball to drop, and so puts the next fuse, which is attached to pieces of brass wire, in exactly the same way as the first was, in circuit, and so the arrester is ready to act a second time. Ten or twelve fuses are generally arranged in each arrester.

In the Wurts lightning arrester for use on overhead trolley systems some further principles are utilised. It is known, for example, that a discharge passes more readily over a non-conducting surface like glass or wood than through an equal air gap, and that a pencil mark facilitates this discharge. It is also known that to maintain an arc there must be vapours of the electrodes present. If these vapours are prevented from forming, no arc can be maintained. In the Wurts arrester, two flat pieces of metal are mounted on a wooden block flush with the surface, and charred grooves in the wood connect their ends together. A second wooden block fits closely over the first, so that there is no room for metal vapours to form. One of the pieces of metal is connected to the trolley wire, and the other to the earth. This arrester is found effective in practice, but the resistance between its terminals is only about 50,000 ohms. With 500 volts pressure it will be seen that the leakage continually taking place is appreciable. In an older form of lightning arrester Wurts placed small zinc cylinders on a slab of marble separated from one another by a small air gap, as he found that it was almost impossible for an arc to be maintained between zinc electrodes. He also found three other metals—namely, cadmium, magnesium, and mercury—which he called non-arcing metals, owing to the difficulty of maintainin an arc with them.

In places where thunderstorms are very severe, then, during the progress of a thunderstorm, it is sometimes found necessary to make a large artificial leak on the line itself so as to protect the system thoroughly. In the Westinghouse tank arrester, for example, we have wooden tanks about 2 ft. square and 1 ft. in depth, through which water is constantly flowing. A carbon placed in the water and connected to the trolley wire makes an artificial leak to earth of about ten or twenty ampères, and protects the system. The energy expended in maintaining this leak is about ten horse-power, as the pressure is 500 volts. This, however, is a small price to pay for the safety of the system during a thunderstorm.

OBITUARY.

M. RÉVOIL.—The death is announced, at Marseilles, of Henri Antoine Révoil, at the age of seventy-eight. He was the senior among the Government Architects of France, and his death is a great loss to French architecture, for there is hardly an important town in Provence or Languedoc in which he has not built a church or chapel. He exhibited in the Salon in 1872 drawings of the chapel of St. Gabriel, near Tarascon, of the restoration of the Roman bridge at Chamas, and of the cloister at Frejus. In the great exhibition of 1867 he exhibited a fine series of drawings of the principal architectural monuments of the South of France. In that of 1878 he exhibited the drawings of the church of Bourg-St.-Audeol. He designed the tomb of Mgr. Casterigé at Nimes. He was author of a very interesting work on the Romanesque architecture of the South of France. Among the numerous modern buildings which he carried out, the cathedral of Marseilles is the most important and the best known. A view and description of this fine church, one of the best examples of what may be called the French neo-Byzantine type of architecture, was given in the *Builder* of June 1, 1889. M. Révoil, who was a pupil of Caristie, was created "Officier" of the Legion of Honour in 1878, and was subsequently promoted to the rank of "Commandeur" in recognition of his eminent services in the cause of art.

GENERAL BUILDING NEWS.

RESTORATION OF MORETON SAYE CHURCH, SHROPSHIRE.—This church has undergone restoration. The work has included the rebuilding of the eastern gable, and the substitution of a five-light Perpendicular window in the east wall, in place of the round headed one. A timber porch has been erected over the south doorway. A chancel has been formed in the church by the construction of a carved oak screen. A carved and panelled oak roof has been substituted for the plaster ceiling. The floors have been renewed, and an oak pulpit, choir stalls, and a lectern have been placed in the church. The east window was by Mr. C. E. Kempe, of London. Mr. Bridgman, of Lichfield, was the contractor, and Mr. C. Hodgson Fowler, of Durham, was the architect.

CHURCH, WESTON GREEN, THAMES DITTON, SURREY.—The foundation-stone was laid recently of All Saints' Church, Weston Park-road, Weston Green. At present it is intended to proceed only with the erection of the nave, which will be 56 ft. long and 21 ft. 8 in. wide. A chancel, 25 ft., and two transepts will be added. Accommodation will be provided for 140 worshippers at present, but it will be extended eventually to 220. The building will be of red and yellow bricks, with stone dressings. Mr. A. J. Style is the architect, and Messrs. Wheatley & Sons, of East Molesey, are the contractors.

ST. JOSEPH'S CATHOLIC CHURCH, LEYTON.—The new school-chapel of St. Joseph's, Vicarage-road, Leyton, has just been opened. The new building is of two stories, and the upper one has been fitted up as the temporary chapel until such time as the permanent structure, the site for which is in an adjacent part of Vicarage-road, is erected. The lower story will be used for an elementary school, as also will the other part when it ceases to be used as a chapel. The school will accommodate 352 scholars. The whole building has been erected at a cost of about 2,500*l*. Mr. Guy, of Leytonstone, was the builder, to plans prepared by Messrs. Sinnott & Powell, of Liverpool.

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WESLEY CHAPEL, REDRUTH.—At a cost of nearly 2,000*l.*, Wesley Chapel, Redruth, has been considerably improved. All the old plain-glass windows have been replaced by coloured windows. The seats in the gallery have been modernised and made to correspond with those in the body of the chapel; the old organ has been sold to Messrs. Hele, of Plymouth, who are to supply practically a new one; the rostrum has been repolished; and the walls and ceiling recoloured and decorated. The work has been carried out under the direction of Mr. Horace Collins, architect, of Redruth.

ROMAN CATHOLIC CHAPEL, MOTHERWELL, EDINBURGH.—The new Roman Catholic Chapel, which has been erected by the congregation of the Church of "Our Lady of Good Aid," Motherwell, at a cost of between 11,000*l.* and 12,000*l.*, was opened on the 9th inst. The church, which has been erected in Coursington-street, and adjoining the old chapel, consists of nave, chancel, aisles, side chapels, baptistry, confessionals, and ample sacristy accommodation. The nave is divided into seven bays, and is separated from the aisles by an arcade which supports the clearstory. The chancel, which is divided from the nave by double principals, is apsidal in form. There is a chapel on either side at the chancel end of each aisle. The church is entered at the west end by two doors; there is another entrance in the north wall of aisle; and there is also an exit door at the chancel end of aisle. The west gable is pierced by a five-light window, which is 28 ft. high. In each bay of the clearstory there is a four-light window with traceried head. At the same height in the chancel is a three-light in each bay. The internal length of the church is 130 ft., and it is 62 ft. wide and 64 ft. high. The church will accommodate 1,000 people. Red stone has been used in its construction, and the building will be lighted with electricity. The whole has been designed by Messrs. Pugin & Pugin, architects, London.

BOARD SCHOOL, ST. GEORGE, BRISTOL.—The new Board school at Dean-lane, Moorfields, St. George, Bristol, was opened on the 5th inst. The school is in two blocks and will accommodate 900 children—300 boys, 300 girls, and 300 infants. Pennant stone and freestone dressings are the materials used. Mr. J. Mackay, of Kingswood, was the architect, and Messrs. A. J. Beaven & Co., of Bristol, were the contractors. Messrs. Skinner, Board, & Co., of Bristol, supplied the heating apparatus.

BOARD SCHOOL, RAWMARSH, YORKSHIRE.—The Board school which has been built in the district of Ryecroft, Rawmarsh, was opened on the 3rd inst. The new school adjoins the existing schools, and has a frontage to South-street. Accommodation for 200 children has been provided. The classrooms are divided by a movable partition, so that a large room can be provided when desired. There are separate entrances, cloakrooms, &c., for the boys and girls. The floors of the school are laid with pitch-pine interlocking blocks, and the walls have dadoes of brown-glazed brick. The exterior of the building is faced with Leicester-pressed bricks, with ashlar dressings. The cost has been about 2,600*l.* Mr. J. Platts, of Rawmarsh and Rotherham, was the architect, Mr. G. Pugh, of Rawmarsh, having been the contractor, with several sub-contractors. Messrs. Wright Bros., of Attercliffe, supplied the heating apparatus.

MUNICIPAL OFFICES, KEIGHLEY.—The new municipal offices, Keighley, have been erected by the Corporation in Bow-street. The building, which comprises four stories and basement, stands on the portion of the Town Hall site immediately adjoining the post office, on the North-street side. The plans for the new offices were formally passed by the Town Council on April 11, 1899, and the work of excavating for the foundations was begun about four months afterwards. The Council accepted Mr. John Haggas's design for the building, and the adopted plans for the interior of the premises were those of Messrs. J. B. Bailey & Son. The cost of the building will, it is expected, come within the 10,300*l.* for which the Council obtained borrowing powers. The various contracts have been executed as follows:—Masonry and iron and steel work, Mr. T. Moore; joiner, Mr. Ineson Taylor, Lees; slating, Messrs. T. Nelson & Sons, Bradford; plastering and concreting, Messrs. Bradley, Krischke, & Co., Bradford; plumbing, Mr. Jas. Jackson; heating, Messrs. Bailey & Clapham; painting, Messrs. Tillotson & Harrison; furniture and fittings, Messrs. Simpson & Sons, Limited, Halifax; electric fittings, Messrs. G. H. Woods & Co., Blackburn.

BUILDING IN ABERDEEN IN 1900.—During the year just closing the total of building operations carried on has been about 25 per cent. less than in 1899, and the lull is not likely to end for six months yet. Very few public buildings of any consequence have been completed, and house-building has been restricted mainly to the erection of suburban villas, although a good few business premises of moderate size have been erected during the twelvemonth. The wages both of masons and joiners have been reduced, and many operatives of these classes have left the town, where the number of unemployed is still considerable. It was lately officially announced by Mr. Akers-Douglas in the House of Commons that building operations at the new general post-office for Aberdeen could not be begun till after the middle of 1901. It has also been found that the erection of the new Greyfriars Church cannot be commenced till Whitsunday removal term (May 28) next. It has likewise been found necessary to issue fresh schedules for the proposed new asylum at Newmachar—Mr. A. Marshall Mackenzie, A.R.S.A., architect—near the city, which will delay the commencement of operations for a month at least, while it is not known when the new joint railway-station buildings are to be taken in hand. In the near future, however, the new poorhouse at Oldmill (Messrs. Brown & Watt, architects), for Aberdeen Parish Council, and a new electric station at Ferryhill, for Aberdeen Town Council, are to be contracted for. Numerous private buildings in the older parts of the city will also have to be reconstructed soon, and though the immediate prospect is not very bright, things will look far more hopeful in a few months. The plans of new buildings approved of by the Town Council of Aberdeen during the period from January to December of this year may be classified as follows:—Dwelling-houses, 228; blocks of dwelling-houses and shops, 6; additions and alterations at various premises, 60; shops, 12; factories, workshops, &c., 20; miscellaneous (warehouses, stores, stables, &c.), 38; public buildings, 26. Among public buildings are included additions at eight Board schools, a new R. C. school, and alterations at F. C. Training College, and St. Margaret's School; extension of Aberdeen Fish Market; new meat market, Hutcheon-street; alterations at Aberdeen Art Gallery; alterations at Nazareth Almshouse; additions and alterations, Borough Hall, Woodside mission hall, Correction Wynd, Y.M.C.A. Hall, Union-street, Free East Church, Belmont-street, Drill-hall, Woolman Hill, and Sick Children's Hospital, Castle-terrace; also new life assurance office, Union-terrace, and new church at Ruthriesston. Two large churches have also been finished and opened in the Beechgrove district.

EDINBURGH CITY CHAMBERS IMPROVEMENT AND EXTENSION.—The plans for a further instalment of the general scheme for the extension of the City Chambers were submitted and passed at the Edinburgh Dean of Guild Court on the 13th inst. The new building will extend to Cockburn-street at the north-west corner of the Chambers, and will occupy the ground upon which stood what was formerly known as the City Hotel. The basement will be heavily rusticated, and the two stories above will be in rusticated channelled ashlar. Then there will be a story in broken ashlar, and all above will be in plain ashlar. The building will terminate in the top story in an Ionic order the whole height of the Council Chamber. That will be treated with columns of the same order with entablature and pediment above, the centre part culminating in a group of statuary. The various sub-divisions of the elevation will be treated with appropriate moulded string courses. The most interesting part of the plans passed related to the new Council Chamber. The length of the chamber will be 65 ft., and its width 37 ft., and it will be divided longitudinally into three portions, the centre forming a square in the centre of its length. That by means of columns of the Ionic order will support an entablature of a like order, from which will spring a boldly-covered hemispherical dome of somewhat restricted rise. In the crown of the dome a foliated cupola about 10 ft. in diameter will admit light from the superimposed roof, and the light will be toned down by means of ornamental glazing. From the north end of the room an interrupted view will be obtained towards Princes-street, and over the Firth of Forth; and the south end, where there will be a gallery, will be reserved as a space for the general public. It is understood that the chamber will be used on special State occasions as a banqueting hall, and with that object in view there will be provided a servery and other appurtenances in direct communication with the kitchen. In the centre of the chamber on the west side will be a fireplace with pilaster, entablature, and overmantel designed in keeping with the general character of the apartment. The walnut panelling of the room will be richly treated and the entrance doorways will be panelled with pilaster, trusses, and carved pediments. The chamber will be on the same level as the present meeting place of the Town Councillors. Below the Council Chamber there will be a flat devoted to the officials of the Burgh Court, and on the level of the piazza there will be a room for the meetings of the members of the Dean of Guild Court. On the basement will be a laundry for the use of the building, and behind that to the south a large boiler-house, which will provide the power for heating, ventilating, and other purposes. Access will also be got in connexion with this block to a coal store from which there will be a lift for delivering coals to every part of the building. The intermediate flat over the basement will be occupied as a dwelling-house for the porter. The roof will be constructed of steel, and the building will be rendered fire-resisting throughout. From the street to the ridge of the roof the height of the building will be about 130 ft. The contract for the mason work has been let to Messrs. Turner & Sons, and for the joiner work to Mr. Colin Macandrew. It has been agreed to recommend the acceptance of an estimate, amounting to slightly more than 3,000*l.*, for the rebuilding of the front screen of the City Chambers, the original of which was recently pulled down in connexion with the municipal buildings improvement scheme. The plans for the new arcading show a screen of simple character, and in keeping with the general style of the original arches, but differing in this respect, that the masonry is only half the depth of the old structure. The screen consists of seven arches of stone vaulting—the second arches from the ends respectively being somewhat wider than the others and forming an entrance and an exit for carriages passing into and from the square.—*Scotsman.*

BANK BUILDINGS, TUNSTALL.—The Manchester, Liverpool, and District Bank's new premises, which have been in course of erection opposite the Town Hall, Tunstall, for some considerable time, have just been taken possession of and opened. They occupy a corner site, which has been taken advantage of in the design by having a corner doorway worked up into an angle tower and turret. To the height of the first floor the building is faced with Hollington stone, and above to the roof with buff terra-cotta supplied from Tamworth (Gibbs & Canning). In the interior the walls are lined 12 ft. high with teak panelling; the floors are oak blocks; and the space for the public has a mosaic tile floor. There are strong-rooms, book-stores, lavatories, &c. The upper floors are devoted to the purposes of a manager's house. The general work has been executed by Mr. W. Cooke, builder, Burslem. Messrs. Edwards, of Newcastle, are responsible for the fittings. The whole of the work has been carried out under the direction of and from the designs of Messrs. Wood & Hutchings, architects, of Tunstall and Burslem.

LAUNDRY PREMISES, SHEFFIELD.—A block of buildings has been erected at Sheffield, near to Coniston-road, for purposes of a steam-laundry. The machinery has been supplied by Messrs. Bell, of Bradford. Messrs. Hawksley, Wild, & Co. supplied the boiler. The buildings were erected by Mr. Hancock, of Sheffield, from designs by Mr. W. J. Taylor, of the same town.

THE RYDAL MOUNT SCHOOL, COLWYN BAY.—The new dining-hall of Rydal Mount School, Colwyn Bay, which was formally opened on the 14th inst., has been erected from the designs and under the superintendence of the architect to the school, Mr. T. E. Lidiard James, of London. It follows generally the lines of the old public school halls, the relative positions of the high table, buffets, screens, minstrels' gallery, &c., being retained as far as modern and local requirements allow. The hall, throughout is oak panelled; the screens, gallery, &c., are also in oak; the windows are filled with specially designed lead glazing, a portion of the lights to recessed bays being enriched with heraldic glazing arranged in a chronological sequence. It forms a portion of a scheme, and occupies a middle position between the older portions of the school and the newer parts. When the additional house block is completed, the hall will be the centre feature in the school quadrangle facing the Pwllycrochan-avenue. It is 66 ft. long by 27 ft. wide, the height to the wall-plates being 17 ft. and to the collar 25 ft., and its acoustic properties are excellent. The contract for both hall and additional house is being carried out by Messrs. J. Gethin & Co., of Shrewsbury; the clerk of works being Mr. R. H. Henley.

BUSINESS PREMISES, LEITH.—New offices and bonded stores have been erected at the corner of Coburg and Couper-street, Leith, by Messrs. A. Alexander & Co. The buildings are six stories in height, and were designed by Mr. W. N. Thomson, of Leith.

BUILDING SCHEME, BLACKBURN.—The Blackburn Exchange Hall, with the Exchange Hotel and other property, is to be pulled down, and shops, arcades, &c., are to be erected on the site. Plans have been prepared by Messrs. Briggs & Wolstenholme, of Blackburn.

WORKING LADS' INSTITUTE, WHITECHAPEL.—On Monday evening the 10th inst., this building was re-opened after extensive alterations. It was erected originally from the designs of Mr. George Baines about fifteen years ago in sections, the last portion being a spacious lecture-hall, with swimming bath under. This portion of the property was recently compulsorily acquired by the Whitechapel and Bow Railway Company, and has been pulled down. The remainder of the premises has been remodelled for the purposes of the institute, the old reading-room on the first floor being enlarged by the addition of another room, the two together now forming a large lecture-room, the reading-room being transferred to the floor above. New caretaker's-rooms have been added in the rear, and a new retiring-room to the lecture-room, and the whole premises have been decorated. The work has been carried out under the superintendence of Messrs. George & R. P. Baines, architects, by Messrs. Turtle & Appleton, at a cost of about 1,300*l.*, inclusive of electric lighting throughout.

NEW WORKHOUSE, DONCASTER.—On the 4th inst. the new workhouse at Balby, near Doncaster, erected by the Doncaster Board of Guardians, was formally opened. The buildings, which have cost about 100,000*l.*, are situated near Balby. The site comprises about 30 acres, which provides ample space for future extension, the accommodation of the new buildings being for 600. The buildings

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consist of six groups, viz.:—Entrance building, main building, laundry and boiler-house building, infirmary, lunacy building, and isolation hospital. The entrance building, through the archway of which is the principal approach to the buildings, contains porter's accommodation, receiving wards, and vagrant wards (vagrants of both sexes are provided for, principally on the cellular system). In this building are also rooms in which to store the clothing of the inmates when taken from them on leaving the receiving wards for their respective places in the workhouse. The workhouse proper, or main building, is in the centre, in the front of which are the committee-room, business offices, and master's house, and in the rear of these the dining-hall, kitchen lighted from the roof, scullery, work-rooms, matron's office and stores, bakery, and flour store. Upon each side of the administrative block, and connected by corridors, are the pavilions for the male and female, aged and able-bodied classes, with the necessary dayrooms, officers' rooms, bathrooms, lavatories, and offices. The laundry and boiler-house buildings are placed in a central position between the main building, lunacy blocks, and infirmary. The boiler-house has space for three boilers, and in close proximity to it is the electric light house, with dynamo and accumulator-rooms, the workshops, coal-house, and water tower. The infirmary is in the south-west portion of the site, and is a complete building in itself, and consists of a central building, from which corridors to the left and right lead to the male and female pavilions, which pavilions are divided up into wards for the various class of sick. The nurses' homes occupy the central building, and contain nurses' bedrooms, sitting, recreation-rooms, &c., doctor's surgery, and dispensary. The front of the infirmary wards face the south. All the walls of the wards are of hard, impervious plaster, with glazed brick dadoes of light colour; the lavatories, &c., are lined with glazed bricks. The heating of the large infirmary wards is by hot water and by means of central stoves faced with faience, with horizontal flues in the thickness of the floors, which are supplied with fresh air direct from the outside. The maternity block is in the rear of the infirmary. The lunacy buildings occupy a similar position to the infirmary, but in the south-east portion of the site, and provide accommodation for imbeciles, epileptics, and short period lunatics. The buildings contain wards for the different classes, and padded and attendants' rooms for both sexes. The isolation hospital is a complete building in itself, and has its own nurses' accommodation, washhouse, and mortuary. It is situated in a remote position to the north of the main building. The aged married couples' cottages are on the south side of the main building, and are entirely separate from it. Each of the cottages will have pleasant gardens, with a light metal palisading fronting them. The buildings are faced with bricks and stone dressings, with slated roofs. The corridors and wards in the main buildings have dadoes of salt-glazed bricks, whilst the kitchens and sanitary offices are of cream glazed bricks. The lighting throughout is by electricity. The contractors for the whole of the work have been Messrs. Harold Arnold & Son, of Doncaster, the architect being Mr. J. H. Morton, F.R.I.B.A., of South Shields. The principal sub-contractors have been Messrs. Benham & Sons, Limited, of London, for the principal portion of the engineering; the Keighley Electrical Engineering Company, Limited, for the electric lighting; and Messrs. Dinning & Cooke, of Newcastle-on-Tyne, the heating. Mr. R. M. Robertson has acted as clerk of works.

PRIMITIVE METHODIST CHURCH, SUNDERLAND.—On the 5th inst. the Sunday school building, which, together with a church, has been in course of erection in Cleveland-road, Sunderland, was opened. The church is not yet finished. The school will accommodate over 300 persons, and when completed the church will seat over 460. Messrs. W. & T. R. Milburn are the architects, Mr. John Elrick being the contractor. The total cost will be over 4,000*l.*

HOUSING OF THE WORKING CLASSES, MERTHYR.—Mr. W. O. E. Meade King, an Inspector to the Local Government Board, held an inquiry at the Town Hall, Merthyr, on the 5th inst. into an application by the Urban District Council for sanction to borrow 15,000*l.* for the provision of dwellings for the workingclasses. Mr. T. F. Harvey, the Surveyor to the Council, showed plans of 100 cottages proposed to be erected at Penydarren, on a site which, it was stated, could be obtained on a 999 years' lease at a ground rent of 1½*d.* per square yard. The houses would occupy four new streets and the cost would be 150*l.* per house. It was explained that this was only part of the scheme; the whole scheme was for 500 houses in various parts of the district. The scheme has met with some opposition.

A NEW THEATRE IN SHAFTESBURY-AVENUE.—A site has been taken for a new theatre, to be called the Apollo Theatre, adjoining the Lyric Theatre, by Mr. Lowenfeld, for whom the plans and designs will be made by Mr. L. Sharp.

THE WOOL EXCHANGE, COLEMAN-STREET.—Mr. Francis Witt has prepared designs for a considerable extension of the building in Coleman-street, as an enlargement of the restaurant in the front portion of the basement and ground floors.

SANITARY AND ENGINEERING NEWS.

HEYWOOD SEWAGE SCHEMES.—A special meeting of the Health Committee of the Heywood Corporation was held on the 10th inst., when a scheme for the purification of Heap Bridge district was submitted by Mr. James Diggle, C.E. The scheme was approved, and it was decided to recommend the Town Council to apply to the Local Government Board for borrowing powers for 25,100*l.*, 8,600*l.* being for the Heap Bridge sewage scheme, and 16,500*l.* on account of the sewage scheme at Botany.

THE DRAINAGE OF HOVE.—A Local Government Board inquiry into an application by the Hove Town Council for sanction to borrow 6,000*l.* for works of sewerage was held by Colonel A. G. Durnford, R.E., at the Hove Town Hall, on the 12th inst. It was explained that the money was required for the construction of new sewers from the south end of Goldstone-street, eastward to the intercepting sewer at the bottom of Medina-villas, also for enlarging the small portion of sewer in Sackville-street between Blatchington-road and Portland-road from 2 ft. to 3 ft. in diameter. The scheme was explained by Mr. H. H. Scott, the Borough Surveyor.

SEWERAGE SCHEME, BIRSTALL, LEICESTERSHIRE.—On the 13th inst. Lieutenant-Colonel A. C. Smith, R.E., an Inspector to the Local Government Board, held an inquiry at the National School, Birstall, into an application by the Barrow-on-Soar Rural District Council for permission to borrow 8,250*l.* for purposes of sewerage and sewage disposal for Birstall. The scheme was explained by Mr. Simpson, the engineer.

SEWAGE PURIFICATION SCHEMES, DUMFRIES AND MAXWELLTOWN.—Mr. W. Carter, C.E., Edinburgh, has reported to the Town Councils of Dumfries and Maxwelltown as to the purification of sewage before it is discharged into the river Nith. He recommends a separate scheme for each burgh. The scheme for Dumfries he roughly estimates, would cost 30,000*l.*, and the scheme for Maxwelltown is estimated to cost 14,000*l.*

FOREIGN.

FRANCE.—The six first galleries of the Musée des Arts Decoratifs are in course of arrangement in the Pavillon Marsan, and will be devoted to ancient furniture and other objects of art. They will be opened early in January.——It is announced that, on the proposal of M. Bouvard, the crypt of the Khmer temple, which was in the Colonial Exhibition at the Trocadéro, is to be permanently preserved.——The commemorative medal of the recent Paris Exhibition, designed by M. Roty, is being struck at the Hôtel des Monnaies. On the obverse of the medal the artist has represented the personified figure of the Exhibition handing the torch of progress to Posterity. On the reverse is a garland of roses and laurels, surmounted by a perspective view of the Avenue Nicolas II.——It is proposed to rebuild the Luxembourg Museum with a façade towards the Rue Auguste Comte, opposite the small college of Louis le Grand, behind the Luxembourg. M. Scellier de Gisors will probably be appointed architect, and it is proposed that the façade should be of a very simple character, specially designed to secure good lighting for pictures, a point too much neglected by the architects of the other portions of the building.——The exhibition of the Société des Artistes Français (Old Salon) will be held next year in the new Grand Palais at the Champs Elysées, from May 1 to June 30—a longer period than usual. It is proposed to admit 1,500 pictures, and 500 drawings, in addition to the sculpture. The examination of architectural drawings sent for exhibition will take place on April 3 and 4. No artist will be allowed to exhibit more than two works.——One hundred and fourteen artists have taken part in the competition opened by the Conseil General of the Seine for the artistic decoration of the Mairie of Asnières; the decoration to consist of a landscape painting.——M. Fernoux has been eleeted President of the Société Nationale des Architectes de France, for the ensuing year.——M. Ferdinand Fuchs, architect, of Besançon, has died, at the age of thirty-four. He was a pupil of M. Daumet and M. Girault, and one therefore from whom good work might have been expected had he lived.

INDIA.—The North-Western Railway Company is constructing platforms and sidings for the British and native general hospital at Quetta.——An official publication states that the total area of land irrigated in India during 1898-99 was 18½ million acres.——The foundation stone of considerable additions to the civil hospital at Karachi was recently laid by the Viceroy. The total cost of the new work is estimated at 63,000 rupees.——In view of the unsatisfactory condition of the water main from Lake Vehar to Tansa, supplying part of the city of Bombay, the Corporation have sanctioned as a preliminary measure the replacement of 1½ miles of old pipes by 48-in. steel pipes. Five miles will, in all, have to be ultimately replaced.

MISCELLANEOUS.

BELGIAN CEMENT AND MACADAM.—One of the most prosperous of Ghent industries is the manufacture of cement, cement stones, and similar objects, and the export trade to the British Isles has of late years taken considerable extension. Total exports, which for 1897 were registered at 14,040 tons, increased in 1898 to 21,070 tons, and (as appears from the latest official statistics) in 1899 to 26,067 tons. Although in these totals are included the consignments from the interior of the country, notably from Tournai, the bulk is made up of shipments from Ghent works. Great effort is made to maintain the reputation of the article for quality, and the price at which it can be offered, by reason of cheap labour, secures a ready market in the British Isles and in the colonies. Macadam, which is carried at very low freights, varies in the quantity exported, according as there may be spare room in vessels to receive it. Under these circumstances, it is pointed out, the difference of 5,849 tons more in 1899 than in 1898 assumes no special importance, and the total of neither year equals that of 1897, which was 43,433 tons.

URBAN DISTRICT COUNCIL OF HANDSWORTH.—At the ordinary meeting of the Urban District Council, held on December 12, it was resolved to accept Mr. George Trentham's tender of 1,848*l.* for the making-up of Hutton-road. Fifteen plans, representing fifty-three houses and shops, three alterations and additions, and six new streets, to be called "Avenue-road," "Beverley-road," "Deanscourt-road," "Farnham-road," "Green Hill-road," and "Uplands-road," were approved.

THE VALUE OF STRAND PROPERTY.—Mr. John Troutbeck, High Bailiff for Westminster, and a special jury sat on the 17th inst. for the purpose of assessing the compensation to be paid by the London County Council to the Aërated Bread Company, Limited, for the compulsory acquisition of the lease of their depot, 263, Strand, at the corner of Clement's Inn and immediately adjacent to the Law Courts, the site being required for the Strand improvement. Mr. Littler, Q.C., for the claimants, said this shop was started in 1887, and the lease had six and a half years to run. The rent was 500*l.* per annum for the ground floor and basement, but his evidence would show that the place was worth at least 900*l.* a year, the profit rental being, therefore, 400*l.* The value of the fittings had been agreed at 475*l.* The trade had been steadily progressing. During 1896-7 the net profits were 1,050*l.*, 1897-8 1,137*l.*, and 1898-9 1,321*l.* That was an average of 1,172*l.* per annum. He asked the jury for three and a half years' purchase, making the total sum claimed 6,037*l.* Evidence for the claimants was given by Mr. Douglas Young, a surveyor, Mr. Edward Bousfield, and Mr. Daniel Watney, all of whom agreed that the premises were well worth 900*l.* a year, and the last-named said he considered the property had increased 100 per cent. in value since 1887. Sir Edward Clarke, who represented the London County Council, characterised the claim as an extravagant one, but admitted that the property had increased in value to some extent. Mr. Edmund Farmer, of Cheapside, said he considered 650*l.* a year the full value of the property, and, allowing 900*l.* for profit rent, and two years' purchase of the profits, a sum of 3,500*l.* would amply compensate the company. Mr. James Green, of Chancery-lane, also put the profit rental at 160*l.*, but would give the company only one and a half year's purchase of their profits. He did not deny that the profits might have gone on increasing for another six and a half years, but it was speculation. The jury awarded the claimants 4,225*l.*

THE SANITARY INSTITUTE.—At an examination in practical sanitary science, held in Manchester on December 14 and 15, 1900, four candidates presented themselves, and the following two candidates were awarded certificates:—J. S. Andrew and James G. D. Armstrong.

CAPITAL AND LABOUR.

EMPLOYMENT IN THE BUILDING TRADES DURING NOVEMBER.—The December issue of the *Labour Gazette* reports that during November employment in the building trades fell off to some extent. The percentage of unemployed union members among carpenters and plumbers at the end of November was 3·3, compared with 2·5 in October and 1·5 in November, 1899. The London report states also that the building trades are not so well employed. Returns from 187 branches of eight unions paying unemployed benefit, with a membership of 13,801, show that 517 (or 3·7 per cent.) were unemployed, compared with 2·8 per cent. in October, and 0·7 per cent. in November, 1899. The stonecarvers describe employment as "fair"; the plumbers as "moderate"; the stonemasons, bricklayers, carpenters and joiners, and painters and decorators as "dull"; and the plasterers as "bad." Six disputes commenced during the month, the number of workpeople affected being 831. Four of the disputes were in England and two in Ireland. The dispute in the Northern counties has affected 450 bricklayers. At Rochdale some plumbers refused to work with non-unionists, and fifty have come out. At Birmingham some joiners objected to the employ-

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ment of cabinet-makers on work alleged to belong to joiners, but an amicable settlement has been arrived at. The employment of labourers as wallers led to a strike of masons at Bakewell, but the cause of complaint has been removed. Of the two disputes in Ireland one was in Dublin, where 260 plumbers have come out on strike for an advance in wages of 1d. per hour; and the other was at Cork, and affected nine plumbers, the cause being the alleged deduction from outworking allowance. The outworking allowance has been maintained.

DUNDEE BUILDING TRADE.—About a month ago the master masons of Dundee gave notice to the operatives in their employment of a reduction of 1d. an hour in the wages, the new arrangement to come into effect on February 15. At a meeting of the men on the 10th inst. the employers' communication came up again for discussion. A motion was brought forward that a reply be sent to the employers stating that they do not see their way to agree to the decrease. It was moved as an amendment that the meeting ignore the masters' notice altogether, and on a vote the amendment was carried by a large majority. It was further decided to appeal to fellow tradesmen throughout the country for funds to enable them to resist the action of the employers.

LEGAL.

BAD MORTAR.

AT Stratford Police-court recently, Mr. Charles White, builder, of Leyton, was summoned by the Leyton District Council in respect to some buildings at Sidney-road, Leyton, the walls of which, it was alleged, were "not properly bonded and solidly put together, in good mortar, compounded of good lime and clean, sharp sand or other suitable material." Mr. R. Vincent prosecuted; Mr. F. George defended. Mr. Martin, the building inspector, produced some of the mortar used, which he said was mainly composed of clay and mud, the sand used being very dirty. Mr. George entered a plea of "Guilty." He said that different mortars were used for different jobs, and one of the labourers by mistake used the inferior stuff. As soon as Mr. White heard of it he had the wall pulled down and rebuilt with proper material. The Bench imposed the full penalty of 5*l.*, with 7*s.* 6*d.* costs.

CROW *v.* THE BOARD OF WORKS FOR THE DISTRICT OF WHITECHAPEL.

INSPECTION CHAMBERS UNDER PUBLIC FOOTWAYS.

ON the 10th inst. the case of Crow *v.* the Board of Works for the District of Whitechapel came before a Divisional Court of Queen's Bench, consisting of Justices Kennedy and Darling, on the appeal of the defendants from a decision of Mr. Dickinson, the magistrate, sitting at the Thames Police-court in June last (reported in the *Builder* of June 9, 1900). The case came before the court in the form of a special case stated by the magistrate, from which it appeared that a summons was taken out by the District Surveyor against the Whitechapel Board of Works, for not having given him notice under Section 145 of the London Building Act, 1894, before they began certain works, viz., the construction of a number of boxes or inspection chambers under the streets in the district for the purpose of electric lighting. The general size of these chambers was approximately 10 ft. long by 5 ft. wide inclusive of the brick sides of the structure, and about 2 ft. 6 in. in depth. In some cases the chambers were octagonal in shape, 7 ft. 6 in. in diameter, and 7 ft. in depth. The chambers were constructed with a brick floor and sides 9 in. in thickness, upon which rests the steel joists carrying the manhole covers and paving-stones. The defendants were the Local Authority within the meaning of the Electric Lighting Acts, 1882 and 1888, for the district, and in the year 1892 were granted by the Board of Trade, pursuant to the Electric Lighting Acts of 1882 and 1888, in respect of such district, a provisional order called the Whitechapel District Electric Lighting Order, 1892, which was afterwards confirmed and came into force on June 27, 1892. By Sections 11 and 12 of this order the "undertakers" were authorised to construct in any street any such boxes as might be necessary for purposes in connexion with the supply of electric energy, including apparatus for the proper ventilation of such boxes. The sections further provided that "every such box shall be for the exclusive use of the undertakers and under their sole control, except so far as the Board of Trade may otherwise order, and shall be used by the undertakers only for the purpose of leading off service lines and other distributing conductors, or for examining, testing, regulating, measuring, directing, or controlling the supply of energy, or for examining or testing the conditions of the mains or other portions of the works or for other like purposes connected with the undertaking, and the undertakers may place therein meters, switches, and other suitable and proper apparatus for any of the above purposes. Every such box, including the upper surface or covering thereof shall be constructed of such materials and shall be constructed and maintained by the undertakers in such manner as not to be a source of danger whether by reason of inequality of surface or otherwise." Section 12 further provided that the undertakers should, one month before the commencement of such works, serve a notice upon the Postmaster-General describing the proposed works together with a plan of the proposed works and, in addition, a like notice and plan upon the County Council. The defendants did not before commencing the construction of the boxes in question serve Mr. Crow, as the District Surveyor, with notice of the intended work under Section 145 of the London Building Act, 1894. Mr. Crow's contention was that the boxes came within the definition of "building structure or work" in Section 145, and that the defendants were bound before commencing the work to serve upon him as the District Surveyor a "building notice" as prescribed by the Section. The defendants contended that the Act of 1894 did not apply at all to boxes constructed in streets under the provisional order, inasmuch as the order contained a complete code regulating the materials, situation, and mode of construction of such boxes, and provided a complete machinery for enforcing such regulations, and with which special code and machinery the London Building Act of 1894 was inconsistent. Mr. Dickinson, the magistrate, found as a fact that the boxes so constructed were "buildings, structures, or works" within the meaning of Section 145 of the London Building Act of 1894, and having regard to Sections 72, 201, and 203 of the said Act, he held that the provisions of Section 145 were not inconsistent with the special Act and fined the defendants the nominal sum of 1*s.* and ordered them to pay 10*l.* 10*s.* costs. From this decision the defendants now appealed.

Mr. H. F. Dickens, Q.C., and Mr. Talbot appeared for the appellants (defendants); and Mr. Horace Avory for the respondent (Mr. Crow).

At the conclusion of the arguments their Lordships reserved judgment.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

16,732.—A PRESERVATIVE FOR WOOD: *Berliner Holzcomptoir.*—An emulsion is made by dissolving tar-oil in a solution of soap and then stirring the tar-oil solution with water. For the impregnating compound it is claimed that a much smaller quantity of tar-oil than is customary needs to be employed.

16,747.—PNEUMATICAL MECHANISM FOR LIFTS: *F. G. Gracey and A. A. Gfeller.*—The mechanism is intended for use in regulating the fall of a lift-cage or platform or of a carriage, &c., upon an inclined railway, and so on. In one form two cylinders having separate air inlet and outlet valves are fixed underneath the platform or staging, their pistons being moved by means of crank discs, whose shaft is driven by a pinion that gears with a rack upon one of the guides, the outlet valves become shut with the platform's descent, the air finding escape through a hand-controlled valve; on this wise one can control the maximum rate of descent, whilst the breaking of the lifting-rope or other small damage is obviated. For the automatical opening and shutting of the valves the inventors join the valve spindles together by means of a rocking-frame that comprises a pair of rod-coupled bell-cranks, and other rods joined thereto act in unison with a cam upon the shaft so as to open and close the valves at the ascent and descent respectively; the rack is caused to stop short in order that a block may open the valves as soon as the platform has arrived at the bottom of the well.

16,779.—EXTINCTION OF FIRE: *G. Mills.*—To provide a support for an automatical sprinkler valve is contrived a T-shaped lever, which is sustained by a U-shaped lever in such a manner that the leg of the T rests within the bend of the U, thus constituting a compound lever whose parts a spring retains in their places; a socket soldered upon a tube secures the spring's end, a cooling of the joint being prevented by the use of insulating washers; a pointed screwed pin carries the compound lever upon its underside, and so serves for adjustment of the valve's pressure upon its seating. When the heat of the fire has melted the soldered joint, the compound lever will collapse, and the spring drives off the socket.

16,781.—COLOURING MATTER FOR STONEWARE, GLASS, PORCELAIN, AND SIMILAR GOODS: *R. Zsigmondy.*—For purple, vermilion, and rose lustre colours the inventor prepares solutions of 1 part by weight of gold mixed with from 0·2 to 5 parts by weight of silicic acid in the shape of an organical silicide, the silicide solution being made from an admixture of an alcohol, an essential oil, or a solution of resin, or a mixture thereof with chloride of silicon with evaporation of the chlorine; the addition of resinates, or original compounds of silver, lead, strontium, bismuth, zirconium, &c., will tend to vary the tints or colours; and for fixing the silvery lustre colours, the goods should be heated at a comparatively low temperature within a closed muffle.

16,789.—JOINTS FOR PIPES: *F. G. Pawsey.*—The joint, which is after the spigot-and-socket kind and is intended for drain, stack, rain-water, soil, ventilating and similar pipes, has upon its socket end an inner flange which constitutes a recess into which the stopping can be put and into which the spigot end is to be inserted; the flange should have a bevelled upper edge and be a little shorter than the socket.

16,800.—JOINTS FOR PIPES: *F. Stewart.*—A spigot-and-socket joint for pipes similar to those cited above consists of a strengthening tube made of copper or other metal, which is coated with lead and is fashioned with lugs or tacks. Other lugs are fitted upon a socket, which is put into a mould containing molten lead, the other lead-coated socket is adjusted with the next lying pipe ends. An expansion joint may be provided by fashioning a neck moulding at one end, or at both ends, of the socket.

16,809.—AN INSTRUMENT FOR THE TRACING OF CURVES: *W. Haddicke.*—The contrivance embraces two legs pivoted together and moving, above the hinge, upon a sector to which they may be clamped at any angle; at the upper and free end of each leg or rod is a shoe in which is cut a slot for retaining one end of a flexible strip which can be clamped in the slot and secured therein with a set-screw; the opening of the rods and a shortening of strip produce a flatter curve.

16,822.—FIRE-PROOF FLOORING: *G. Liebau.*—In the sides of hollow blocks are grooves which take metal rods that may have a T or some other suitable cross section; the floor is to be laid upon wooden supports having mortar joints; the blocks may either be built into the wall or extend over it. The metal rods when carried through the walls and provided with washers and nuts will answer the purpose of tie-rods.

16,827.—ASPHALT COMPOSITIONS: *N. D. Blake.*—A compound for paving, roofing, and flooring purposes, and for damp courses, &c., is made up of natural mineral bitumen, fine sand or limestone powder, and a mineral rock asphalt; when needed for paving purposes it may be cast into blocks with grooves for a filling of some bituminous cement, or it should be heated to a semi-plastic condition, spread over a foundation of concrete, and then raked and rolled. By another method the composition is made up with a larger amount of natural bitumen in order that it may be used in a liquid form.

16,856.—A STAY FOR CASEMENT WINDOWS: *T. Sampson and A. H. Attwater.*—The stay, which is notched along its under surface and is passed through a swivelling block carried by the fixed frame, is pivoted at its end to a bracket mounted upon the frame of the window; the opening of the window is prevented by means of a sliding piece that a spring forces upwards into engagement with the serrated notches cut in the stay, but when it is required to open the window one presses the slide downwards with a key for which a hole is made; in a modified form of the contrivance the key is to be inserted into a recess formed in the sliding-piece, the notches being, in that case, cut upon the stay's upper surface.

16,857.—A BRAKE-MECHANISM FOR USE WITH HOISTS, CRABS, PULLEY-BLOCKS, &c.: *C. Whiteley and A. H. Rotham.*—Upon the pulley-block's frame is a spring pawl that will engage with a ratchet-wheel mounted upon the shaft of the worm, a screw having an opposite hand from that of the worm is engaged by a cone which a spiral spring joins to the shaft, a corresponding recess cut in the hub of the ratchet-wheel receives the cone. Whilst the load is being lifted the ratchet-wheel, cone, and shaft turn together, but when it is lowered the cone turns through friction, within the wheel's hub, whilst the ratchet-wheel itself remains locked. The end thrust-plates are made of steel.

16,921.—KEY-HOLE SAWS: *F. E. Fitchew.*—The key-hole saw's blade is curved and has its back bevelled, the teeth are set towards the handle so that, for sawing, the workman draws the tool towards himself, the blade is secured within a socket upon the handle with two screws whereof one serves for a pinching-screw.

16,939.—CONSTRUCTION OF CEILINGS: *P. Esch.*—Into the sides of and from underneath the beams are nailed rabbetted blocks—which are, moreover, recessed and perforated—composed of pumice stone, gypsum, or some similar material, and then gypsum plaster is used for finishing the ceiling; sand or some other non-combustible substance being filled into the intervals between and above the beams. Care is taken that the recesses formed in the blocks are wide enough for taking the head of the hammer that is employed for knocking in the nails.

16,956.—CONDUITS FOR ELECTRICAL CONDUCTORS: *F. F. Bate.*—The conduits, which are made of concrete or other suitable materials, are fashioned with an oval section, the socket flanges being flattened both at top and bottom and bridge-pieces being fitted within them.

16,965.—FLOOR-BOARDS: *F. Gude.*—Dovetailed blocks are laid so as to slide between strips and fillets that are nailed on to the joists, and the boards are screwed to the blocks. The boards are secured in position by the tightening of the screws, and can, moreover, be shifted to one side for a closing of the joints, springs being placed at the ends of the rows for automatically pressing the boards together, the spaces between the skirting boards—which are secured to the walls—and the floor should be filled with luting or wax.

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16,992.—AN APPLIANCE FOR BAND-SAWS: *A. Arnold.*—By this appliance the bearings of the driving-spindles can be adjusted. Around an opening in the framing the inventor places plates, and there are screws (having hexagonal parts) that are to be turned within sockets in the bearing and pressed against the plates.

17,049.—AN APPLIANCE FOR USE IN VENTILATING DRAINS: *E. R. Palmer.*—For driving an exhaust fan water is impelled against blades mounted upon a shaft within the casing, down draught being prevented with a baffle-ring, and the shaft's middle portion being divided with a vertical partition; the central inoperative portion of the fan is stopped up with a disc.

17,080.—APPLIANCES FOR COOKING-STOVES: *J. Harper & Co. and C. Retallack.*—For oil stoves some heat-radiating plates are fastened to the top with curved projections which will engage with the two short cross-bars of the slots at the stove's top; the plates will serve for various purposes, as, *e.g.*, for the heating of irons or as side extension plates. In a varied form the stove's sides are hinged together, so that they may be closed, either obliquely or vertically, or be opened outwards horizontally, a loose top being fitted upon them when closed. The invention is described as being applicable to gas and other stoves.

17,119.—A DUST-COLLECTING APPARATUS: *T. W. Freemen and J. Perry.*—The dust-laden air is caused to flow in a horizontal direction between baffles, from whose smooth surfaces the deposited dust slides down into a conveying-trough beneath; the baffles—semi-circular in section and corrugated—are placed apart in rows in such a manner that the spaces in one row shall be opposite the baffles in the next row, whilst transverse partitions turn the air current away from the collecting-trough.

17,168.—A BAND-SAWING MACHINE: *W. Hartmann.*—The machine is for sawing metal, which remains fixed whilst the band-saw is being fed forwards. The saw is passed over three pulleys whose axes a weight pushes forwards lengthwise, by means of a strap the weight serves to turn a shaft which also presses forwards the shafts of the pulleys by means of levers that are geared together with toothed segments; the specification includes certain variations in the feeding mechanism whereby the toothed segments are discarded for the levers alone.

MEETINGS.

FRIDAY, DECEMBER 21.

Institution of Civil Engineers (*Students' Meeting*).—Mr. C. E. Inglis, B.A., on "The Use of Geometrical Methods in Investigating Mechanical Problems." 8 p.m.

Glasgow Architectural Craftsmen's Society.—"Conditions of Contract" (Mason, Joiner, and Plumber).—Messrs. R. Aikenhead, J. A. Ferguson, and Isaac Low. 8 p.m.

Architectural Association of Ireland (*Technical Demonstrations*).—Messrs. Hudman and Tickell on "Hardwoods" (at the Dublin Timber Company, Limited). 4.30 p.m.

SATURDAY, DECEMBER 29.

Royal Victoria Hall (*Waterloo-road, S.E.*).—Professor Capper on "Niagara Water Power Installation." 8.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

December 8.—By H. DUKE & SON (at Dorchester).

Portesham, Dorset.—The Manor Farm, 760 a. 1 r. 3 p., f. £10,900
Steepleton, Dorset.—Samways Tenement, 83 a. 1 r. 25 p., f. 950

December 10.—By ELLIOTT, SON, & BOYTON.

Cavendish-sq.—8, Upper Wimpole-st., and 8, Devonshire Mews South, u.t. 10½ yrs., g.r. 70*l.* 1,450

By E. J. GILDERS.

Finsbury Park.—148, St. Thomas-rd., u.t. 80 yrs., g.r. 6*l.*, r. 30*l.* 335
Highbury.—132 and 134, Gillespie-rd., u.t. 80¾ yrs., g.r. 10*l.* 10*s.* 470

By GRAVES & SON.

Bromley, Kent.—34 to 38, Stanley-villas, f., r. 74*l.* 8*s.* 850
Bayswater.—48, Richmond-rd., u.t. 46 yrs., g.r. 8*l.*, r. 50*l.* 440
Teddington.—Windsor-rd., a plot of land, with erection thereon, f. 110

By ALFRED SAVILL & SON.

Poplar.—Castor-st., copyhold manufacturing premises, area 15,500 ft. 3,000
Clapham.—121 and 127, Clapham Park-rd., f., r. 120*l.* 2,150

By ALFRED RICHARDS (at Tottenham).

Tottenham.—14 and 16, Vicarage-rd., u.t. 78 yrs., g.r. 12*l.* 12*s.*, r. 54*l.* 360
Vicarage-rd., f.g.r. 19*l.*, reversion in 78 yrs. 310
2 and 4, Louise Cottages, f., r. 39*l.* 455
34, Springfield-rd., u.t. 80 yrs., g.r. 4*l.* 10*s.* 280

December 11.—By KING & CO.

New Barnet, Herts.—1 to 4, Preston Cottages, f. 1,200
Chelsea.—86, Westbourne-st., u.t. 20½ yrs., g.r. nil, r. 45*l.* 380
Brompton.—29, Ifield-rd., u.t. 49 yrs., g.r. 8*l.*, r. 45*l.* 395

By E. & H. LUMLEY.

Beckenham.—53 and 55, Coper's Cope-rd., u.t. 62½ yrs., g.r. 17*l.*, r. 95*l.* 760

By REYNOLDS & EASON.

Poplar.—7, 9, and 11, Alton-st., f. £820
Houndsditch.—16, Gun-sq., f. 710
Aldgate.—2 and 5, Hutchison-st. and 1a, 1 and 2, Hutchison-av., f. 545

By ROUCH, PARKHOUSE, & LUCK.

Hornsey Rise.—514, Hornsey-rd., f., r. 50*l.* 710

By J. S. RICHARDSON.

Bow.—180, Roman-rd., f., r. 79*l.* 1,200
Kentish Town.—51, Victoria-rd., u.t. 34½ yrs., g.r. 5*l.*, r. 50*l.* 400
Pimlico.—56, Hindon-st., and 33, Hindon-pl., u.t. 23¾ yrs., g.r. 5*l.*, r. 43*l.* 550
25, Lillington-st., u.t. 23¾ yrs., g.r. 5*l.* 5*s.* 320

By ROGERS, CHAPMAN, & THOMAS.

Chelsea.—540 and 542, King's-rd., u.t. 28 yrs., g.r. 13*l.* 745
Brompton.—107 and 109, Ifield-rd., u.t. 52 yrs., g.r. 16*l.*, r. 84*l.* 775
160, Finborough-rd., u.t. 64 yrs., g.r. 10*l.*, r. 52*l.* 460

By SIM & RANDALL (at Forest Gate).

Forest Gate.—11 and 13, St. George's-rd., f., r. 56*l.* 750

By J. C. PLATT (at Hammersmith).

Hammersmith.—85 and 87, Shaftesbury-rd., u.t. 52½ yrs., g.r. 12*l.*, r. 78*l.* 845
Acton.—5, Kingswood-rd., f., e.r. 39*l.* 360

By JAMES STRAKER & SON (at Abergavenny).

Clodock, Hereford.—The Great Cwm Farm, 179 a. 2 r. 24 p., f. and c. 2,500
Great Blackhill Farm, 143 a., f. and l. 1,625
Abergavenny, Monmouth.—An enclosure, 2 a. 2 r. 39 p., f. 150

December 12.—By G. F. BOX & CO.

Hoxton.—76, Murray-st., u.t. 41½ yrs., g.r. 4*l.* 4*s.*, r. 35*l.* 375

By H. J. BROMLEY.

Forest Hill.—31, Perry-vale, u.t. 60 yrs., g.r. 5*l.*, r. 70*l.* 1,000

By PHIBBS, GIBSON, & CO.

Dulwich.—160, Rosendale-rd., f., e.r. 65*l.* 760

By ROGERS, CHAPMAN, & THOMAS.

Kensington.—Blythe-rd., f.g.r. 11*l.* 10*s.*, reversion in 29½ yrs. 550

By TOWERS, ELLIS, & CO.

Bayswater.—24 and 30, Westbourne Park-rd., u.t. 44½ yrs., g.r. 18*l.*, r. 170*l.* 2,280
14, Westbourne Park-villas, u.t. 44½ yrs., g.r. 9*l.*, e.r. 55*l.* 700
Paddington.—82, Praed-st., u.t. 21 yrs., g.r. 6*l.*, r. 65*l.* 520
Ealing.—9, Lothair-rd., u.t. 57 yrs., g.r. 5*l.*, r. 26*l.* 200

By WAGSTAFF & SONS.

Paddington.—34 and 36, Ashmore-rd., u.t. 78 yrs., g.r. 12*l.*, r. 80*l.* 890

By DOUGLAS YOUNG & CO.

Kentish Town.—45, Patshull-rd., u.t. 61 yrs., g.r. 7*l.*, r. 48*l.* 600
Wandsworth.—1, Lebanon Gardens, u.t. 77 yrs., g.r. 6*l.* 10*s.*, e.r. 36*l.* 360

By Messrs. SPELMAN (at Norwich).

Norwich.—2 to 6, Eagle Walk, f. 590
Eagle Walk, a plot of freehold land. 115
Allen's-lane, house and market garden, area ½ acre, f. 400

By WYATT & SON (at Chichester).

Sidlesham, Sussex.—Copyhold business premises and house and cottage adjoining 490

December 13.—By H. J. BLISS & SONS.

Bethnal Green.—33, Abbey-st., f. 650
5, Winchester-st., f. 195
11, Ramsay-st., f. 150
214, Green-st., f., r. 48*l.* 655
65, Moss-st., f. 180
St. George's East.—102, Cable-st., f., r. 26*l.* 415

By FAREBROTHER, ELLIS, & CO.

St. John's Wood.—88, Finchley-rd., u.t. 33 yrs., g.r. 4*l.* 1,200
Anerley.—11, Weighton-rd., u.t. 65 yrs., g.r. 15*l.*, r. 55*l.* 300

By GLASIER & SONS.

Hampstead-rd.—68, Oakley sq., u.t. 43 yrs., g.r. 14*l.*, r. 70*l.* 720

By HARDS & BRADLY.

Charlton, Kent.—9, 11, 13, and 15, Fossdene-rd., u.t. 90 yrs., g.r. 18*l.* 1,210
Rotherhithe.—3, Adam-st., f. 190
20, Clarence-st., f. 205

By C. C. & T. MOORE.

Commercial-rd. East.—14, East-st. and 7a, Old Church-rd., f. 710
6 and 8, Stepney Causeway, f., r. 75*l.* 1,350
Limehouse.—112, Elsa-st., f., r. 30*l.* 425
Poplar.—7 to 19 (odd), Broomfield-st., u.t. 52 yrs., g.r. 19*l.* 5*s.* 980
Bow.—62 and 64, Wellington-rd., f. 650
Spitalfields.—23, 25, and 27, Wilkes-st., f., r. 178*l.* 10*s.* 3,550
Bow.—153, Malmesbury-rd., e.r. 32*l.*; also i.g.r's 12*l.* 12*s.*, u.t. 47 yrs., g.r. 16*l.* 16*s.* 300
105, Tredegar-rd., u.t. 58 yrs., g.r. 5*l.* 380
141, Antill-rd., u.t. 62 yrs., g.r. 4*l.* 10*s.* 295
Mile End.—4 and 18, Medway-rd., u.t. 49 yrs., g.r. 8*l.* 640
220 to 226 (even), Devonshire-st., and 1 to 8, May's-bldgs., u.t. 16½ yrs., g.r. 8*l.* 800
Poplar.—Pekin-st., f.g.r. 11*l.*, reversion in 45 yrs. 280

By STIMSON & SONS.

Brixton.—70 to 86 (even), Arlingford-rd., u.t. 74½ yrs., g.r. 76*l.* 10*s.*, r. 376*l.* (in lots) 3,875
Lambeth.—35, Sutton-st., u.t. 15 yrs., g.r. 6*l.* 7*s.* 6*d.*, r. 35*l.* 180
Bow.—148, Turner's-rd., u.t. 60 yrs., g.r. 5*l.*, r. 40*l.* 330
Clapton.—25, Inver-rd., u.t. 78½ yrs., g.r. 5*l.* 170
Walworth.—35 and 37, South-st., f. 640
Peckham.—12, Talfourd-pl., u.t. 58 yrs., g.r. 6*l.*, r. 23*l.* 285
61, Blake's-rd., u.t. 63¾ yrs., g.r. 4*l.* 250

By WM. STEVENS.

Canning Town.—2 and 4, Nelson-st., u.t. 55 yrs., g.r. 20*l.* 190

By J. A. & W. THARP.

Bethnal Green.—3, Bacon-st., 1, 3, and 5, Cygnet-st., also The Champion beer-house, u.t. 45 yrs., g.r. 21*l.* 1,910

By FOSTER & CRANFIELD (at Oswestry).

Oswestry, &c., Salop.—The Ford's Farm, 117 a. 2 r. 35 p., f. £4,375

By T. W. MEPHAM (at Forest Gate).

Forest Gate.—100 and 102, Clova-rd., f., r. 68*l.* 1,220
31 and 33, Studley-rd., f. 585
49, Elmhurst-rd., u.t. 86 yrs., g.r. 3*l.* 10*s.*, r. 26*l.* 230
46, Wolseley-rd., u.t. 86 yrs., g.r. 3*l.* 5*s.* 205
Shrewsbury-rd., f.g.r. 8*l.*, reversion in 95 yrs. 205
Ilford, Essex.—1 and 2, Denver-villas, u.t. 81 yrs., g.r. 8*l.* 215

December 14.—By B. PERCY ABRAMS.

East Ham.—117 and 133 (odd), Roman-rd., f., r. 175*l.* 10*s.* 1,620

By BELLHAM, WILLIAMS, & CO.

Wimbledon.—4, 6, 8, and 10, Norman-rd., u.t. 99 yrs., g.r. 20*l.* 735

By BROWETT & TAYLOR.

Islington.—371 and 371a, Essex-rd., u.t. 47 yrs., g.r. 8*l.* 8*s.*, r. 68*l.* 670
Tooting.—Fortescue-rd., f.g.r. 20*l.*, reversion in 98 yrs. 490
51, Beechcroft-rd., u.t. 65 yrs., g.r. 4*l.* 15*s.* 230
Brixton.—Dalberg-rd., f.g.r. 13*l.* 2*s.* 6*d.*, reversion in 72 yrs. 332

By JONES, LANG, & CO.

City of London.—119, Fleet-st., area 1,530 ft., f., r. 150*l.* 4,350
Kilburn.—81 and 83, Lancefield-st., f., r. 85*l.* 1,150
34 and 36, Salusbury-rd., u.t. 78¾ yrs., g.r. 22*l.*, r. 175*l.* 2,270

By MOSS & JAMESON.

Camden Town.—35, Camden-rd., u.t. 39 yrs., g.r. 12*l.*, e.r. 80*l.* 630

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.			
Hard Stocks	1 16 0	per 1,000	alongside,	in river.
Rough Stocks and Grizzles	1 12 0	,,	,,	,,
Smooth Bright Facing Stocks	2 18 0	,,	,,	,,
Shippers	2 6 0	,,	,,	,,
Flettons	1 10 6	,,	at railway depôt.	
Red Wire Cuts	1 15 6	,,	,,	,,
Best Fareham Red	3 11 6	,,	,,	,,
Best Red pressed Ruabon Facing	5 5 0	,,	,,	,,
Best Blue Pressed Staffordshire	4 7 0	,,	,,	,,
Do., Bullnose	4 12 0	,,	,,	,,
Best Stourbridge Fire Bricks	4 4 6	,,	,,	,,
GLAZED BRICKS.				
Best White and Ivory Glazed Stretchers	13 0 0	,,	,,	,,
Headers	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	17 0 0	,,	,,	,,
Double Stretchers	19 0 0	,,	,,	,,
Double Headers	16 0 0	,,	,,	,,
One Side and two Ends	19 0 0	,,	,,	,,
Two Sides and one End	20 0 0	,,	,,	,,
Splays, Chamfered, Squints	20 0 0	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	14 0 0	,,	,,	,,
Double Stretchers	15 0 0	,,	,,	,,
Double Headers	14 0 0	,,	,,	,,
One Side and two Ends	15 0 0	,,	,,	,,
Two Sides and one End	15 0 0	,,	,,	,,
Splays, Chamfered, Squints	14 0 0	,,	,,	,,
Seconds Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.	

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	,, ,,
Best Portland Cement	38 0	per ton ,,
Best Ground Blue Lias Lime	24 6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12*s.* 6*d.* per yard, delivered.
Stourbridge Fire-clay in sacks, 32*s.* 6*d.* per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	2 0	per ft. cube,	deld. rly. depôt
Bath ,,	1 7	,,	,,
Farleigh Down Bath	1 8	,,	,,
Beer in blocks	1 6½	,,	,,
Grinshill ,,	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,

[*See also next page.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Cottages	Tanfield (Durham) U.D.C.	10*l.*, 5*l*	Jan. 28
*Alterations, &c., to Petty Sessional Court and Offices	Bristol County Council	100*l.*, 50*l*	Feb. 13

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Underground Conveniences	Bradford Corporation	F. Stevens, Town Hall, Bradford	Dec. 26
Flint Road Metal	Wilton (Wilts) U.D.C.	W. H. Musselwhite, Borough Surveyor, Ditchampton, Wilton	do.
Granite Setts	Rochdale Corporation	Borough Surveyor, Town Hall, Rochdale	do.
Alterations, &c., to Council Offices, Woolston, Hants	Itchen U.D.C.	T. A. Collingwood, Surveyor, Bridge-road, Woolston	Dec. 27
Building Works (3 contracts)	Nottingham Corporation	W. Smith, Surveyor, Town Hall	do.
Macadam	East Stonehouse (Devon) U.D.C.	A. W. Debnam, Surveyor, Town Hall, East Stonehouse	do.
Paving and Flagging Belle Vue-street, &c.	Leeds Corporation	City Engineer, Municipal Buildings	do.
Street Paving Works	Salford Corporation	L. C. Evans, Town Hall, Salford	do.
Lime	Haworth (Yorks) U.D.C.	W. Robertshaw, North-street, Keighley	do.
Sett Paving, Green Bat	Alnwick U.D.C.	G. Wilson, Surveyor, Council Offices, Alnwick	do.
Road Works, Edward-street, &c.	Withington (Lancs) U.D.C.	A. H. Mountain, Civil Engineer, Town Hall, Withington	do.
Cast-iron Pipes and Laying, Auchindoors	Port Glasgow Burgh Commrs.	W. R. Copland, Civil Engineer, 146, West Regent-street, Glasgow	Dec. 28
Refuse Destructor, &c.	Salisbury Corporation	A. C. Bothams, Civil Engineer, Municipal Offices, Salisbury	do.
Alterations to Fish Market, Albion-street	Halifax Corporation	J. Lord, Civil Engineer, Town Hall, Halifax	do.
Recreation Ground Works, Exeter	.....	Ellis, Son, & Bowden, Surveyors, Exeter	do.
Alterations to Church, Whitchurch, Salop	.....	W. Webb, Architect, 6, Bargate, Whitchurch	Dec. 29
Sewers, &c.	St. Annes-on-Sea U.D.C.	H. Bancroft & Son, Civil Engineers, 88, Mosley-st., Manchester	do.
Additions to Police Station, Wigton, Cumberland	.....	G. Dale Oliver, Architect, Carlisle	do.
Road Works, Queen's-road, &c.	Hayward's Heath U.D.C.	E. Waugh, Council Offices, Haywards Heath	do.
Road Works, St. John's-road	Knutsford U.D.C.	W. J. Downes, Surveyor, Knutsford	Dec. 31
Cemetery Paths, Road, &c., Tabley Hill	do.	do.	do.
Setts, Kerbs, &c.	Pemberton (Lancs) U.D.C.	P. Partington, Council Offices, Pemberton	do.
Electric Lighting Plant	Leeds City Council	H. Dickinson, 1, Whitehall-road, Leeds	do.
Road Works, College-road, Heswall	Wirral R.D.C.	T. Davies, Surveyor, Eastham	Jan. 1
Additions to Laundry	Kingston-on-Thames Guardians	J. Edgell, Union Offices, Kingston-on-Thames	do.
Quay, The Hythe	Colchester Corporation	H. Goodyear, Borough Surveyor, Colchester	do.
Warehouse, Peckover-street, Bradford	.....	Milnes & France, Architects, Bradford	do.
Public Conveniences	Leicester Corporation	E. G. Mawbey, Civil Engineer, Town Hall, Leicester	do.
Road Works	Hailsham (Sussex) R.D.C.	J. Huxley, Civil Engineer, 9, Wellington-terrace, Hailsham	do.
Police Station, Poynton, Cheshire	.....	H. Beswick, Architect, Newgate-street, Chester	do.
Sewerage Works, Kessingland, near Lowestoft	.....	F. H. Anson, Engineer, 15, Dean's-yard, Westminster, S.W.	do.
Drainage Works, Stroud-lane	Dover Town Council	H. E. Stilgoe, Civil Engineer, Town Hall, Dover	do.
Business Premises, Leicester	Nat. Union of Boot & Shoe Oper	Harrison & Hattrell, Architects, 34, Friar-lane, Leicester	do.
Chapel, Mountain Ash, Wales	English Baptist Trustees	T. W. Millar, Architect, Mountain Ash	do.
School, Lexden-road	Colchester Grammar SchoolGovnrs	H. Goodyear, Borough Surveyor, Colchester	do.
Whinstone Road Metal, &c.	Felling (Durham) U.D.C.	H. Miller, Civil Engineer, Council Offices, Felling	Jan. 2
Electric Tram Depôt, Pendyris-street	Cardiff Corporation	W. Harpur, Civil Engineer, Borough Engineer, Cardiff	Jan. 3
School and House, near Diss, Norfolk	Fersfield School Board	H. Winkworth, Architect, 3A, Hatton-court, Ipswich	Jan. 4
Road Works, Albert-road, &c.	St. Annes-on-Sea U.D.C.	T. Bradley, Council Offices, St. Annes	Jan. 5
Forty-five Houses, Greetland, Halifax	.....	R. Horsfall & Son, Architects, 22A, Commercial-street, Halifax	do.
Building Work at Town Hall	Larne (Ireland) U.D.C.	W. G. Younge, Town Hall, Larne	do.
*Isolation Hospital	Rochford R.D.C.	R. L. Curtis & Son, 119, London-wall, E.C.	Jan. 7
*Supplying and Fixing Radiators	Metropolitan Asylums Board	Offices, Embankment, E.C.	do.
*Electric Light Station and Destructor	Whitby U.D.C.	Clerk, Council Offices, Whitby, Yorks	Jan. 8
*Removal of House Refuse, &c.	St. Marylebone Borough Council	Town Hall, St. Marylebone, W	Jan. 10
Fire Engine House	Lambourn (Berks) Parish Council	H. J. Maberly, Market Place, Lambourn	do.
Electric Lighting Plant	Rathmines (Ireland) Town Council	R. Hammond, Civil Engineer, 64, Victoria-street, Westminster	do.
Refuse Destructor	West Bridgford (Notts) U.D.C.	W. Pare, Civil Engineer, George-road, West Bridgford	do.
*Schools	Hanwell School Board	See Advertisement	Jan. 14
Extension of Police Station	Preston (Lancs) Corporation	Borough Surveyor, Town Hall	Jan. 17
*New Infirmary, &c.	Swindon & Highworth Guardians	See Advertisement	Feb. 25
Alterations to Welcome Home, Ashton-under-Lyne	.....	Eaton & Co., Architect, Aston-under-Lyne	No date
Alterations to Miners Arms Inn, Ashton-under-Lyne	.....	do.	do.
Street Works, Long Benton, Newcastle-on-Tyne	.....	C. S. Errington, Architect, 21, Grainger-street West, Newcastle	do.
Drainage Works, Iscoed, Ferryside	.....	Jones & Co., Architects, 18, St. Mary-street, Cardiff	do.
Alterations to Stag Inn, Finningley, near Doncaster	.....	W. Gill, Cattle Market, Doncaster	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Applications to be in
*Road Foreman	Heaton and Isleworth U.D.C.	2*l.* 10s. per week	Dec. 31
*Assistant Surveyor	Croydon School Board	150*l.* per annum	Jan. 5
Surveyor, &c.	Witham Drainage Commrs. Boston	300*l.* per annum	Jan. 8
*Building Inspector	Tottenham U.D.C.	150*l.* per annum	Jan. 9
*Engineering Assistant	London County Council	300*l.* per annum	do.
*Clerk of Works	Wirral R.D.C.	3*l.* per week	No date
Assistant Surveyor	Southport Corporation	100*l.* per annum	do.

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv.. Contracts, pp. iv, vi. viii. x. & xviii. Public Appointments, pp. xvii. & xviii.

PRICES CURRENT (*Continued*).

STONE.

		s. d.		
Darley Dale in blocks	2	1½	per ft. cube, deld. rly. depôt.	
Red Corsehill "	2	5	"	"
Red Mansfield "	2	4½	"	"
Hard York in blocks	2	10	"	"
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	8	per ft. super. at rly. depôt.	
" " 6 in. Rubbed Ditto	3	0	"	"
" " 3 in. sawn both sides slabs (random sizes)	1	3	"	"
" " 2 in. self-faced Ditto	0	9½	"	"

PRICES CURRENT (*Continued*).

SLATES.

in. in.	£	s.	d.		
20×10 best blue Bangor	11	5	0	per 1000 of 1200 at rly. dep.	
" best seconds "	10	15	0	"	"
16× 8 best "	6	2	6	"	"
20×10 best blue Portmadoc	10	18	0	"	"
16× 8 best blue Portmadoc	6	0	0	"	"
20×10 best Eureka unfading green	11	2	6	"	"
16× 8 " "	6	15	0	"	"
20×10 Permanent green	10	0	0	"	"
16× 8 " "	5	12	6	"	"

PRICES CURRENT (*Continued*).

TILES.

	s.	d.		
Best plain red roofing tiles	42	6	per 1,000 at rly. depôt	
Hip and valley tiles	3	7	per doz.	" "
Best Broseley tiles	48	6	per 1,000	" "
Hip and valley tiles	4	0	per doz.	" "
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000	" "
Do. ornamental Do.	60	0	"	" "
Hip tiles	4	0	per doz.	" "
Valley tiles	3	9	"	" "
Best Red or Mottled Staffordshire Do. (Peakes)	90	9	per 1,000	" "
Hip tiles	4	1	per doz.	" "
Valley tiles	3	8	"	" "

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PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0 „ „ „	
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
„ „ 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
„ „ „ 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
„ „ „ 3 in. by 9 in.	13 0 0	14 0 0
„ „ battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 9
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	9 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small „ „	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
½ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	8 7 6	9 7 6
Compound Girders „ „	10 5 0	11 10 0
Angles, Tees and Channels, ordinary sections	11 2 6	13 2 6
Flitch Plates	11 0 0	11 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	9 15 0	- - -
Staffordshire Crown Bars, good merchant quality	10 5 0	10 10 0
Staffordshire "Marked Bars"	12 0 0	- - -
Mild Steel Bars	10 10 0	11 0 0
Hoop Iron, basis price	10 10 0	11 0 0
„ „ galvanised	16 10 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 0 0	- - -
„ „ to 24 g.	12 0 0	- - -
„ „ to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	13 5 0	- - -
„ „ 22 g. and 24 g.	14 5 0	- - -
„ „ 26 g.	16 0 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	17 10 0	- - -
„ „ 22 g. and 24 g.	18 0 0	- - -
„ „ 26 g.	19 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 10 0	- - -
„ „ 22 g. and 24 g.	14 0 0	- - -
Cut nails, 3 in. to 6 in.	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	19 15 0	- - -
Pipe in coils	20 5 0	- - -
Soil Pipe	23 5 0	- - -

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.
ZINC—Sheet—		
Vieille Montagne ton	27 0 0	- - -
Silesian	26 10 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 1	- - -
Thin „	0 1 3	- - -
Copper nails „	0 1 3	- - -
BRASS—		
Strong Sheet „	0 0 11	- - -
Thin „	0 1 1	- - -
TIN—English Ingots „	0 1 5	- - -
SOLDER—Plumbers' „	0 0 7½	- - -
Tinmen's „	0 0 9½	- - -
Blowpipe „	0 0 11	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
„ fourths	2¾d. „ „
21 oz. thirds	3½d. „ „
„ „ fourths	3d. „ „
26 oz. thirds	4½d. „ „
„ „ fourths	4d. „ „
32 oz. thirds	5½d. „ „
„ „ fourths	5d. „ „
Fluted sheet, 15 oz.	3½d. „ „
„ „ 21 „	4½d. „ „
½ Hartley's Rolled Plate	3d. „ „
⅓ „ „ „	3½d. „ „
¼ „ „ „	4d. „ „

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 2 11
„ „ „ in barrels „	0 3 0
„ „ „ in drums „	0 3 2
Boiled „ „ „ in pipes „	0 3 2
„ „ „ in barrels „	0 3 3
„ „ „ in drums „	0 3 5
Turpentine, in barrels „	0 2 9
„ in drums „	0 2 11
Genuine Ground English White Lead ...per ton	27 10 0
Red Lead, Dry „	24 10 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 10 0

VARNISHES, &c.

	per gallon £ s. d
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

T. H. (Amount should have been stated.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

(Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.)

*** Denotes *accepted*. † Denotes *provisionally accepted*.**

BASFORD (Notts).—For additions to hospital for the Guardians. Mr. W. V. Betts, architect, Radford-road, Old Basford:—

W. C. Shaw	£1,942 0 0	W. J. Hutchinson	£1,689 15 6
J. Greenwood	1,820 0 0	A. B. Clarke	1,687 12 4
J. Cooper	1,745 0 0	W. Maule	1,664 0 0
J. G. Thomas	1,737 0 0	G. Hopewell & Son, Old Basford*	1,650 0 0
J. Attenborough	1,700 0 0		

DARTFORD.—For the erection of an electric-light station, for the Urban District Council. Messrs. Hesketh & Stokes, architects, 110, Cheapside, E.C.:—

T. Martin	£8,043	Perry Bros.	£5,807
Leslie & Co., Ltd.	6,537	Smith & Sons, Ltd.	5,619
J. Lonsdale	5,935	Somerford & Son*	4,906

DONCASTER.—For the erection of schools and house, Owston, for the Owston and Skellow School Board. Mr. J. Simmons, architect. Quantities by architect:—

Sprakes & Sons	£2,053	G. Mottram, Queen's-road, Doncaster*	£1,750
Gill & Son	1,877		
Arnold & Son	1,780		

EDMONTON.—For completion of four cottages, Montagu-road, Edmonton, for Mr. B. S. Dimmock. Mr. A. E. Mullins, architect and surveyor, 16, Church-street, Camberwell Green, S.E.:—

A. Mitchell* £473 12 6

FALKLAND (Fifeshire).—For the execution of water-supply works (Contracts Nos. 1 and 2) for the Police Commissioners. Mr. Henry Bruce, C.E., Cupar:—

	Contract No. 1.	Contract No. 2.
Strachan & Son, Chance Inn, Cupar*	£403 14 9½	£230 8 3½
R. Ness, Newton of Falkland	458 19 5½	503 15 2½
Mackay & Son, Broughty Ferry	474 14 3½	289 12 7½
Gray & Co., Kirkcaldy	477 19 10½	322 0 8
R. Gilmour, Strathmiglo	482 4 0	225 19 6½
W. Brown, Kirkcaldy	511 1 6½	—
A. Darling, Kirkcaldy	538 12 0	451 10 10½
Mitchell & Son, Dundee	553 0 2½	266 14 10
P. Beaton, Kirkcaldy	578 6 2½	413 14 3
W. Caragher, Dunfermline	585 15 11	426 3 4
J. Kennedy, Kirkcaldy	612 13 5	313 13 7½
J. Martin, Dunfermline	615 13 0	349 17 0
Henderson & Son, Markinch	670 3 0	737 0 6

HANDSWORTH (Staffs).—For making up Hutton-road for the Urban District Council. Mr. H. Richardson, C.E., Council House, Handsworth:—

J. Biggs	£2,424 0	Fitzmaurice & Co.	£2,243 0
G. Law	2,249 0	J. White, jun.	1,976 15
Currall, Lewis, & Martin	2,246 0	G. Trentham, Handsworth*	1,848 0

HARROGATE.—For the drainage and formation of three new roads, St. James's Park Estate. Mr. Samuel Stead, C.E., 33, James-street, Harrogate:—

Roger W. Barker, Church-square, Harrogate ..... Over £3,000

LONDON.—For taking down and rebuilding the Dundee Arms Hotel, Artillery-street, Bermondsey, for Messrs. Noakes and Co., Limited. Mr. G. W. Thompson, architect. Quantities by Mr. C. A. Priestley, 35, Norfolk-street:—

		Extra for Granite.	Total.
Bullers	£10,400	£500 0 0	£10,900 0 0
Laurance & Sons	9,046	—	—
Rider & Sons	8,669	500 0 0	9,169 0 0
Patman & Fothergingham	8,111	482 0 0	8,593 0 0
Downs	7,893	510 0 0	8,403 0 0
Lole & Lightfoot	7,859	466 0 0	8,325 0 0
G. Newton*	7,649	453 5 6	8,102 5 6

LONDON.—For the erection of new drying and stamp rooms, for the Vinolia Company, Limited, Stratford. Mr. S. S. Dottridge, architect, Albert Buildings, Queen Victoria-street, E.C. Quantities by Mr. F. R. Smith, 6, Great College-street, Westminster:—

Gregar & Sons	£2,888	Weibking & Son	£2,585
Falkner & Sons	2,781	Munday & Son*	2,503
Outhwaite & Son	2,726		

LONDON.—For the erection of a receiving-house for children and nurses' home, Broad-street, W.C., for the Guardians of the Poor of St. Giles-in-the-Fields and St. George, Bloomsbury. Mr. J. Grafton Izard, architect, 5, Bloomsbury-square, W.C. Quantities by Messrs. Gardiner & Theobald, 110, Great Russell-street, W.C.:—

F. & H. F. Higgs	£14,150	King & Son	£12,290
T. C. Sharpington	13,750	H. L. Holloway	12,000
Foster Bros.	13,539	W. J. Renshaw	11,989
Courtney & Fairbairn	13,221	Smith & Sons	11,892
Todd & Co.	13,069	J. Appleby	11,890
Hibberd Bros., Ltd.	13,068	Prestige & Co.	11,777
B. E. Nightingale	12,555	A. Bush, 62, Ridgmount-street, W.C.*	11,586
C. Ansell	12,521		
H. Wall & Co.	12,392		

[Architect's estimate, £12,114.]

LONDON.—For electric lighting, Grove Park Workhouse. Mr. Thomas Dinwiddy, architect, 54, Parliament-street, S.W., and Greenwich:—

Pearson & Co.	£7,550	Samuel G. Cozens	£6,140
Troy & Co.	7,394	Collins Bros.	5,921
National Electric Wiring Co.	7,350	Foote & Milne	5,763
Hampton & Sons	6,598	Johnson & Phillips	5,550
Barlow Bros. & Co.	6,400	Joel & Co.	5,456
Drake & Gorham	6,380	Dawson & Co.	5,014
Geipel & Lange	6,278	Lea & Warren	4,910
		Cook & Co.	4,338

[Architect's estimate, £5,500.]

LONDON.—For alterations, &c., at Nos. 67 and 71, Russell-square, Bloomsbury, W.C., for the National Union of Teachers. Mr. A. E. Mullins, architect and surveyor, 16, Church-street, Camberwell Green, S.E.:—

Cox	£758	Phelps & Bisiker	£650
Burman & Sons	692	Lee	648
Marsland	676	Smith*	617

LONDON.—For repairs, &c., at Relief Station, Peckham Park-road, for the Camberwell Guardians. Mr. A. E. Mullins, architect and surveyor, 16 Church-street, Camberwell Green, S.E.:—

W. Wright* £165 2 3

LONDON.—For rebuilding No. 77, Warham-street, Kennington, S.E., for Mr. G. Moss. Mr. A. E. Mullins, architect and surveyor, 16, Church-street, Camberwell Green, S.E.:—

Wood & Co.	£289	N. & G. Mallett	£230
Rice & Son	285	J. Gedye*	257

[*See also next page.*

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LONDON.—For additions and alterations at Nos. 51, 53, 55, and 57, Commercial-road, Peckham, S.E. Mr. A. E. Mullins, architect and surveyor, 16, Church-street, Camberwell Green, S.E. :—

J. H. Thompson* £720

MANSFIELD.—For the erection of a schoolroom, Shirebrook, for the Methodist Free Church. Mr. Jos. Perkin, architect, Shirebrook, near Mansfield. Quantities by architect :—

F. H. & J. W. Moore	£725 0	L. Green	£684 5
J. Greenwood	700 0	J. H. Reavill, Ollerton, Notts*	661 15
T. Hutchinson	693 15		

NEWMARKET.—For the erection of engine and destructor houses, &c., Exning-road, for the Urban District Council :—

W. Manders	£12,433 12	A. J. Bateman	£10,577 0
J. G. Cowell	10,990 0	H. J. Linzell, Newmarket†	10,497 0
Scales & Robins	10,700 0		

PLYMOUTH.—For alterations and additions to the Laira Green Schools for the Plymouth School Board. Mr. Henry J. Snell, architect, Plymouth :—

Lethbridge & Son	£16,390	Wakeham Bros.	£14,266
A. Andrews	16,325	J. Berry	14,144
P. Blowey	16,300	Lapthorn & Co.	13 379
Tozer & Son	16,225	J. Paynter	13,268
W. Trevena	16,220	Blackell & Son	12,853
T. May	15,890	W. G. Goad	11,545

[All of Plymouth.]

SHREWSBURY. — For the construction of about 1,000 yards of garden walk for Mr. L. S. Dyer, Westhope, Shropshire. Messrs. Hall & Steavenson, surveyors, College Hill, Shrewsbury :—

E. Thomas, Aughton, Liverpool.
By schedule of prices.

SIDCUP.—For new children's homes, Sidcup, Kent. Mr. Thomas Dinwiddy, architect, 54, Parliament-street, S.W., and Greenwich :—

		Add Roads and Fences.	Total.
Martin Wells & Co.	£120,000	£8,553	£128,553!
White & Son	121,115	7,200	128,315
Leslie & Co.	113,360	11,740	125,100
W. Mills	115,736	8,347	124,083
B. E. Nightingale	110,000	10,150	120,700
Wm. Shepherd	111,490	7,923	119,413
Holloway Bros.	104,800	9,450	114,250
Killby & Gayford	104,100	9,600	113,700
Thomas & Edge	104,000	9,530	113,530
C. Wall	105,370	7,700	113,070
J. J. Wise	106,000	6,000	112,000
Wallis & Sons	103,895	8,100	111,995
H. L. Holloway	100,900	9,300	110,200
T. Rowbotham	100,654	7,123	107,777
Pattinson & Son	97,245	6,795	104,040!

[Architect's estimate, £108,500.]

SPENNYMOOR (Co. Durham).—For the erection of isolation hospital, Merrington-road, for the Urban District Council. Mr. G. W. Rogers, C.E., Spennymoor :—

Blackett	£4,399 0 11
G. H. Bell	3,434 2 0
T. Hilton, Bishops Auckland*	3,031 19 8

SWADLINCOTE.—For the erection of farm buildings, Stanton. Mr. Thos. Kidd, surveyor, Swadlincote. Quantities by surveyor :—

Selby Bros.	£606 19 10	M. Maddock	£485 8 6½
A. Bradbury	537 19 1½	Jno. Beard	468 19 11
W. Wood	503 11 1	Edwin Clarke, Swadlincote*	464 15 2
M. Chamberlain	495 15 4		

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The Builder.

VOL. LXXIX., No. 3021. DECEMBER 29, 1900.

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Design for a Chapter House.—By Mr. Percy E. Newton ..... *Double Page Ink-Photo.*
Design for Street Front (Royal Academy Travelling Studentship, 1900).—By Mr. Henry Tanner, A.R.I.B.A. ..... *Double Page Ink-Photo.*
Convalescent Home, near Sheffield.—Messrs. Hemsoll & Paterson, Architects ..... *Single Page Ink-Photo.*
An Entrance Lodge.—By Mr. H. Inigo Triggs, A.R.I.B.A. ..... *Single Page Ink-Photo.*
Constructional Details of an American Frame-House, to illustrate paper by Mr. Harry Budden ..... *Double Page Photo-Litho.*

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Sun-dials.

IN the *Builder* of December 21, 1889, we published an article on sun-dials, partsuggested by Miss Gatty's re-issue of the book originally brought out by her mother, Mrs. Alfred Gatty, in 1872, when we gave a very simple diagram showing (what many people do not realise) that in whatever position the dial is placed, whether on a vertical wall or on a horizontal surface, the gnomon is a visible portion of an imaginary line parallel with the earth's axis; a fact which, once grasped, does more than anything else to dispel the element of mystery, or puzzle, which the popular mind finds in the sun-dial. Although, as we then observed, the interest in the sun-dial is in the present day a purely æsthetic one, since we have more convenient and exact methods of recording the time, this interest has in the last few years rather increased than diminished, so that we can feel no surprise at being greeted by a third issue of "The Book of Sun-dials"* in a much larger form and with a great deal of additional matter, compiled by the same editors, Mrs. Eden (formerly Miss Gatty) and her friend Miss Lloyd. Not only have a great many new examples with their mottoes been added to the already long and interesting list, but the book has assumed a more important form in a historic and scientific sense.

The information contained in the former general chapters on "Remarkable sun-dials" is now extended and classified in distinct chapters on "Antique dials," "Early English dials," "Early Irish dials," "Renaissance dials," "Scottish dials," and various other classes distinguished not by geographical situation but by peculiarity of design or make. A long chapter has also been contributed by Mr. Lewis Evans on the curious subject of "Portable dials." Mr. Wigham Richardson's short paper on the construction of sun-dials remains pretty much as it was in the 1889 edition, but we observe that he has been able to make use of Sir Norman Lockyer's admirable diagram of the principle of the sun-dial, to which we referred in our former article as one of the simplest and most intelligible graphic explanations of the problem. We observe, however, that the misleading paragraph to which we formerly objected—"the gnomon will be a right-angled triangle &c."—is still retained (page 472), giving the incautious reader the impression that the right-angle is an essential part of the business, whereas it is merely one way of strengthening the gnomon, which might equally be a scalene triangle (if we choose to make it a triangular structure), the only important point being that the hypothenuse of the triangle, which is what actually casts the measuring shadow, should be at the proper angle, viz.: parallel with the earth's axis: while the triangular construction may of course be dispensed with altogether.

In considering the early English dials the authors fully recognise that the fact of a dial being affixed to a building is not evidence of its being of the same age as the building; but there is some question whether the dial at Weaverthorpe has even the date of the building in its favour as giving it a Saxon origin. Professor Baldwin Brown, in his recent series of articles in our columns on Saxon churches, does not admit Weaverthorpe as a proved Saxon example, yet the authors speak of the dial on it as being, by implication, of the middle of the tenth century. The Kirkdale dial, however, is of better authenticity; at all events the church is Saxon. A better illustration of this dial is given than in the 1889 edition. It divides the time on the half-circle into eight parts; the Weaverthorpe dial divides it into twelve parts, which seems in itself an indication of a later date, though there is a considerable similarity in the general design of the two dials; both, in particular, show the device of marking the more important divisions of time by a short cross line over each alternate ray; a method of accentuation found in a good many of the early dials. That at Bishopstone (Sussex), which divides the day into twelve hours, accentuates every third ray in this manner; thus marking the quarters of the day. This dial has been attributed to the seventh century, a date which we should think quite out of the question; nor do the authors support it.

The many curious forms of hollow dials found in among those of Renaissance date, and especially in Scotland, are amply illustrated in the volume before us, but they are mostly more curious than either beautiful or useful, for it can hardly be thought that the same care went to the setting out of these eccentric dials which was bestowed on a simple dial with a flat face, which was really set out to tell the time as exactly as the means allowed. The many-facetted dials for which there was at one time such a fancy in Scotland are for the most part anything but beautiful; they remind one rather of the old-fashioned plum-pudding with pegs of spice sticking out of it like a *chevaux de frise*. The most simple and useful form of dial is also the most pleasing, both in regard to appearance and association.

The chapter on portable dials added to this edition by Mr. Lewis Evans, who has made a collection of these articles (which have been made in numbers and variety quite beyond what would be expected by those who have not made a study of the subject), is a really valuable and most interesting addition. At first thought the idea of a portable sundial seems rather analogous with the practical joke of sending a simpleton out at night to get the time by the sun-dial with a candle; and we should imagine that the adjustment of these portable dials to the circumstances was often very roughly carried out. One of the simplest forms is a very wide ring with a small hole pierced in it, "the hour lines marked by sloping or curved lines drawn across the breadth of the ring inside so as to suit the various seasons." The adjustment was made by simple gravitation, the ring being suspended edgeways by a small staple at one point in the circumference, and the side with the hole in it turned towards the sun. Ring-dials of this description were much used in England, and were made at Sheffield, Mr. Evans tells, as late as 100 years ago. There are however other instruments figured and described by Mr. Evans which are of much more scientific make, and provide for adjustment according to latitude. In the majority of forms the principle of setting seems to

* "The Book of Sun-dials," originally compiled by Mrs. Alfred Gatty, now enlarged and re-edited by H. K. F. Eden and Eleanor Lloyd. (London: Geo. Bell & Sons. 1900.)

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Fig. 1.

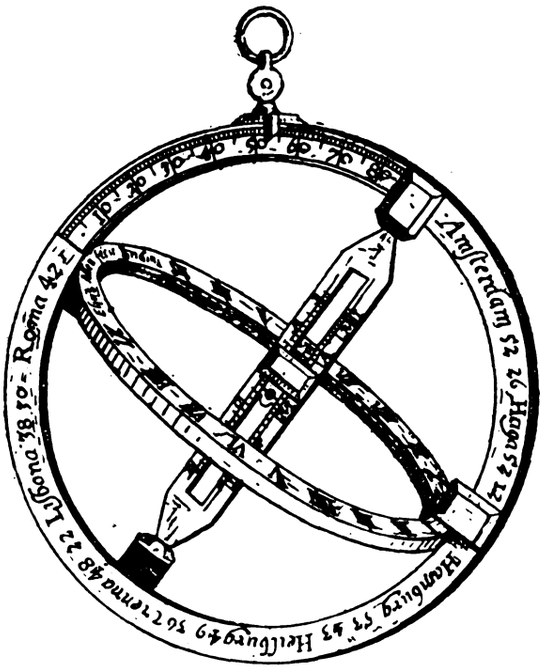

Fig. 2.

have been, as in the ring-dial, by gravity; but there are some later forms capable of more scientific precision of adjustment. On the other hand, in the case of the pretty chalice or cup dial figured on page 190, where the hours are marked on the inside of the chalice and shown by the shadow of a wire gnomon standing up in the centre, no indication is given as to the means of adjustment.

One of the most interesting things figured in this chapter is the Roman dial in Mr. Evans's possession, of the engraving of which we give a reproduction (fig. 1), and which is supposed to date from about A.D. 300. In this the outer circle (about 2⅝ in. diameter) is divided into four quadrants, one of them further divided into sections of 30 deg.; the smaller disc, which turns in the hollow of the outer one, has its surface bisected by a line—the equinoctial line, with divisions on each side of it representing the sun declination north or south on entering each sign of the zodiac; and on one side of the equinoctial line is a line drawn at right angles to it passing through a small knob. The gnomon and the curved piece with the hour lines marked on it are both carried on a pin passing through the dial.

"To use this instrument it was necessary first to set the line with the knob on it opposite the latitude of the place, as shown on the outer disc, and then to adjust the gnomon to the season of the year. In the drawing it is shown set for latitude 52 deg., and for one month from the winter solstice—that is, about the 25th of January or November.

When the dial was thus set it was allowed to hang from a string fastened to the small loop at the top, and turned until the shadow of the gnomon fell exactly along the hour circle, which it would completely cover at noon, and the number of hour spaces not in shadow would show the number of hours before or after noon up to six; for the early morning or late evening hours a modification of the setting was needed."

We give also the illustration of one of the more elaborate of the later English dials (fig. 2), a type which Mr. Evans says, however, was in general use all over Europe in the sixteenth century. In this the outer circle (when in use) represents a meridian circle, the inner one the equator, and the slotted plate in which the gnomon slides, the pole. The gnomon, as in the "ring dial," is a hole which casts a spot of light; it has to be moved up or down in the slot according to the season. The vertical adjustment is by suspension, but apparently the horizontal adjustment could only be by the eye.

This addition to the book, by Mr. Evans, may be the means of drawing a little more attention to a most interesting class of scientific objects, the precursors of the modern watch, of which little is popularly known. In regard to the suggestion that Shakespeare intended one of these contrivances in his reference to the "dial" which Touchstone produces and looks on "with lack-lustre eye," that is no necessary interpretation, as watches had been invented more than a century before, and in an uncleared forest, besides, the sundial would not have much chance of acting; but the point was worth raising.

The artistic side of the subject is hardly professed to be dealt with in the book before us, and there are no illustrations given merely for their artistic interest; but this aspect of sundials cannot of course be overlooked here. Enough has hardly been made of sundials in this sense, either in old or modern examples. The most common form of the old-fashioned garden sundial, placed on a slab supported by a simple pillar or baluster, nearly always looks well, and has the interest of old association about it; but the subject is so suggestive that something more may surely be done with it than this, especially with the aid of sculpture. The wall sundial equally affords occasion for interesting and picturesque symbolical treatment; and a design for a sundial would be a very suitable subject for a students' competition at the Institute of Architects or the Royal Academy. It has been given more than once at the Ecole des Beaux-Arts.

What may be called the literature of the sundial has been much extended in this new volume, which contains a long list of sundials and their mottoes; many of these, as is well known, being exceedingly fine and suggestive; for the marking of time by the movements of the sun (or rather of the earth) itself seems always to have affected men's imagination and moral sense in a manner that the mere mechanism of a watch or clock, made by human hands, does not affect them. The clock can be stopped, the shadow on the dial cannot; we can only watch it and record it; and there is something in that fact that gives a kind of solemnity to this method of measuring time: we see it sliding by, irrevocable. That mankind have felt this is evident from the grave tone of the mottoes frequently found on old sundials especially. It is almost startling to look for the time on a sundial and be brought up suddenly with the reminder "On this moment hangs eternity," or *Suprema multis hora, forsan tibi* ("the last hour to many; perhaps to thyself"). A characteristic French motto, which may be taken either lightly or seriously, is *Il est plus tard que vous croyez*. Then there are the energetic mottoes, urging us to make the most of time; of which one of the most effective, in its weighty brevity, is that from Leventhorpe—"Time can do much." The subject is not inappropriate to our last issue in the century.

STAIRCASE JOINERY.*

STAIRCASING and handrailing are amongst the highest, if not the highest, branches of work in which an intelligent and ambitious joiner hopes and endeavours to excel, presenting as they do opportunity for the exercise of more brain-power and thought than the every-day straightforward operations of the joiner's bench. Belonging, therefore, to the more intellectual side of the craft, the subjects of staircasing and handrailing afford opportunity for treatment of the problems they contain by written and diagrammatic explanation, for whilst it is impossible for a young joiner to learn how to saw straight or shoot truly from a book, it is quite possible to explain clearly the geometrical problems which have to be solved in getting out a wreathed and ramped handrail. It is not, therefore, surprising to find that the vast majority of books intended for the use of workers in wood deal with and are wholly confined to the cognate subjects of staircases and handrailing. Two additions to the number of these books already in existence are now before us, and we are pleased to note that the subjects are therein ably and clearly elucidated. From these we are able to gather what is required to be known by the joiner who desires to possess the ability of a good staircase hand.

In the first place, assuming without saying that he is, of course, already a complete master of his tools, it is very desirable and important that he should be proficient in solid as well as plane geometry. This knowledge, indeed, both our authors assume that their readers possess, and starting from these the novice is first of all instructed in the method of preparing his vertical and horizontal rods on which are marked the rise and going of the stair; and the various rules, some of which are more or less empirical, for determining the proper proportion between the treads and rises are given. The best and most logical of these is probably that which demands

* "A Treatise on Stairbuilding and Handrailing." By William Mowat, M.A., and Alexander Mowat, M.A. (London: George Bell & Sons. 1900.) "Practical Staircase Joinery." Edited by Paul N. Hasluck. (London: Cassell & Company, Limited. 1899.)

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that twice the rise added to the tread should equal 23 in. or 24 in., the basis of which rule is that the average pace of an average person is 23 in. or 24 in., and that the labour of stepping up is twice that of stepping along the flat. Other rules, such as the height of a riser plus the tread being made equal to 16 in., or the rise multiplied by the tread equal to 66 in., although giving satisfactory results in many cases, do not apply universally. One early caution given by Mr. Hasluck might be well borne in mind by the young architect as well as the young joiner. "It should also be noted whether stairs, if finished at the bench, can be got into their places in the building, as an error in this direction may give serious trouble." The next operation in the building of a stair is the preparation of pitch board and template, in which accuracy is essential, as from it are marked on the strings the setting out of treads and rises. The preparation of the strings next follows, and full and careful directions are given by our authors, and the method explained of setting-out and working these important parts of staircases. Then comes the housing of treads and risers into the strings and wedging-up; the latter an operation which requires care, as, although unseen when the stair is finished, upon it depends to a large extent the stability of the stair as well as the comfort of the users, and particularly the freedom from creaking, which is in nine cases out of ten due to inaccuracy of wedging, either by faulty workmanship at first or shrinkage of material after the wedging-up has been done. In a small straight-flight stair nothing more remains but to fix a straight length of handrail, it being assumed that the width of the stair is not sufficient to require carriages.

To stairs of more than one flight the framing of outer strings to newels and the construction of winders present additional and more complicated problems, the latter in particular leading to the adjustment of ramps in the strings. A newel staircase with open well-hole is indeed such a long way in advance in point of difficulty beyond a straight-flight stair, that Mr. Hasluck wisely recommends that the novice should construct a model on a scale of, say, 1½ in. to the foot, and we happen to know that this is a course which is very largely followed by those who are endeavouring to obtain certificates of proficiency from the City and Guilds of London Institute.

At the foot of a stair in a restricted space there is usually present a fresh problem, in the treatment of the bottom step, whether this is finished as a mitred step, or a rounded or curtail end; and various ways of forming these are explained by our authors, commencing with the simple square mitred bottom step, and subsequently advancing to the more difficult bull-nosed and curtail, both of which require the ability to construct a riser circular on plan.

For staircases, the method of kerfing is seldom employed in good work, veneering being almost invariably resorted to, the former on account of the small radius of the circles giving an untrue line, and the latter producing a fair surface without unnecessary and undue planing. The veneered ends are, of course, backed with blocks, which it is recommended should be built up.

The next step in advance is the construction of a geometrical stair, where the weakness of the outer strings at the turn necessitates the use of iron balusters and core to the handrail in order to obtain the necessary strength. It is recommended that one in seven of the balusters should be of iron. In geometrical stairs, balanced or dancing steps are strongly to be recommended, thus increasing the number of winders, allowing of a better curve being given to the inclination of the handrail, and the width of tread more closely approximating in the centre of the going to the width of ordinary treads or fliers. We do not find any reference to the continental method frequently adopted with dancing steps modifying the rise, an omission which would seem to indicate a lack of knowledge on the part of British joiners, as certainly the peculiar feeling that one experiences in traversing these continental stairs indicates unfamiliarity on the part of the users.

In the construction of geometrical stairs it sometimes occurs that the normal pattern of cut brackets has to be enlarged or diminished. The method of doing this is clearly explained by Messrs. Mowat. Wreathed strings are also sometimes preferably cut out of the solid instead of being built up or veneered, and to do this forms a suitable introduction to the science of handrailing, as a certain knowledge of solid geometry has to be acquired and utilised. For the purpose of cutting a wreathed string out of a solid plank two moulds are necessary—a face mould to enable vertical faces to be cut out to the cylindrical form which they occupy on plan, and a falling mould to bend round these curved surfaces after they have been formed to mark out the piece for trimming its edges to the requisite falling line. There are two methods of drawing a face mould, first by level ordinates, second by describing ellipses; both of these are clearly explained by Messrs. Mowat. The preparation and application of falling moulds requires a knowledge of the geometrical process for the developments, or, as they may be called in workmen's language, unfoldments of surfaces; these also are clearly treated by our authors.

In both the books we have before us, the construction of stairs for passenger ships is treated, more fully in the larger volume by Messrs. Mowat, but still clearly, though not to so high a development, in the smaller volume by Mr. Hasluck. Much of the ordinary construction of stairs applies also to these special instances, but there are additional points that have to be studied and understood. Primarily amongst these are the modifications of height rods to allow for the sheer and camber of decks. Then also the treatment of treads, by covering them with various materials for minimising wear and tendency to slipperiness, has to be borne in mind. The plans of stairs on board ship often present considerable variation from the more straightforward arrangements usually obtaining in domestic or even public buildings, though in some, particularly those that are termed of quarter-circle type, there occur problems the solution of which is particularly valuable to the joiner who may be called upon to construct some of the independent circular or other geometrically-planned stairs that are occasionally to be seen in high-class shops, which we do not find specifically described in either of our authors.

In handrailing we have what is generally regarded as one of the most difficult branches of the joiner's craft for the workman to acquire, and one, therefore, on which much has been written from the time of Peter Nicholson onwards. Some knowledge of solid geometry is absolutely necessary to the workman who wishes to feel himself adequately equipped for dealing with the problems that handrailing presents. In handrailing one of two systems is generally adopted—either the cylindrical system, including its variations by bevel cut or square cut, and the system by square or normal section. The cylindrical system is that usually practised, and in this the squared wreath is regarded as forming a part of a right hollow cylinder whose base coincides with the plan of the wreath. The surfaces of a squared wreath are of two distinct natures, the vertical sides being quite regular, easily formed, developable; while the surfaces forming the upper and under sides are of a much more complicated character, but in many cases closely approximate to regular helicoidal or screw surfaces.

The system of normal or square sections is more difficult and less extensively practised than the cylindrical method. Both of these systems are faithfully and clearly explained by our authors both in theory and practice. With a view of rendering their volume more complete, Messrs. Mowat have included some chapters on the construction of stone stairs, both straight, circular, and elliptical, in which the modifications of the science of staircasing and handrailing required by the mason are fully treated. There is also an admirable appendix dealing with the ordinary problems of plane and solid geometry which are required by the student. This appendix in particular can be commended to the careful study of young architects and builders, as well as of all those craftsmen for whom it is more immediately intended.

NOTES.

The Easement of Light.

THERE can be no doubt that the tendency of judicial decisions in regard to the easement of light is to make it less onerous. We do not mean by so saying that the right where it clearly exists is prevented from operation, but that the tendency is not to stretch the law against the owner of the servient tenement. In the recent case of the Home and Colonial Stores *v.* Colls, in which Mr. Justice Joyce delivered judgment at the end of the recent law sittings, an attempt was made to obtain a judgment in favour, not of an ordinary, but of an extraordinary, amount of light. But following the decision of Mr. Justice Wright in Warren *v.* Brown, Mr. Justice Joyce refused to grant an injunction. He admitted, as we pointed out when commenting on the decision of Mr. Justice Wright, that the decisions on this point are conflicting, but we are glad to find he took the view which will commend itself most to the opinion of both experts and sensible laymen. We confess that in the case before Mr. Justice Joyce we can see no ground at all for the claim. The light was not required for a special purpose for which much light was needed, such as a jeweller's trade, but for an ordinary office the back portion of which was always artificially lighted. The erection of the new buildings, the Judge found as a fact, would not affect the selling or letting value of the

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plaintiffs' premises. This finding, if correct, seems to dispose of the case, because if there were an infringement of the right it was nominal only, and could be only measured by the familiar one farthing. At the same time we should be glad to see Mr. Justice Wright's and Mr. Justice Joyce's modern construction of this point of law approved once for all by the Court of Appeal.

Uses of Expanded Metal.

A PAPER in the current number of the *Journal of the Franklin Institute* deals with the manufacture and some uses of expanded metal. This useful material is obtained by cutting and stretching out sheets of open-hearth steel, so as to form a netting of the desired mesh, or section of strand. The two operations are practically simultaneous, and both are performed in the cold state. Expanded metal occupies a somewhat enviable position, inasmuch as it is a product which has been used to a far greater extent, and for a far greater variety of purposes than the inventor originally anticipated. This is saying a good deal, for we all know how hopeful is the temperament of the average inventor. Perhaps the chief use of expanded metal in the present day is in fire-resisting and in concrete construction. Its suitability in the latter direction is shown by the fact that more than 200 acres of expanded metal were embodied in various buildings at the Paris Exposition. For decorative details in architecture the metal is particularly convenient, and if properly secured to a light steel framing there can be no change of form likely to damage finished plaster surfaces, whilst the excellent key afforded by the mesh gives a sufficient assurance that the plaster will not fall off when once applied. Partitions of plaster upon a basis of expanded metal resist sound waves to a remarkable degree, this property being explained by the theory that the vibrations are intercepted by the network and dissipated in other parts of the structure instead of passing directly through the partition.

Proposed Railway to Hampstead Heath.

THE Hampstead Heath Protection Society have forwarded us a copy of the following resolution, passed at a meeting of their Committee on December 14 :—

"*Charing Cross, Euston, and Hampstead Railway Extension Bill.*

That this Society object strongly to the proposed extension, on the grounds that tunnelling under the Heath may injure it, and that the threatened erection of a station on the summit of the Hampstead Hill, or on or adjacent to any part of the Heath, would be a substantial injury to the Heath.

The Society will use every effort to oppose the proposed extension as shown on the deposited plans."

We have every sympathy with the intentions of the Committee, but it is a pity that they did not confine themselves to the question of the erection of a station on the Heath, as to which there can be no doubt whatever. The statement that tunnelling under the Heath may injure it will be laughed at by engineers. But there is no doubt that half the attraction of Hampstead Heath would be gone if we had a railway station erected there. It seems too bad that we cannot be allowed to keep any place near London quiet from railways.

Fire-resisting Docks.

IN rebuilding the North German-Lloyd docks at Hoboken, N.J., the company is apparently taking precautions against a repetition of the appalling disaster which occurred a few months ago. Along the water front a river-wall of granite and concrete is to be built, and upon this will be constructed a two-story fire-resisting building, 850 ft. long by 130 ft. wide, divided by five transverse fire-walls. The upper floor and a roof promenade are to be reserved for passenger traffic, and those desiring to witness the arrival and departure of vessels will only be allowed to do so from these parts of the dock premises. Each of the three piers projecting into the river is to be formed upon wood piling, protected by a concrete floor decked with timber and sheathed with oak from below water level to the deck, the timber walls being finished with a covering of tin as a further protection. All pier sheds will be of fire-resisting construction, including concrete-covered steel columns, and three transverse fire-walls. Automatic sprinklers and fire-alarms are to be furnished in all the buildings, as well as a complete system of hydrants and fire-hose. Although the piers represent slow-burning, and not fireproof, construction, the method adopted was considered the more suitable, because, as evidenced in the recent fire, steel-work is very liable to be distorted by exposure to great heat. As timber appears to enter largely into the scheme of reconstruction, it is to be hoped that nothing but non-flammable wood will be employed.

The Carnegie Institute.

THE greatest gift of Mr. Andrew Carnegie to Pittsburg is his latest, a technical institute where it is intended that artisans and mechanics may find the means of such education as is most needed in the United States. In announcing his gift, the donor remarked upon his surprise at finding—during a recent visit to England—that nearly half of the students in the Keighley Institute, and fully half of those in the Halifax Institute, were young men and women working during the day and studying various subjects pertaining to their crafts in the evening. We sometimes hear loudly-sung praise of American technical education; but, in truth, this is not generally conducted on lines suited to the wants of self-supporting students, and the remark to which we allude is a sufficient indication of the fact. Too many subjects are included in the curriculum of the American Polytechnic Institute, subjects that might be excellent for the civil engineer, or for the works manager of an important engineering company, but that are not at all necessary to, or desired by, the mechanic. We believe the responsibility for this undesirable state of things lies largely with science teachers whose tendency is towards over-elaboration. If the trustees of the new Institute should be able to secure teachers of the right kind, who will conform with the required standards, the Pittsburg district will derive incalculable benefit from the princely gift of Mr. Carnegie.

Toronto Engineering Society.

A VOLUME published this year records the transactions of the Engineering Society of the School of Practical Science, Toronto, during the session 1899-1900. Amongst the contributions of more especial interest to our readers is one on "Hydraulic and Electric Elevators," giving a fair description of the chief forms of such appliances. In connexion with the direct-connected type of electric lift, it is mentioned that both mechanical and electrical methods are adopted for controlling the motors from the moving car, but detailed reference is only made to a somewhat complicated hand-wheel control. It certainly appears that the more elegant and equally efficient system of electrical control might profitably have been discussed. The safety device selected for description is one consisting of a centrifugal governor actuating a pair of cams, which grip an endless rope connected with another rope wound on a drum secured to the car bottom. On the unwinding of the latter rope, the guides are gripped by two toggle-clamps, operated by right and left hand screws in the drum. This train of movements is rather involved, and presents too many elements of possible failure to be entirely satisfactory. A preferable arrangement is one employed on the Central London Railway, in which the centrifugal governor and the safety mechanism form one self-contained apparatus attached to the car bottom. There are other important features of electric lifts which could have been mentioned with advantage, notably various automatic devices for cutting off current in certain eventualities, and the fact that current can be generated by the motors during the descent of a loaded car, thus effecting considerable reduction in working expenses. It is interesting to observe from a paper on "Roadmaking," by Mr. Campbell, Provincial Road Commissioner, that Canadian roads are now being much improved, both by the central Governments and by the County Councils, and also that mechanical appliances for road-work are coming into more general use in the Dominion.

Stroud Rural and Nailsworth Urban Districts.

DR. ST. GEORGE MIVART'S Report to the Local Government Board on the general sanitary circumstances of the Stroud Rural and Nailsworth Urban Districts states that in the former district, in every parish, almost without exception, may be seen examples of supply by wells and springs, even when the mains of the public water service are available. The only public water service is that furnished by the Stroud Water Company. He saw no wells that had received any internal treatment other than dry steining, usually by means of blocks of local stone, the joints of which were frequently wide apart. There are many wells which are evidently liable to pollution from the direct passage into them of filth from the surface of the ground; the collars and covers being ill-fitting or broken. The only parish furnished with sewerage upon a definitely known plan is Stonehouse, which has a system of sewerage laid in 1884 at a cost of 3,000*l*. The closely-built town of Painswick, above Ordnance Datum, is provided with stone drains of considerable antiquity, in section either square or oblong, with, for the most part, earth bottoms. These drains, now [called and used as sewers, were undoubtedly intended originally for the disposal of surface water, but now water-closets in increasing numbers have been directly and indirectly connected with them. At one point he caused a sewer

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to be opened; the bottom was found to be covered with several inches of black, stinking sludge, excrement and paper being clearly discernible. These sewers are often only a few inches below the roadway surface. In regard to excrement and refuse disposal, the most striking feature of the district is the common custom of placing privies over the edge of streams and watercourses—wherever such a position is practicable. The Report as to the Nailsworth District gives the same general character as to sanitary conditions.

St. Giles, Cripplegate.

FOR the widening of Fore (formerly Postern) street along its south side will shortly be pulled down a block of seventeenth-century houses, constructed largely of timber, which overlook the churchyard and stand against a portion of the north wall of St. Giles, Cripplegate, Church. The Corporation have purchased the property for, we understand, 19,000*l.*; they will, however, preserve the old gatehouse, opposite Redcross-street, that covers the entrance into the churchyard, and rebuild it in alignment with the new frontage. The quaint old buildings comprise the "Four Shops" and the "Quest House"; they were erected by the parish, and have survived the Great Fire and the recent conflagration in their immediate vicinity. It is proposed after their removal to open out two blocked windows in the north aisle of the church, and to fill them with stained glass in commemoration of the church's escape from fire on those two occasions.

The Latest Thing in Competitions.

AN architect sends us a sample of a circular inviting architects to compete, which may seem, as the phrase is, almost too good to be true; but it is undoubtedly a *bonâ-fide* proposal. It was sent out by a committee wanting a new church at Burghead, and runs as follows:—

"*Proposed New Church and Hall for Burghead.*

MR. ——, ARCHITECT,—We, the undersigned, were appointed by the General Committee as a Sub-Committee to procure plans for new church, Burghead, and we shall be pleased if you send us a few specimens you may have on hand of such a building as you think would suit. Our accommodation and finances, which are as follows:—

Accommodation	500
Area	400
Gallery (at end)	100
Finances	£1,300

We would prefer, if possible, a Gothic design. No spire, but instead, two turretettes on principle (*sic*) gable.

Size of hall: To accommodate 200.

As several architects have signified their willingness to supply us with plans free of charge, we have taken your name into consideration."

It would be interesting to know, among other things, what was the latent idea which prompted the reservation, "if possible," before the request for a Gothic design. Probably, however, it was merely meant to imply that the architect might possibly not have a Gothic design in stock at present, as that seems to be the conception on which the whole document is based.

WORKHOUSE, DONCASTER.—Messrs. Shorland & Brother ask us to mention that in this building, described under the head of "General Building News" in our last issue, the warming and ventilation in the wards is carried out by means of their warm-air ventilating stoves with descending smoke flues.

AMERICAN FRAME-HOUSES.*

By HARRY BUDDEN, A.R.I.B.A.

THE printing and figuring on the plan will be noticed (see last issue); this is not put in detail upon the pencilled drawings but on the tracings, and referring to these illustrations, the thoroughness of this on all plans will be admitted, though the system differs nothing from the English. In our examples it was not considered necessary to figure through the whole drawing, so let the left hand in each plan be a type for the remainder. No mention is made in our examples of gas and electric light points nor of bells and speaking tubes, in this they are incomplete, for these are generally indicated at every point, and numbered, sometimes in coloured inks. The doors are figured as they hang, and the custom is to have all doors the same height on each separate floor, though the width varies to suit convenience. Mark all sliding-doors and any glazed ones. The kitchen range stands on a "brick" or "tile hearth" without any chimney breasts to it, and each flue in every stack must be indicated by letter or name. The advisability of this thoroughness throughout a set of drawings may be realised by the English stranger when he learns that the "quantity surveyor" is practically an unknown person in America, and probably the best verdict you will obtain for him if you plead his cause is "time waster" or "expensive luxury." The contractor in America takes his complete set of sun copies and specification for two or three days on a 100,000 dollar job and his subcontractors have every opportunity to obtain particulars from a set in the contractor's room at the architect's office, and so, in a fortnight or three weeks, "bids" can be obtained from eight or ten men, and the results will compare very favourably with any set of English tenders on a similar 20,000*l.* contract, which has taken the quantity surveyor and builders at least two months to figure out.

The cellar walls above ground will be shown in the typical American rubble, and the walls dotted down their full depth. All floor and ceiling lines are clearly shown in red ink, and their heights figured. The windows are also figured, as seen in both these elevations, and the roof and chimney heights, too. The old and new "grades" naturally are required to be shown. A little sketchy effect will be approved in the pencil drawings, but the drawings must be conventional and accurate enough to insure a line tracing such as our illustrations show, though some offices do ask a little freehand on the tracings, and since the sun copies are mostly "blue-prints," and are seldom coloured, this must surely be acceptable to the builder. The little colouring on the prints is done by special coloured crayons such as we will use later in preparing the full-size details. Sections are perhaps not such a feature in a set of drawings for a frame house as would be the case in England; construction is seldom shown on them, because this is all clear on the "frame" tracings.

The "frame plans," though a novelty, will not puzzle one who can see through floor boards and plaster finish to the skeleton of an ordinary wooden construction, though it would do him good to see an experienced "construction man" run off a set of frame tracings on cloth from the original pencil drawings.

For the first floor frame shown here, an outline in red ink (shown dotted) of the cellar walls and piers must first be traced on the cloth, and this pinned down over the first floor plan, then, with the outside of studs as boundary, draw the 6 in. by 8 in. sill round all outside walls, reducing to 4 in. by 6 in. round chimnies. The cross walls are carried on beams, or more often on steel channels ruled in blue ink and figured as shown under the principal interior walls in question. The levels of all such steel or wood girders are figured at once as required within or under the 12 in. joists. The trimmers to stairs, hearths, &c., will next be drawn and figured 6 in. by 12 in. and 4 in. by 12 in., as shown—large scantlings are common—and the floor joists filled in between these at 12 in. to 16 in. centres. The standard joist is 2 in. by 12 in., and it is no economy to reduce it for small areas of short spans here and there. The value of good cross-bridging is acknowledged, and it is introduced in all floors, clearly shown and marked "bridging."

Some offices prefer the cellar outline shown in black and all the timber in yellow ink, but this is easily discovered by reference to previous frame drawings. Where a short cross wall runs parallel with the joists it is usual to carry it on short 4 in. by ⅜ in. iron plates, lag-screwed to the underside of the two adjoining joists, and these plates must be shown in blue ink. This construction is adopted only for walls carrying no weight, being more economic than using 6 in. by 12 in. trimmer to take the studs, and a separate joist each side to take the floorboards.

The front elevation framing (see lithograph) will present but few difficulties when studied with the elevation itself (given in last issue); adjoining, like the plans, it is prepared on cloth pinned over the original pencil drawing. The sill, girt, and plate previously drawn on the frame plans are set at the required heights, and are held at all angles by 4 in. by 6 in. or 4 in. by 8 in. posts, and in good work have 4 in. by 6 in. braces at feet; then will the outline of window openings be traced on and second lines run round outside these to indicate the "double" studs called for in the specification, which runs as follows:—"Studs to be 2 in. by 4 in. spruce set over each other on 12-in. centres (more often 14 in. or 16 in., in keeping with the joists) and doubled to all openings, to be once bridged with 3 in. by 2 in. bridging and long braces to be used where possible." It would no doubt be better to have window frames 4 in. by 4 in., but the doubling system serves the purpose and is cheaper, because timber of a size can be bought in large quantities. No mention is made of mortice and tenon, simply because experience has proved these to be unnecessary, and so much time and expense is saved, though it will take the Englishman long to believe the omission anything but a "scamping" trick.

The general details for the frame house are invariably prepared to full size in pencil, and the colouring of sections done by hatching with special architect's crayons of excellent quality, better suited than colour wash to the thin roll paper used for detailing and also for the tracing paper they are copied on. Some men even use these colour pencils for the outline, and that again saves time. The colours adopted for various materials differ nothing from our system; yellow for deal, red for brick, green for plaster, blue for iron, and so on. The first and principal detail is a section through an outside wall from cellar window sill to eaves. This is prepared to full size and in a continuous line from bottom to top. The "lower floor" is always carried through to the outside face of studs, a furring strip being introduced to give nailing, but this floor is not always laid diagonally, because the joints of upper and lower flooring running parallel is considered no disadvantage when paper or felt is inserted between the two floors. The underside of all joists taking lath and plaster ceilings is furred with 2½ in. by ⅞ in. spruce on 12 in. or 14 in. centres, and where double plastering on walls is adopted (see detail). Similar furrings are used between the two thicknesses to give nailing to the second laths.

The time-saving instinct of the American has probably developed that method of framing used in Ohio and on West which is shown at B in the detail sheet (see lithograph) and which I think has decided advantages of its own. The "ledger board" seems weak, yet it is sound construction, let in as it is and with joists well spiked to the studs, which can now be cut to one long length and run up at a great rate, whilst the shrinkage in a well dried 6 in. by 1 in. or 7 in. by 1 in. ledger board is less likely to affect the structure than in a bulky 4 in. by 8 in. girt on which all the upper studs rest, and remembering there are no tenons or mortices, the double butt joint cannot be so firm as the through studs. This ledger board construction is sometimes combined with the Eastern method to take the third floor joists when a large attic is desired, and then the top plate standing some few feet higher lifts the whole roof well up from the floor as shown at C in the same detail. The English mind may to some extent be reconciled to the omission of tenons throughout the framing, when, in good work, the "ironing" of plates and posts and heads with 2 in. by ½ in. straps is seen together with efficient spiking, and the bracing value of the outside boarding is considerable, though seldom if ever calculated upon.

Another sketch on the same sheet shows the "hanger," which is the American substitute for our tusk tenon; the iron strap is 2 in. by ½ in., hooked over the trimmer an inch or more and twisted as shown to form a stirrup for the

a

* Concluded from last issue.

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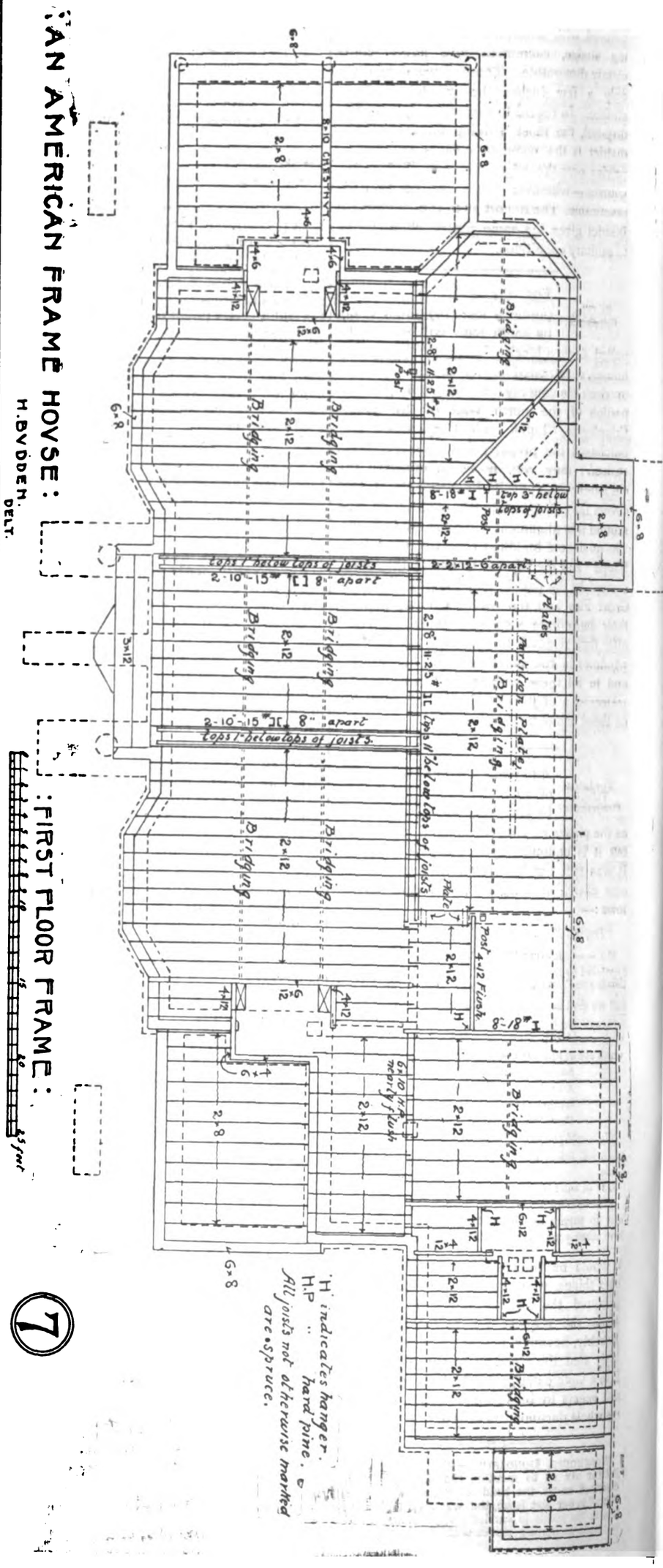
header which is often further secured to the trimmer by a ¾ in. bolt and nut. The common joists are tenoned into the headers in the ordinary way. The lower sketch on this detail explains the carrying of the short end wall to coat closet, running parallel to the joists, on short iron plates where indicated on our first floor frame; these are secured to the underside of joists by ¾-in. lag-screws 4 in. long, and the studs rest directly upon these plates. It is argued that this construction saves the partition in case of shrinkage of the joists, which would not be the case were the iron plates let in on the upper side of the joists, but this is surely a hair-splitting scarcely consistent throughout the job. The furring strips here, as in many another instance, keep the laths well clear on the iron work.

There exists with some architects an old custom called "fire-proofing" or "brick-filling" which it is advisable to know the meaning of in case you are told to "fire-proof all walls and partitions" or "walls only." It consists of filling between the studs with 4-in. brick or terra-cotta lumber in mortar from sill to 6 in. above floor and in partitions from head to the same height, and perhaps again from plate to under side of roof boarding. An example is shown at A on first lithograph; and where this idea is adopted the lower floor is specified to run to brick-filling. The reasons for this construction are so vague and varied, that I will not attempt to explain it, but leave the subject as my inquiries were generally left, with an indefinite reply of "stops run of fire;" "and run of rats and mice;" "makes all a bit solid;" and "helps to hold her down."

The detailed section of the wall from ground to eaves is that first required; it is prepared to full size in pencil—probably coloured pencils—and on a continuous sheet, each part lining up with that below and separated by ruled spaces between the several features; hence this drawing often assumes large proportions, and may have to be "continued in our next" before it reaches the eaves. The cellar window usually has a solid frame, worth remarking because box-frames are by far the most common throughout the States; the granite sill is set just clear of grade, and is shouldered to jambs and throated to projection only in the best work, the common sill being a mere weathered "slip" without projections. The wooden sill is simplicity itself. The weather to all sills in America is obtained in the easiest way possible, viz., by tilting; and the outside face being planed vertical thrusts a sharp angle down on the stone; the under side is pointed in cement from behind to keep it watertight. The cellar is seldom more than our idea of heating chamber, coals, and laundry, but should there be kitchen or servants' hall therein, the walls to these are invariably "furred" with 3-in. by 2-in. studs, and plastered or sheathed with vertical boarding in narrow widths. The rebating of casements is a weak point, since they prefer to open cellar casements inwards; the frame is 5 in. or 6 in. by 2 in., double rebated for casement and for mosquito net frame, which feature may have to be provided for throughout.

The outside boarding is rough 8 in. by ⅞ in., tongued and grooved, and the lower flooring 6 in. or 8 in. by ⅞ in. matched. Both are laid with stout paper before the finish work is applied, so also is the roof boarding, and the paper or felt is turned up behind the skirting, which is fixed before the upper floor is laid, so preventing that shrinkage so often showing between our floors and skirtings. The upper floor is always in narrow widths, tongued and grooved, and in the best rooms blind-naile . It may be 2½-in. by 1-in. oak or hard pine, or for chambers 3-in. spruce, and heavy "deafening paper" or felt is laid between the two floors as just described. The common "clap-board" (weather-board) is 6 in. wide, ½ in. or ⅝ in. thick at butt, and reduces to ¼ in. It is laid to weather 4 in., and at the angles the best effec is obtained by careful mitreing, though the old angle piece is often adopted. A narrow strip of tin-flashing is inserted where clap-boards and architraves abut, tin taking the place o lead in all such instances, and if painted both sides before being fixed, it has a life long enough to warrant its adoption. Mosquito frames are incidentals which may be asked for or not, the usual practice being only to prepare a place should the proprietor adopt them afterwards.

Frequently a design breaks from clap-boarding to shingling above the first floor or



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in the gables; then the detail of this would be shown in its place on the drawing between the first and second floor windows.

The eaves treatment is, perhaps, the most varying feature of the frame house. The "Colonial" house will almost invariably carry something pertaining to an entablature at its eaves, and the section will show if it is to be supported by projecting joists, rafters, or sprocket-pieces. This point settled and the material for gutter—wood or metal—decided upon, the wooden casing to any detail is easily applied. The characteristic part is about the gutter itself. This is a stock design in white pine, though many wisely prefer red wood—"Sequoia," as it is termed in England—a fancy name, perhaps to command a fancy price, for it is a cheap pine in the West. The groove for the facia under is run as required on the job to suit detail. A 1-in. gutter facia notched over the back of the gutter takes the edge of the shingles. The back facia adds stiffness to the whole, and covers any defect in the joint between gutter and its facia. The "planceer" or soffit is always tilted, so that, should there be any overflow caused by snow or ice accumulating on the outer edge, it will not flow back to the wall, but escape through holes purposely bored in the width between the brackets. The gutter is painted inside as out, joints are made in red lead and tinned over. The eaves to porch or piazza, such as is shown in the general elevation published last week, will be on the same lines and could be detailed in the same way, but with another and smaller stock gutter. The piazza ceiling would be sheathed in narrow widths, 3 in. by ¾ in. or ½ in., tongued and grooved and beaded, with a small angle mould as indicated. It might be well here to refer to the piazza column, as it would be detailed at the same time to inch scale or quarter full size with upper or lower diameters to full size. If the diameter is only about 12 in., the column will be built up solid out of 3-in. or 4-in. planks and turned on a lathe, but if larger than this, as the column to portico in the front elevation, they would be built up hollow and the joints hidden in the fluttings, and one will look at many such columns before he finds the joint. They stand the climate wonderfully; so does the cap, because this is papier-maché and a stock design, yet manufactured by a maker who has employed excellent modellers. And so "Cap No. 2,785 to 10 in. diameter" is detail enough; and when all is painted from gutter to base in the typical American white the effect is good. The weight over such a framed column as that to our portico would be taken by a 6-in. by 6-in. or larger hard pine post which occupies the centre space.

Returning to the subject of eaves, that to the main house shown in our working drawings requires a very different treatment from the "Colonial" one we began with; yet it will be found familiar enough to houses wearing an expression that some might term "Italian." The soffit in this case would be panelled or lined with narrow sheathing; cut brackets, about 4 in. wide, are simply nailed on, and the bed mould cut in between them; the facia and mould complete the "finish," while the gutter is a 16-oz. copper one, or 20-gauge half-round galvanised iron, hung clear of eaves with galvanised iron rods, 1 in. by ¼ in., and dogs 2 ft. on centres. Such an eaves will often have a projection of some 3 ft. or 4 ft., and be treated exactly as those old Florentine loggias with very deep shaped rafters and coloured panels in the soffit, and, by the way, being told to adopt such an Italian detail for this or any other feature, you will do well to copy it implicitly. It is deemed no crime to transplant from Italy through book or photograph a complete detail to America, where many such thrive; they are as familiar parasites on many a fine healthy design, and one can only admit that a good copy is better than a bad original in such matters.

The dormer details would not trouble the Englishman much, he is acquainted with the feature on old places like Clare College; and the "Colonial" house would have as good if it could, but the too general use of hung sashes instead of casements robs a dormer of a valuable effect, though a good overhang to the eaves compensates this loss not a little. A dormer in the picturesque American treatment may call for almost any variety of finish, with or without barge-boards, but in the familiar shingle treatment the projection amounts to nothing and the finish is kept very simple. The "Gambol Roof," so familiar in small houses with attic story, is often laid to a dangerously flat pitch for shingles, rendered water-tight only by layers of tarred paper, &c.

The appearance of frame houses is enhanced not a little by the colours they are finished in, whether stain or paint; and though that does not affect the mere drafting, it is worth remembering that the majority have stained shingles, green for choice, and buff or brown painted clap-boards, whilst all "finish" from gambol roof to water table is painted white, and probably varnished. The interior finish of the frame house can claim nothing really peculiar to it, and therefore can scarcely have a place under this heading.

ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE fifth meeting for the session of the Discussion Section was held on Friday evening, the 14th inst., at 56, Great Marlborough Street, W., Mr. C. H. Strange in the chair, when Mr. Crawfurth Smith contributed the following paper which he himself, now holding an appointment in Ireland, was unable to read, and which Mr. George H. Smith, Hon. Secretary, read on his behalf. As the subject is one seldom treated, and of some interest, we give the paper entire:—

The Churchyard and its Accessories.

"In dealing with the subject of my paper, I wish to confine myself strictly to the churchyard as an intrinsic part of the church it surrounds, and therefore interesting to the architect, it being, I think, a very good axiom that a country church is largely what the churchyard makes it, it being the setting, so to speak, of the jewel. Under these circumstances, the subject of cemeteries will not be considered.

Before going into detail we may briefly note that from the time of the Cave of Macpelah, amongst Jews and Christians, and from the earliest records of other nations, places of sepulture have always been set apart and regarded with feelings of respect and veneration. Amongst those nations who practised cremation in some form or other the place of the deposit of the ashes has been equally respected, witness the Roman Lararium. In the history of the Catholic Church, we find that about the year 750 A.D. spaces of ground adjoining churches were enclosed and consecrated for burial, and by a canon of the ninth century every grave was to be esteemed sacred, to be adorned with the sign of the cross, and was to be preserved from trespass and violation by dogs and cattle. It is needless to refer to the ceremony of consecration performed by the Bishop in all branches of the Catholic Church to bear witness to this respect at the present day.

Many churchyards have a history far older than the church which stands in them, being places appropriated to religious assemblies, divine service being performed, and so the church was added for greater honour and convenience.

It is a curious fact that in a large majority of cases the churchyards are on the north side of the church and on the north side of the road leading to them. St. Leonards, Aldrington, Sussex, has this peculiarity and also Sompting Church in the same county. There is also a superstition amongst old-fashioned peasantry that the north side of the churchyard is less sacred than the rest of the consecrated ground. It is often found in country churchyards that the north side is unoccupied by graves where there is space in other portions available. 'To be buried there' says Durandus, the great fourteenth century ecclesiologist, 'is, in the language of the eastern counties, to be buried out of sanctuary,' and the position is appropriated to the graves of suicides, unbaptized persons, and excommunicates. Incidentally I may remark that in the 'Paradise Lost' Milton in every case refers to Satan's Palace in the Heavenly Country as being in the 'Regions of the North.' There is doubtless some connexion between the two, though an obscure one. It must of course be borne in mind that local peculiarities of site would be the first factor to be considered in the disposition of the churchyard.

The churchyard may be for the purposes of our discussion considered from three aspects: 1. Religious; 2. Practical; 3. Æsthetic. This is not the occasion on which to deal with the first. As regards the second, although it is subsidiary in importance from our point of view, yet certain facts must be considered. They are briefly:—1. Soil. 2. Size and disposition of graves. 3. Convenience for burial service and general particulars as to laying out.

First as regards the soil, of course this must to a large extent be guided by the neighbourhood and locality. I may point out, by the way, that under the Public Health Act a cemetery must not be constructed within 200 yards of any dwelling house without the consent in writing of the owner, occupier, or lessee. This I presume would apply equally to a churchyard although surrounding a church which had been in existence for many years.

The soil should be dry, close, and yet porous, permitting the rain and its accompanying air to enter and so expedite decay. The formation should be well covered with vegetable mould which assists in neutralising any noxious exhalations, and encourages the growth of shrubs. The subsoil should be of such a kind as will readily drain itself and so prevent water lodging in any grave or vault. It should also be exposed to north or north-east winds, which are dry and do not hold the putrative gases in solution like the moist south or south-east winds; against this graves open to the north, and sheltered on the other sides are sunless which has a most depressing effect. Loam, sand, and chalk make the best soils, clay and stony ground if not finely commingled the worst.

With regard to the number of graves in a churchyard, a standard of 110 to the acre is often taken; this of course permits of a large number of burials, as more than one coffin is often laid in the same grave. It may be roughly estimated that one-sixth, at least, of the total available space is taken up by paths, shrubs, &c.

I may add, that in order to make the best of an old churchyard in a bad soil, deep and careful drainage should be adopted without hesitation; drainage pipes laid at a depth of at least 10 ft., and the positions carefully marked for obvious reasons. Surface drainage of the paths should always be provided; nothing is worse for the church, churchyard, or monuments than water-logged paths and standing pools. A rough garden enclosed should, as far as possible, be provided in a position as close as possible, as there is always a large amount of surplus earth remaining after a newly-dug grave has been filled.

It is of the highest importance that a careful plan of every churchyard, showing the grave spaces, should be kept and adhered to, and for old churchyards such a plan should always be made; neglect in this particular has often led to very horrible results. Many old churches have suffered from vaults being dug right under walls or so close to walls or buttresses that a subsidence has occurred, repairing which has led to much trouble and expense. I had to take down the whole of the tower of a small Kentish church and rebuild it, owing to the fact that one of the angle buttresses was undermined by a family vault. A large border of lawn or a path round the church is better for the foundations and adds greatly to the appearance. Under the Cemeteries Act in new buildings, a space of 15 ft. is reserved round the building. The sizes of grave spaces vary for adults from 9 ft. by 4 ft. to 9 ft. by 6 ft.; the direction, it is needless to say, is always east and west. The foregoing details may appear prosaic, but bear upon the subject of my paper.

The æsthetic aspect of a churchyard appeals, and has appealed, to us all. The immortal 'Elegy' presents a picture with which we are all familiar, and which needs nothing more to enhance it.

May I state as a fundamental proposition that a really picturesque churchyard is beyond our power to design; the quiet plot of ground with varied alterations of light and shade, the sea of grass heaving in the soft undulations of nameless graves, broken by a moss-diapered cross, or quaintly carved headstone, the churchyard cross rising from a low stepped pedestal, and the whole curtained with sombre trees, owes all the beauty it possesses rather to the genial irregularity of its growth than to the skilled hand of the artist. However, having the ideal before us, we may all do our best to attain to it.

I think we shall all agree that the best covering for a churchyard is turf, the paths, where required, being of gravel. I have seen a churchyard, I think St. Peter's, Bournemouth, where the graves were laid out each with a surrounding of path and shrubs, and the result was, to my mind, not happy.

On the importance of keeping the turf constantly cut and free from leaves I need not insist.

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Walls.—What is the best wall for a churchyard? The modern cemetery with its dwarf wall and iron railing is a thing abhorrent; no doubt the most successful wall is a rubble wall with rounded top and moss grown, but this unfortunately is grown, not made. A stone wall in rubble with a red brick coping soon acquires a pleasant weathered look; the wall should, I think, be as irregular as is compatible with proper enclosure. Stone or coursed rubble or red brick with a weathered coping with rough battlemented top looks very well, and I should like to put in a word for the use of buttresses to the wall, not too wide with one offset. I have in my mind a granite wall in rough coursed rubble, with hit-and-miss coping and red brick buttresses at intervals, and overgrown here and there with creepers; the effect is very pretty; they break the long stretch of wall surface and add greatly to the picturesque appearance. One of the pretty country churches I know has next to no wall. It lies about 5 ft. above the road level, with a rubble retaining-wall with ferns here and there, and has a low stone coping about 2 ft. high; but this unfortunately is not always feasible.

Trees.—Having decided upon our walls, the next question is laying out the ground in the most picturesque form. Graves being laid from east to west, paths should, as far as possible, run at right angles to the general line of graves, in order to avoid too tidy an appearance. The graves should also be placed at reasonable distances apart, so that a person may pass to any particular grave without treading upon one adjoining; and this is a matter that is often neglected, probably with a view to burying as many as possible within a limited area—I should hardly like to suggest for the sake of making a maximum sum of money—The path should be plain gravel rolled, of sufficient width to allow a funeral procession, no more, and with grass only at the edges; tiles or iron rails are both inconvenient, unsightly, and give an artificial appearance which is out of place.

With regard to the question of planting a churchyard, much depends upon the situation, locality and surroundings. We are all familiar with the traditional avenue of yews leading to the church porch, or the large tree spreading far and wide over the surrounding graves; and no one will question the fact that from its sombre colour and massed foliage it is very suitable; besides long traditional usage has strengthened its position, but brighter foliage, shrubs and trees are not out of place. Trees like beech and sycamore, which shed their leaves in great profusion, should be avoided for obvious reasons.

For my own part, I think the traditional avenue from gate to porch should be avoided; it is inconvenient for funerals, it cuts a hard line through the churchyard, and prevents cross views. A clump should be placed each side of the lych gate at entry, and in each corner where an angle occurs, or where the churchyard is overlooked too closely. As regards the planting of the churchyard, circumstances and individual tastes enter so much into the matter that I do not feel called upon to make any remarks.

Tombstones and Monuments.—These are unfortunately in many cases entirely beyond the power of the architect to control. In the majority of cases the monumental mason supplies the sorrowing wants of the mourners with graven blocks that add a new pang and indignity to death; if his talent could be restrained to a simple cross with either plain or carved surface it would be endurable, but he ranges from slabs having the appearance of chairbacks in stone to angels whose simper would be out of place in a domestic servant, and the contour of whose limbs is cursed with a commonplace immortality. I have even seen a country churchyard which was as beautiful as natural advantages could make it, vulgarised by the monument to a member of the local squire's family with a cabinet photograph of the deceased let into one side and protected with glass. Wreaths of artificial flowers can be treated with the contempt they deserve.

To my mind the more simple a grave is the better; a low mound covered with turf, at the head an oak cross made of oak 2½ in. thick, the members 6 in. wide, standing about 4 ft. high, and finished by a weathered canopy extending from the head to the extremities of the cross arms, and crowned with a small triple roll is as complete and picturesque a monument as can be desired; there is ample room for the name, date, and whatever else in truth and reason may be required; the material is lasting, in harmony both as to design and substance with its surroundings, and the weather and lichen soon give the surface an exquisite enamelling. I would also call your attention to many of the tombs of the neglected eighteenth century. They, as a rule, may be arranged in two classes, headstones and tombs of the corer order, the outline of the former are often very elegant, and the latter are really in many cases models of refined design; there is an excellent example of this latter in New Shoreham churchyard, Sussex.

How far the debased copies of classical models seen in many churchyards can be regarded as either picturesque or appropriate, I leave you to consider. The representation of a broken column is not in itself an object of beauty, and from a Christian point of view has no sense of fitness.

Churchyard Cross.—This appears to have been an important adjunct from the early ages of Christianity.

The Emperor Justinian made a law (probably legalising an existing custom) 'that none shall presume to erect a church until the bishop of the diocese hath first been acquainted therewith, and shall come and lift up his hands to heaven, and consecrate the place to God by prayer, and erect the symbol of our salvation, the venerable and truly precious rood' (Sir R. Phillimore, 'Eccl. Law,' p. 1761). Accordingly, the service for the consecration of a churchyard, in the old Pontificals, involves the existence of a cross, though from the pictorial illustrations it would seem as if the cross were sometimes only a temporary erection of wood.

An Irish canon of the eighth century, published by D'Achery, seems to indicate their meaning; it directs that a cross shall be set up wherever there is a consecrated ground to mark the limits as well as the sanctity of the place.

One of the constitutions of William of Blois, Bishop of Winchester, made in 1299, says: 'Let a handsome cross be erected in every churchyard, to which the procession shall be made on Palm Sunday.'

An incident recorded in the 'Life of Mr. Richard Baxter' (p. 40 of the folio of 1696) gives a graphic account of the way in which their destruction was often effected, and of the opposition which was sometimes offered to it by the better affected:—

'About this time (*i.e.*, 1640) the Parliament sent down an order for the demolishing of all statues and images of any of the Three Persons of the Blessed Trinity, or of the Virgin Mary, which should be found in churches or on the crosses in the churchyards. My judgment was for obeying the order, thinking it came from just authority, but I meddled not in it, but left the churchwarden to do what he thought good. The churchwarden (an honest, sober, quiet man), seeing a crucifix upon the cross in the churchyard, set up a ladder to have reached it, but it proved too short. Whilst he was gone to seek another, a crew of the drunken, riotous party of the town (poor journeymen and servants) took the alarm, and ran together with weapons to defend the crucifix and the church images, of which there were divers left since the time of Popery.' On the other hand, where the Church party had the upper hand, the churchyard crosses which had been mutilated or fallen into decay were at this period sometimes repaired. Blomfield (Norfolk, i., 362) relates how in 1632 the wooden top of the cross in the churchyard was made by appointment of the Bishop of Norwich. On the top of the side towards the church was painted 'Crux Christi salus mundi'; on the standing part, 'Christus pro nobis passus' on the traverse a wounded heart, and hands wounded with nails, 'Ecce! quanta pro te pertulit'; on the back side, towards the east, 'In Christo spero'; on the standing part, 'Si compatemur conregnabimus'; then on the traverse, 'Reliquit nobis exemplum.' The globe was set up to signify the heavens, coloured with blue, with stars and clouds; on the equator circle, 'Aspiremus permansura eterna'; the lower part coloured green to signify the earth, with trees and flower, on it 'Quid tumultuamur et peritura possidemus.'

If the crosses which remain be studied it will be seen that they divide themselves into two classes, of very different style of design, which may be called pre-Gothic and Gothic. The former are usually richly decorated as beautiful ornaments of the court of the sanctuary and appropriate monuments to the undistinguished dead whose dust lies thick around.

The churchyard crosses of Ireland form in themselves a subject of unique interest, and from their design and form are suitable as models for reproduction in England. I have a few photographs of some of the better known crosses. Generally speaking, these crosses were erected for sanctuary or commemorative purposes; in very exceptional circumstances only were standing crosses sepulchral, as appears from a homily on the life of St. Patrick. The sepulchral crosses were generally cut on incised slabs. Of these latter many examples remain both in England and Ireland. The simplest form is generally a Latin cross floriated at the top and cross ends, and having a circle round the crossing or quatrefoil, the cusps of which are also floriated. It was customary on choosing a site for a church or monastery both to indicate and hallow the site by the erection of a cross; thus from the Book of Lismore we learn that St. Columba, when he founded a church where Swords now stands, 'marked out the well named "sord,"' *i.e.*, pure and sained a cross.

The form of the Irish crosses is in nearly every case almost the same, a Latin cross having a circle round the crossing erected upon a stone base, the material granite or freestone, and the inscribed ornament the Crucifixion, the Twelve Apostles and other Scriptural worthies, and representations of sacred scenes or emblems. The base and remaining surfaces are covered with that implicated work common to all Scandinavian carving. Most of the crosses had originally a roofing stone, but this has generally disappeared.

The following is a detailed description of one of the high crosses at Castledermot Monastery, county Kildare. The date of the cross is slightly earlier than 900 A.D.:—Castledermot North Cross—Height, 10 ft. 3 in.; 3ft. 10 in. across the face; shaft, 10 in. across face, 11 in. thick. The plinth is 3 ft. high by 2 ft. 8 in. at base, and has two panels on each face. The face of the cross is divided into seven panels. The whole cross is carved out of one stone. The roofing stone, probably about 18 in. high, is lost. The centre panel at the crossing has on one side 'The Fall,' and on the other its expiation (for the carving on these crosses was always highly symbolical), the Crucifixion. The four panels round the centre, starting from the top, are: Top, Martyrdom of St. Peter; right, David with a harp; bottom, Daniel in the lions' den; left, Sacrifice of Isaac. The two remaining panels in the shaft have three figures in each. The reverse has three figures in the four panels of the head, making up the Twelve Apostles; and in the shaft, Abraham receiving gifts from Melchizedech denoted by the chalice and paten carved between the two figures, and the bottom panel has two figures unknown.

The base has on one side a sitting figure, swathed, clasping its knees; this is very curious, and is used to signify death. The bodies found on opening many cromlechs are swathed and in the same position. The reverse has the miracle of the Loaves and Fishes. The remaining panels and spaces are carved with the implicated ornament mentioned above.

Lich-gate (from Anglo-Saxon *lich*, a corpse), a churchyard gate with a roof over it, under which, on the occasion of a funeral, the corpse and its bearers may await the coming of the officiating minister. They are sometimes of stone—as at Birstall, Yorks—but more frequently of timber, and form a picturesque and suitable entry to the churchyard.

Some of these gates have chambers over them, as at Barking, Essex, where the one chamber was formerly called the Chapel of the Holy Rood; and at Bray, Berks, where the two chambers are connected with some charitable bequest. At Tawstock, Devon, there is a small room on each side of the gate, having seats on three sides and a table in the middle.

There is also sometimes, especially in Cornwall, at the churchyard-gate a great stone, called the Lich stone, on which the coffin can be placed while the funeral procession is waiting, as at St. Winnow, Cornwall. Such stones are sometimes found at a distance from the churchyard as a resting-place for the coffin on its way to burial, as at Lustleigh, Devon.

With regard to the design of lich-gates, so many different examples must be familiar to you that I will not do more than make a few suggestions. They should be simple, consist of three entries, two side gates and one large gate for the entry of hearse, &c., sufficiently lofty, and the roof timbers open and not

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covered in any way. It is seemly to erect a cross over the centre, and the beams facing both ways may be painted with suitable inscriptions in red or black. Oak is the most suitable material for the framing, simply oiled to resist the weather, on a stone or brick base, and covered with tiles or slates or small stone slates as the locality affords. I have never seen them used, but would suggest oak shingles for a covering. They take a pleasant tone from the weather and are durable.

Finally, I hope this paper will give rise to an interesting discussion on a matter that is considered comparatively little by architects, and I have therefore made my paper short, giving rather suggestions than a set treatise. Let us bear in mind that the greatest and best rule for success is simplicity, and giving Nature, as far as possible, a free hand within proper and conveniently arranged limits."

Mr. F. C. Eden proposed a vote of thanks to the author. Coming to the paper in detail, he thought that too many paths in a churchyard were undesirable, breaking up the appearance of repose, and that beside the gravel mentioned in the paper, in some districts stone flagging and stone pitching were available and might be used, and he rather favoured the old-fashioned cobble paving, which enabled one always to have a dry path to walk on; asphalt, however, he deprecated. The enclosure to a churchyard—a low wall, 4 ft. high, with good round coping—seemed good; perhaps—in the country, anyhow—a thick and well-trimmed hedge could hardly be improved upon. A sunk hedge in some hilly districts should also be noted. Abroad, in Italy, one meets with shrines treated in colour, with lamps burning before them—certainly an interesting feature where found. He did not agree as to the oiling of oak work in the lych-gate; left untouched seemed to him much more satisfactory and better for weathering. He spoke with emphasis against white marble or polished granite, as not mellowing with time, and seeming cold and harsh amongst the other surroundings. He favoured, with Mr. Crawfurth Smith, the more frequent use of oak in monuments, either as a cross at the head of a grave, or else in the long board placed longitudinally with a post at either end, with inscriptions painted on white ground. Runic crosses (of which some photographs were shown) could hardly be looked upon as models for us nowadays, specially with their incised work, the *motif* of which is now almost unintelligible. He recalled a burial-ground belonging to the Society of Friends where all the tombstones were alike in height and all other respects, and he thought perhaps the quiet, peaceful, aspect so noticeable was largely due to this cause, and contrasted favourably with the showy and irregular treatment of a modern cemetery. Two features connected with the churchyards of old times had perhaps been overlooked—the stocks and the charnel houses. The latter existed connected with St. Paul's and also in Finsbury Fields.

Mr. Geoffrey Lucas, dealing more with cemeteries, recalled the Act by which if any cemetery was brought within 200 yards of any inhabited house, permission from landlord and tenant was to be obtained. The chapel, he held, too, was often a very doleful place, and when planned after the fashion of college chapels (mourners facing each other) was not so suited for requirements as when planned with seats the ordinary way, space for the bier and a special exit door being provided against the sanctuary. Artificial flowers ought always to be disallowed in a cemetery.

Mr. R. H. Weymouth called attention to the many interesting tombstone heads of the seventeenth and eighteenth centuries to be found in Suffolk, with flat carving in the head and scrollwork, and usually thinner (say 2½ in. to 3 in. thick), than modern headstones. The practice, too, of railing in any monumental cross, &c., close round the steps at its base seemed to detract from the quiet blending of the cross or monument with its surroundings.

Mr. Crook suggested that perhaps the reason that churchyards were mostly on the north side of the church might have been that the vicarages would naturally be placed on the sunny side in close proximity to the church, and hence this fashion might have arisen. He thought that marble monuments, especially for county families of some means, were quite reasonable, being so durable.

Mr. J. S. Blunt called attention to the oak crosses and lych gate to the churchyard at Cheam, the lych gate with shingled roof. Many of the trees, too, of churchyards throughout the country were historical, and sometimes artistically lopped and trimmed. He thought that perhaps Mr. Crawfurth Smith had overlooked in his paper the sundials to be found in many churchyards, especially in North Wales.

Mr. W. A. Pite viewed the churchyard as "God's Acre" and a "Garden of Sleep," therefore to be treated as no common field; and held that the way in which many churchyards in the country were kept, with sheep browsing, &c., was an absolute disgrace. He called attention to the beautiful treatment of the cemetery at Ramsgate by the late Mr. George Gilbert Scott, with its ample lych gate and rooms for keeper over. No churchyard should be viewed as a place of gloom and be full of ugliness (the mark of many modern monuments); it called on all hands for care and reverence. The tombstones of Old Germany consisted of a plain stone with bronze tablet let in—a method, though expensive in execution nowadays, certainly very satisfactory in appearance.

Mr. H. P. G. Maule agreed heartily with Mr. Pite's remarks, and thought the family vault ought to be certainly forbidden and disallowed as insanitary in the highest degree.

Mr. C. H. Brodie held that where churchyards in towns were disused and rights of way existed over them, paths outside the churchyard walls should be obtained, and many a churchyard in town has had its peaceful character and beauty spoiled by the broad asphalt pathways cutting it up into small irregular pieces. The old thin slate headstones, with flat carving, to be found in some parts, were very beautiful and suitable.

The Chairman called attention to the many uses the churchyard and the porch of the church were put to in former days, as for vestry meetings and proclamations by the sheriff, &c. A church house, for those who came from a distance to have their mid-day meal in, kept by the sexton, was (according to Mr. Baring Gould) the origin of many a public-house now just outside the churchyard. All must rejoice that the churchyards of Dickens' days were things of the past.

Mr. George H. Smith thought, perhaps, rather the church house was the home of the parish priest and his assistant, where they lived in times bygone. He understood that yew trees were ordered by Act of Parliament of Edward I.'s reign to be grown in all churchyards for the sake of making bows for the archers, but was himself a little uncertain as to this, and could not put his hands on the authority for this statement. With regard to the uses of the churchyard in former days, parish or miracle plays were generally held within it.

A cordial vote of thanks was accorded to Mr. Crawfurth Smith for his paper, and to Mr. George H. Smith for reading it on his behalf.

ARCHITECTURAL SOCIETIES.

DEVON AND EXETER ARCHITECTURAL SOCIETY.—The following is a summary of the substance of a paper read by Mr. James Crocker on the 6th inst., for which we have not hitherto been able to find space:—

Some Recent Law Cases as Affecting Professional Practice.

There are two or three classes of cases affecting us as a profession; such as actions for the recovery of fees, actions for alleged negligence in the fulfilment of duties, actions arising out of withholding certificates, and for penalties, besides other litigation having a bearing on building operations, although not directly between architect and client. I shall endeavour to place a few of these before you, giving only the leading facts and results, and classifying them as well as may be possible.

I take first the case of *Burrough Hill* v. *G. A. Barnard*, in which the plaintiff (an architect) claimed of the defendant (also an architect) 8*l.* 8s. 8d., balance of an account for attending court and giving evidence in support of the present defendant's claim for fees against his client, in which, after a three days' hearing, he had succeeded, with costs.

In the case of *Hutton* v. *Chorley* (heard before Mr. Justice Channell and a jury) the plaintiff claimed 147*l.* for preparing plans, specifications and quantities for altering and rebuilding an hotel, to cost 1,800*l.* or 2,000*l.*

Phipps & Jackson v. *Brownrigg* was a curious claim for 526*l.* 5s., prosecuted by the widow of the late C. J. Phipps and his partner, Mr. Arthur Blomfield Jackson, for plans and drawings for a proposed theatre in the Haymarket, and, in the alternative, damages by reason of the defendant's failure to get the plans approved of by the London County Council. His lordship said the matter had been shipwrecked by the action of the County Council in rescinding their approval of the site; but as that prevented the approval of the plans coming before the Council, he reluctantly gave judgment for defendant without costs, expressing the opinion that some satisfaction should have been given.

Whipham v. *Everitt*, before Mr. Justice Kennedy in the Queen's Bench, is worth recording because of its bearing upon the scale of the Royal Institute of British Architects. Plaintiff brought an action to recover 169*l.* 16s., being 3 per cent. on 5,660*l.*, the amount of a single tender for plans and specifications for the erection of a villa at Saltburn.

I now pass on to summarise as briefly as possible the facts connected with the recovery of fees in a "quantity" case. One further case will perhaps suffice.

Arthur Crocker v. *C. J. Head.*—The former, a quantity surveyor of Fenchurch-street, sued the defendant, a chemist, for 24*l.* 15s. 6d. The plaintiff had, as is usual, received his instructions from the architect, it was said with the full concurrence of the defendant, but the latter denied this. The work was suddenly abandoned when the estimates came in, and the defendant settled his architect's account, but refused to entertain that of the quantity surveyor. He had, however, to pay it in full. This is not an uncommon contingency in the course of practice, and appears to prove that if an architect's instructions are to obtain tenders, he may do what is reasonably necessary in order to get them. Speaking broadly and generally, it is seldom a recalcitrant client can escape liability for work done by an architect when there is nothing of the nature of a speculative agreement between them. On the other hand, it is by no means certain that the 3 per cent. scale can be maintained for work abandoned after the tendering stage.

With reference to *Light and Air*, I will refer to two cases of a typical character, which may indicate how dangerous it is under certain conditions to take away even a small portion of that in which a man enjoys the same right as he does in his freehold.

May I say first that air is generally erroneously mixed up with light, and no action can be maintained for air unless it be so interfered with as to amount to something like positive contamination, rendering it injurious to health. The case of *Brown and others* v. *Collings* may come under this head. The *locus in quo* was in the High-street, Bromley, Kent (I have a rough sectional sketch of the facts). From it you will see that the width across from window to obstruction is about 60 ft., and the windows themselves are between projecting wings. That labelled "A" was the one argued on, as others followed it. Old sheds of defendant's building gave light over an angle of 12 deg. The new buildings were proposed to go up to about 32 deg., still leaving 58 deg. of sky surface, whilst the loss of light would be 20 deg. An injunction was applied for and an interim injunction granted in November, 1896. The case came before Mr. Justice Romer in, I think, June 1897, but he would not decide, and asked for both sides to agree to have a report from an architect. This was done and Mr. Gruning sent a report, saying in brief that under 45 deg. no obstruction was, as a rule, caused, but in this case, owing to window at "A" being so recessed by back buildings, he fixed the angle of obstruction at 33 deg., and as defendant did not go so high, he considered that plaintiffs had no case. The judge accepted this report, and the defendant completed his building, but on appeal, heard in February, 1899, this was reversed; the judges holding that *no* light previously enjoyed could be taken away, but hinting that the plaintiffs should not be too hard upon the defendant in letting him go up to a reasonable height. The result was that the latter was compelled to pull down one story, leaving the angle of obstruction about 23 deg. or 24 deg. only. Thus it appears that even in a width across of 60 ft., with an existing sky surface of 78 deg., when there is no *lateral* light, it may be possible for a dominant owner to maintain a right to *all* the light he has hitherto enjoyed. This is rather a startling possibility.

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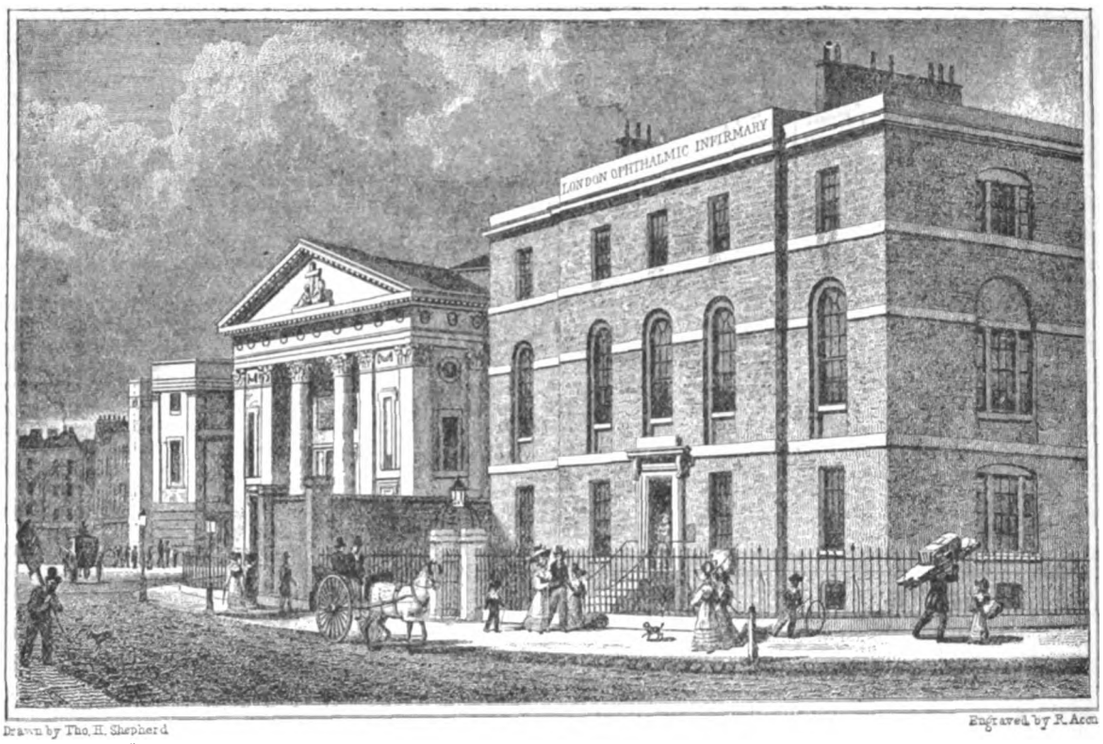

St. Mary's, Moorfields, and the Ophthalmic Hospital.

Illustrations.

DESIGN FOR A CHAPTER-HOUSE.

THIS design, by Mr. Percy E. Newton, was originally submitted in competition for the Soane Medallion some few years ago. It was this year exhibited in the architectural room at the Royal Academy.

The chapter-house is supposed to be attached to the south side of the cloisters of a cathedral church, and was to be fan-vaulted in stone from a central pier. It will be noticed that the equilateral triangle and hexagon enter largely into the plan. The buttresses are triangular on plan, and the turrets are hexagons contained in these triangles. There is a gallery at the window sill level, with a passage under. Underneath again is the crypt. The small windows high up light and ventilate the roof above the vaulting.

DESIGN FOR A STREET FRONT.

THIS is the principal elevation of the design for a street front by Mr. Henry Tanner, jun., which gained the Architectural Travelling Studentship at the Royal Academy this year. Mr. Tanner sends us the following note in regard to it :—

The design for the Street Front for the Royal Academy Studentship was to be for a frontage 120 ft. long, and to comprise four shops with flats and chambers over.

The total height was to be within that prescribed by the London Building Act—the number of floors not stated.

The entrance to the chambers above is in the centre, and the staircase (with lift in well) would be at back of central hall, lighted by area. The design is for a stone building, the fascia above shop fronts would be supported by girders.

THE WOOFINDIN CONVALESCENT HOME, SHEFFIELD.

THIS building, now almost completed, is situated on ground sloping down to the Porter Brook, and overlooks Whiteley Wood, a valley recently acquired for a public Park by the Sheffield Corporation. The site contains about seventeen acres, and is about three miles from the centre of the city.

The building has been placed on a plateau excavated out of the hill-side for the purpose, and is extended east and west so that the whole of the day-rooms may face south. The views across and along the Porter Valley are, on this side, very beautiful, and the building is quite protected on the north by high ground backed up by a belt of trees.

The entire cost of the building, as well as the endowment of the institution, is met by the bequest of the late George Woofindin, of Sheffield, and accommodation is provided for forty patients, who will have a free three weeks' visit. There will also be room for thirty additional patients, who may be admitted at a small charge.

On the ground floor, the dining-hall, together with the principal entrance hall—from which it is separated by an oak screen—occupies the centre of the front, and is marked by its greater height from the side wings. The above-mentioned apartment, 50 ft. by 24 ft., is lined to a height of 5 ft., with oak panelling. In the east and west wings are respectively the women's and the men's day rooms. The former comprise a reading and writing-room and a parlour ; the latter have, in addition to these rooms, a billiard and smoking-room. In the women's wing are also placed the business room and the matron's sitting-room. A wood verandah runs in front of each wing. Behind the above-mentioned rooms a straight corridor extends the whole length of the building, at the ends of which are placed box rooms, lavatories, cloak rooms, &c. On the north side of the corridor are matron's stores, the kitchen, and other offices.

On the first floor are the bedrooms, those for men being—as in the case of the dayrooms—in the west wing, and for women in east wing. In these the cubicle system has been adopted, the space being divided into rooms for two or three beds each by wood partitions 7 ft. high. The cubicle windows on the south front open out on balconies over the verandahs. Lavatories and bathrooms are placed—as on the ground floor—at the ends of the wings, and from these there is at each end an emergency door and escape stair in case of fire.

The central portion of the first-floor—which has been somewhat modified since the drawing was prepared—is on a higher level than the wings and contains the matron's bedroom, and cubicles so arranged as to be capable of being used wholly or in part for patients of either sex. The roof space is used for servants' bedrooms. The Enfield Company's best red pressed bricks from Accrington have been used for all the faces with Matlock stone dressings and Peakes mottled tiles for roofs. The floors throughout are of concrete covered with terrazzo or pitch pine blocks. The architects are Messrs. Hemsoll & Paterson, of Sheffield, and the contractors Messrs. Dawson & Jones, of Huddersfield and Sheffield.

DESIGN FOR AN ENTRANCE LODGE.

THE design for an entrance lodge is of the central archway type, and was suggested by a much smaller entrance at Cranborne Manor in Dorsetshire. It consists of two blocks planned diagonally, connected by an archway 12 ft. wide, with quadrant flank hedges forming a recess from the road.

The ground-floor contains a living-room, with stairs to the first-floor, and gardener's tool-house, and on the first-floor are three bedrooms. The materials proposed to be used are red brick with sandstone dressings ; the roof to be of stone slate.

The drawing was exhibited in the Royal Academy Exhibition of 1900.

H. INIGO TRIGGS.

DETAILS OF AN AMERICAN FRAME-HOUSE.

THESE constructional details are given in connexion with the second part of Mr. Budden's paper on "An American Frame-House," printed on another page, and are referred to there.

ST. MARY'S CHURCH AND THE OLD OPHTHALMIC HOSPITAL, MOORFIELDS.

THE demolition of St. Mary's Roman Catholic Church and the adjacent (old) buildings of the Royal London Ophthalmic Hospital in Moorfields is now in progress. The latter buildings were erected in 1824-5 after the plans and designs of Sir Robert Smirke, R.A., and, together with their site, were sold recently for 78,000*l*. The sale enabled the committee of management to erect new premises (at a cost of 80,000*l*.) upon a much larger scale, and with accommodation for 138 in-patients, on a site in City-road leased at 1,210*l*. per annum from the Ecclesiastical Commissioners, the architect being Mr. Keith D. Young, of the firm of Messrs. Young & Hall. Under a scheme framed by the Charity Commissioners, the proceeds, amounting to 202,000*l*, of the sale of the church, presbytery, and schools, are appropriated to the erection of a new church, with clergy-house and schools, upon a site which the trustees have bought in Eldon-street and Sash-court, Finsbury ; to a sum of 50,000*l*. in aid of completing the fabric of the new cathedral at Westminster ; and to a sum of 20,000*l*. towards the paying off of any mortgage of the cathedral's site ; the annual income will then be applied to the maintenance of the new buildings (to the extent of 400*l*. per annum) and the support of the cathedral. St. Mary's Church was built by Paynter & Haynes, contractors, in 1817-20, at a cost of 26,000*l*., after John Newman's plans and designs, for a congregation who had found a temporary settlement in White-street after the "No Popery"

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rioters, on June 4, 1780, had burned Father Dillon's chapel, opened in 1744 in Ropemakers'-alley—now Ropemakers'-street. There seems to be no possibility of preserving the picture, 55 ft. by 33 ft., painted on the rounded wall of the apse by Aglio, of Cremona, and repainted by him in 1837,* of which, with the high altar and the marble columns (by Comulli, of Milan) in front of the picture, as lighted from above the entablature, we published an illustration from a drawing by Mr. A. C. Conrade, on November 25, 1899. High mass was celebrated in St. Mary's for the last time on Sunday, November 12, 1899. In July last the site, covering in all 18,400 feet superficial, was disposed of under a building lease for eighty years at a rental of 9,500*l.*

EDINBURGH ARCHITECTURAL ASSOCIATION:

BOTHWELL CASTLE.

AT a meeting of the Edinburgh Architectural Association recently, Mr. G. S. Aitken read a paper on "Bothwell Castle," which was illustrated by a series of specially prepared lime-light views. Having described the situation of the castle—on the north bank of the Clyde, about eight and a half miles south-east from Glasgow—Mr. Aitken went on to speak of the present ruin, which consists of the southern portion of the original building, conspicuous for its great western and south-eastern towers and their connecting walls, and occupying a space of about two-thirds of its ancient extent. The architectural features of these towers were dealt with, and the mason's marks in the great western tower were described. What object these marks served had, he said, not been determined, but the system was certainly very ancient, marks having been found on Egyptian masonry. Some experts supposed them to be symbolic; others that they were cut in the stones to show whose work they were, and how much the workmen were entitled to receive in payment. He would suggest, however, from an examination he had made of the ruins, that while the marks might be the property of particular masons, they also served the purpose of indicating the intended position of each stone in the building. The master mason, as any modern clerk of works would do, planned the various courses of masonry, marking in his drawing the symbol of each man to be engaged upon them, and allotting in that way to each hewer his work, which readily found its place in the building on reference to the master mason's original draft. The marks might also have been intended to aid in settling the amount of money that fell due to each, and at the same time assigning to the individual mason the credit due to him for workmanship.

Proceeding to speak of the history of the castle, Mr. Aitken said that three distinct families, the Olifards, Morays, and the Douglases, have been connected with Bothwell Castle from the time of its origin till the erection of Bothwell House—situated a little to the east, the centre and north wings of which were designed by James Playfair in the eighteenth century. If we examine the details of the various parts of the castle and determine their dates, it would not be difficult to find out what share each house had in their erection. We had good reason for stating that the western tower, enclosed within the inner bailey, was the work of the Olifards, because its detail is Early English, the vogue in their time. We go further to say there is every reason to suppose that they erected a complete castle with the more extended outline disclosed by the excavations undertaken in 1888. The period of their occupancy from the time of William Olifard, the second Justiciary of the Lothians, which was probably about 1180, and the date when Bothwell passed into the hands of the Morays (nearly 110 years), gave ample time to carry it out in its entirety.

It seemed clear that no building of any moment could have been done during the occupancy of the Morays from the year 1292 till the date of its dismantling in 1337. The English, who often held possession during this time, were not likely to extend it, and the Scots in their turn had no chance of doing so.

We infer, therefore, that it was carried out during the time of the Olifards; the assumption was eminently reasonable when we consider that according to a contemporary record, Caerlaverock Castle, which closely resembles Bothwell in idea, was by this date complete with its circular towers and curtain walls, and we have besides further confirmation in the condition of castle building across the Border, for at an earlier date than we are considering—the reign of Stephen of England—there had been erected 1,115 castles in England, many of them having the full arrangements of a fortalice, so that allowing for the late development of castle erection in Scotland, there is nothing unreasonable in assuming that Bothwell was complete prior to the invasion of Edward I., at the end of the thirteenth century. The dismantling in 1337, intended to render the castle useless to an invader, and to relieve the owner at the same time of the task of defending it, went so far, we may suppose, as the destruction of the western half of the great tower and the reduction in height of all the rest of the walls and towers.

As the Douglases when they came into possession in 1361 had Tantallon and Douglas Castles, we may presume that having these fortalices, they would only restore so much of Bothwell as served for occasional occupancy. If we assume that they confined their restorations to the south part, at present standing, this will solve all the difficulties of the date problem by assigning to *them* the erection of the banqueting-hall, chapel, and south-east tower, which are all works of their period. As a matter of course, they would make the great western tower available for living in by building the existing cross wall, and also complete their labours by enclosing the area connected with the reinstated castle by the erection of the present north curtain wall. This theory fits all the pieces of the puzzle together.

Mr. Thomas Ross, who moved a vote of thanks, expressed the hope that the lecture would be fully illustrated when published in the "Transactions." Mr. James Bruce, ex-President, in seconding, referred to the slide shown of the Douglas arms over the postern. The arms are ermine, a heart, on a chief three stars. He was followed by Mr. Rae Macdonald, Marchmont Herald, who gave some very interesting information on the heraldry of the castle.

IMPROVEMENTS IN BRIDGE CONSTRUCTION.

FROM the November issue of the *Journal of the Franklin Institute* we learn that the Elliott Cresson gold medal has been awarded to the Pencoyd Iron Works in recognition of the advanced position attained by that company in the field of bridge and other structural engineering. The works particularly selected for commendation by the Committee on Science and the Arts were the Niagara Falls and Clifton Bridge and the Delaware River Bridge, in connexion with which there are some features of special interest. In the case of the Niagara Bridge the conditions were both difficult and exacting; the main span is of unusual length—being fully 200 ft. longer than any such structure hitherto attempted—and the great depth of water and the rapidity of the current rendered false works impracticable. The structure is one of the type known as the two-hinged arch, consisting of two complete arch trusses, resting on cast steel abutments built into solid rock at each side of the river and rising to a height of 150 ft. at the centre. The points of interest in this case are, (1) the method adopted for closing up the arches at the centre, so that all undesirable strains due to cantilever erection are eliminated; and (2), the accuracy with which the whole work was made to carry its calculated strains. The Delaware River Bridge, built for the Pennsylvania Railroad Company, has three fixed spans of 533 ft. and one draw span of 323 ft. In the former the construction is such that all members are absolutely straight when under their maximum strain, and the secondary bending strain of the members is considerably reduced. The draw span is probably the heaviest example extant of centre-bearing construction. Some of its mechanical features are entirely novel, notably the counterbalanced latch, the catch for which is so arranged that if the draw reaches the closing point at too high a speed, the latch will pass over the opening without causing injurious shock to the structure.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A BUSINESS meeting of this Institute will be held on January 7, when, after the election of candidates for membership, the Chairman will move the adoption of the amendments and additions indicated below, in the paper of "Suggestions for the Conduct of Architectural Competitions." The paper, as revised, reads as follows:—

"1. The promoters of an intended competition should, as their first step, appoint one or more professional assessors, architects of established reputation, whose appointment should be published in the original advertisements and instructions, and whose decision should govern the selection of the designs.

The President of the Royal Institute of British Architects is always prepared to act as honorary adviser to promoters in their appointment of assessors.*

All the designs sent in should be submitted to the assessors.

2. The duty of assessors should be—

(*a*) To draw up the particulars and conditions as instructions to competitors, and to advise upon the question of cost;

(*b*) To determine which of the designs conform to the instructions, and to exclude all others;

(*c*) To advise the promoters on the relative merits of the designs admitted to the competition, and to make a selection in accordance with the conditions.

3.† Every promoter of a competition, and every assessor engaged upon it, and any employee of either, should abstain absolutely from competing, and from acting as architect, for the proposed work.

4† The number and scale of the required drawings should be distinctly set forth, and they should not be more in number, or to a larger scale, than necessary to clearly explain the design. If perspective views be required, it should be so stated; and they should be uniform in size, number, mode of colouring, mounting, or framing (if any), &c.

5. Competitions should be conducted in one of the following ways:—

(A) By advertisement, inviting architects willing to compete for the intended work to send in designs. The promoters, with the advice of the assessor or assessors, should make their selection from such designs. The author of the design awarded the first place should be employed to carry out the work.

(B) By advertisement, inviting architects willing to compete for the intended work to send in their names by a given day; with such other information as the candidate may think likely to advance his claim to be admitted to the competition. From these names the promoters, with the advice of the assessor or assessors, should select (*a*) an architect to carry out the work; or (*b*) a limited number to compete, and each competitor thus selected should receive a specified sum for the preparation of his design. The author of the design awarded the first place should be employed to carry out the work.

(C) By personal invitation to a limited number of selected architects, to join in a competition for the intended work. Each competitor should receive a specified sum for the preparation of his design. The author of the design awarded the first place should be employed to carry out the work.

6. No design should bear any motto, device, or distinguishing mark; but all designs should be numbered by the promoters in order of receipt. Any attempt to influence the decision of the promoters, or of the assessor or assessors, should disqualify a competitor.

7. In every case the amount of premium or remuneration for the competitive designs should be fixed‡ under the advice of the assessor or assessors, *and should be paid in addition to the usual professional charges for carrying out the work.*

8. Where a deposit is required for supplying the instructions, it should be returned on the receipt of a *bona fide* design; or if the applicant declines to compete and returns the said instructions within a month after their receipt.

9§ Each design should be accompanied by a

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* In a letter to the *Times*, November 18, 1899, his grand-daughter states that she possesses "a steel engraving, drawn, engraved, printed, and painted in the same colours as the picture by the artist himself," and the original design in water-colour for the ceiling which he painted at the same time.

* This sentence is new.

† Clauses 3 and 4, as they stand in the existing document, are as follows:—

3. Every promoter of a competition, and every assessor engaged upon it, should abstain absolutely from competing, and from acting as architect, for the proposed work.

4. The number and scale of the required drawings should be distinctly set forth, and they should not be more in number, or to a larger scale, than necessary to clearly explain the design. If perspective views be required, it should be so stated; and they should be uniform in scale, number, mode of colouring, &c

‡ The existing clause reads:—

7. In every case the amount of premium or remuneration for the competitive designs should be fixed *by the promoters, acting* under the advice of the assessor or assessors, and should be paid in addition to the usual professional charges for carrying out the work.

§ Clause 9 is entirely new, and the following clauses have been re-numbered.

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declaration, signed by the competitor, stating that the design is his own personal work, and that the drawings have been prepared under his own supervision.

10. A design should be excluded from a competition—

(*a*) If sent in after the period named (accidents in transit excepted);

(*b*) If it does not substantially give the accommodation asked for;

(*c*) If it exceeds the limits of site as shown on the plan issued by the promoters, the figured dimensions on which should be adhered to until officially altered;

(*d*) If the assessor or assessors should determine that its probable cost will exceed the outlay stated in the instructions, or the estimate of the competitor should no outlay be stated; provided always that should the assessor or assessors not have been consulted in the first instance respecting the cost, as recommended in paragraph (*a*) of Clause 2, and should he or they be of opinion that the outlay stated in the instructions is inadequate for the proper execution of the proposed works, the assessor or assessors shall not be bound in the selection of a design by the amount named in such instructions, but the question of cost shall nevertheless be a material element in the consideration of the award;

(*e*) If any of the other instructions are violated.

11. It is desirable that all designs submitted in a competition, except any excluded under Clause 9, should, with the consent of their authors, be publicly exhibited after the award has been made, which award should be published at the time of exhibition.

12. The architect whose design may be selected as the best should be employed to carry out the work, and he should be paid in accordance with the Schedule of 'Professional Practice as to the Charges of Architects' sanctioned and published by the Royal Institute. If no instructions are given to him to proceed within twelve months from the date of the selection, he should receive adequate compensation in addition to the premium (if any) awarded to him. In the event of a part only of his original design being carried out, he should be paid a sum to be agreed upon in respect of the deferred portion, such sum to be merged in the usual professional charge when the completion of the design is proceeded with.

*** It should be understood that the Royal Institute issues these suggestions as a guide to promoters where a competition has been decided upon, but not as necessarily recommending the principle of competition."

At the same meeting Mr. Lewis Solomon has given notice of his intention to move the following resolution:—"That the Institute is responsible for the inferior position of architects as compared with that of other professions, and that a committee be appointed to inquire into the causes of this inferiority of status and to suggest remedies."

THE POST-OFFICE LONDON DIRECTORY.

THE 102nd annual issue of this indispensable work (issued by Kelly's Directories, Limited, High Holborn, W.C.) contains all the useful divisions of previous issues corrected down to the latest moment compatible with its appearance at this time. The new House of Commons and Ministry and the new School Board are given, and the establishment of the Metropolitan Boroughs has been noticed in the Streets Division by the insertion in each street heading, after the Postal District, of the name of the Borough in which the street is situated. The arrangement of the work remains unaltered, but we regret that the interesting "note" which accompanied the 100th edition of the work, and which was included in the last edition, has been omitted—no doubt in order to economise space. Excluding advertisements, the Directory extends to nearly 3,500 pages and, as it appears necessary to add to that number from year to year, the time appears to have come when the work should be divided; for, valuable as the Directory is, it is somewhat unmanageable. Not the least valuable part of the Directory is an excellent map, mounted on linen.

The work has been carefully edited, but we regret to notice in the list of architects in "Trades" that the small "f" indicating Fellow of the Institute of Architects and the † indicating Surveyor have been rather indiscriminately used or omitted. Still, the Directory is a credit to its publishers.

SUNDAY SCHOOL BUILDINGS, ROGERSTONE, MONMOUTHSHIRE.—New Sunday school buildings have been erected at Rogerstone from plans by Messrs. Habershon, Fawckner, & Groves.

COMPETITIONS.

GLASGOW ROYAL INFIRMARY.—An adjourned meeting of the Executive Committee of the subscribers to the Queen's Diamond Jubilee Fund for the reconstruction of Glasgow Royal Infirmary was held in the City Chambers on the 19th inst. The minutes of the meeting of 12th current, and the minutes of the Sub-Committee on Plans of November 24 and December 3, containing reports of the assessor and measurers on the plans sent in by the ten competitors, having been read, Sir D. Richmond moved, and Mr. J. Glen seconded, that plan marked F, placed first in order of merit by the assessor, be adopted. Mr. John E. Nelson moved, seconded by Mr. John S. Templeton, that plan marked E be adopted, and Mr. Hugh Reid moved, seconded by ex-Bailie Robert Anderson, that plan marked B be adopted. These motions having been made, Dr. Rowand Anderson, the assessor, who was in attendance, answered some questions. Thereafter the vote was taken, when 8 members voted for plan F, 10 for plan E, and 3 for plan B. Plan B being struck out, its supporters voted on the other two plans, with the result that plan E had 11 votes and plan F 10 votes. The Lord Provost having opened the sealed envelope marked E the author was declared to be Mr. James Miller, I.A., West George-street, Glasgow. The Committee unanimously appointed Mr. Miller architect for the reconstruction of the infirmary, the work to be carried out in such manner and to such extent as the Committee may from time to time determine. The plan provides for the reconstruction of the whole of the present buildings, adapting them in every respect for the purpose for which they are intended. It is in the Scottish Baronial style, and forms three sides of a square, the opening being towards Castle-street. The cost of the reconstructed buildings is estimated at 224,500*l.*

Correspondence.

To the Editor of THE BUILDER.

"FRENCH ARCHITECTS AND SCULPTORS OF THE EIGHTEENTH CENTURY."

SIR,—In the important review kindly devoted by you in your number of December 22 to the second part of my work on French Art in the Eighteenth Century, you remark:—

"Whether the author has written altogether from personal observation of buildings, or from illustrations, is rendered rather doubtful by the remark in regard to Gabriel's Ecole Militaire—'Standing as we see it now from the Champ de Mars, in isolated dignity, it is impossible to imagine a more gracious and courtly building.' The Ecole Militaire has certainly never been seen from the Champs de Mars since the commencement of 1889, when the Galerie des Machines was completed, so that one must conclude either that the author has been imagining a little too much, or that this book has been in hand more than eleven years."

The writer of the review is, apparently, unacquainted with the distinction between the terms "Champ de Mars" and "Place du Champ de Mars." The "Champ de Mars" includes not only the "Place du Champs de Mars," but the avenues by which it is surrounded and the ground on which the Ecole Militaire stands. There is a space of 20 mètres at least between this building and the condemned Galerie des Machines (which masks at present the view from the "Place du Champs de Mars"), quite sufficient at any rate to allow one to see the Ecole standing in isolated dignity. I have just shown the article in the *Builder* to a most competent Parisian authority, who said:—"C'est comme cela que je vois l'Ecole moi-même du Champs de Mars. Il n'y a pas de bâtiment que l'approche; il y a 20 mètres entre elle et la Galerie des Machines; bien assez de recul pour la voir isolée dans sa dignité."

The only other hostile criticism regards the distribution of the tissue-paper titles. Allow me to say that this is not the work proper to the author, but to the binder, and as I have found them correctly distributed in several other copies, I hope there are but few examples of such regrettable confusion.

EMILIA F. S. DILKE.

Hôtel St. James.

*** In modern literature, French and English, and in ordinary conversation, the "Champ de Mars" is always understood to mean the open space itself; and as to a "Place du Champ de Mars," Baedeker at all events knows nothing of it, either in map of Paris or index; and to say that seeing the Ecole Militaire from the other side of the Avenue de la Motte Piquet is equivalent to seeing it from the Champ de Mars, is absurd. It is exactly because it is *not*, that the Paris authorities propose to demolish the Galerie des Machines, in order that Gabriel's building may really be seen from the Champ de Mars, as it used to be.—ED.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

22. ELECTRIC TRACTION—POWER REQUIRED — SERIES - PARALLEL CONTROLLER — TRACTION DYNAMOS — OVERHEAD, CONDUIT AND SURFACE-CONTACT SYSTEMS —ELECTRIC BRAKES—DROP IN VOLTS—INDUCTION TROUBLES.

IN this country electric traction is at last beginning to make rapid progress. At the beginning of this year there were between fifty and sixty tramways operated by electricity, and at the end of the year there will be at least twenty more. The great success of the Central London Railway also will doubtless lead to the realisation of most of the projected twelve or fifteen underground electric railways for London. There are no signs at present of electricity being adopted for heavy railway work in this country, but it will doubtless come, as it has been already adopted in America, in Switzerland, and in Italy. In what follows we will consider the application of electricity to working street tramways, or as they are called in America street railways. We are accustomed to associate the word "tramway" with a small undertaking of no great financial or economic importance. Systems of electric trams, however, often rival railways in their importance, having armies of employees and competing successfully with railways when they happen to run parallel to one another.

In the early days of electric traction mistakes were made by putting in the cars motors much too small for the work they had to do. At first two 3 h.-p. motors were thought to be ample, but a little calculation would have shown the fallacy of this. An electric car loaded with forty passengers will weigh about ten tons. If this is going at the rate 7½ miles per hour, *i.e.*, 11 ft. per second, and the friction of the rails is 30 lbs. per ton, then the work done in overcoming friction alone will be $10 \times 30 \times 11$ foot-pounds per second. But a horse-power is 550 foot-pounds of work per second, and hence the whole 6 horse-power will be expended in overcoming rail friction alone, leaving no margin for gradients, the increased friction going round curves, air friction, &c. In every electric car, now, are placed two 15 h.-p. motors at least, and if the gradients are steep two 25 h.-p. motors. As we have seen, the current taken by an electric motor is proportional to the power it exerts, and hence these motors work economically. Just at starting they exert great power and take a large current, but when the car has ceased to accelerate, the current has fallen to a third or a quarter of its initial value. It is this property of the electric motor of rapidly adapting itself to variable loads that makes it such a formidable competitor to the steam-engine.

To give an idea of the power required to accelerate a car to its regular speed, consider the case of a car weighing ten tons and getting up its speed of fifteen miles an hour in twenty seconds. At the end of the time its kinetic energy by the well-known formula in dynamics is $\frac{1}{2} mv^2$ foot-poundals, *i.e.*, $\frac{10 \cdot 2240 \cdot (22)^2}{2 \cdot 32} = 169{,}400$ foot pounds. If this energy were given to it at a uniform rate in twenty seconds, the motors would have to work at the rate of $\frac{169{,}400}{20 \cdot 550}$, *i.e.*, 15·4 horse-power. In addition, they would have to exert power in order to overcome friction, gradients, &c. If the car had to get up speed in ten seconds, then the power required for acceleration, if it remained constant for these ten seconds, would be 30·8 horse-power, and so on. It is found that the average power exerted at the car-wheel is only about the fifth part of the power exerted in the same place at starting the car. Manufacturers are now giving up the method of rating electric motors in horse-power, as this is unsatisfactory. A motor, for example, that could exert 15 horse-power safely for one minute might burn out if this load were left on for five minutes. Again it might exert 20 horse-power safely for a quarter of a minute. The method adopted by the General Electric Company of America in rating motors is a good one. They state the tractive effort in pounds that the motor could exert for one hour at the circumference of a 33-in. wheel when rotating at its working speed without raising the temperature

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of the armature more than 138 deg. Fahr. The horse-power at this speed can be calculated from the formula

$$\text{Horse-power} = \frac{(\text{tractive effort}) (\text{miles per hour})}{375}$$

For example, if the tractive effort, or, as it is sometimes called, the draw-bar pull, be 1,000 lbs., and the speed 7½ miles per hour, then the horse-power will be 20.

At first double-reduction gearing was used to connect the armature to the driving wheels, and so an efficiency of 60 per cent. was seldom attained. Now single-reduction gearing is almost universally employed, and an efficiency of at least 80 per cent. is attained. The speed is generally reduced four or five times. Of course, every form of gear is defective, and if it could be eliminated entirely there would be a great economy effected. In ordinary street working, however, the sudden starting and stopping would throw a great stress on a gearless armature, and the motor would be subjected to jars and jolts, as it could not well be coupled to the wheels by springs. In the City and South London Railway gearless motors are employed, but even on a railway they are constantly in need of repair. For street-running motors ought to be completely enclosed so as to be protected from dirt and moisture; and at the same time all the parts ought to be easily accessible for repair.

Having two motors on each car enables them to be connected up in various ways so as to diminish the strain on them and effect economies in working. This is effected by means of a series-parallel controller operated by the driver, which has now been developed to a great degree of perfection. The series of operations it performs as the driver turns the handle is roughly as follows. At first the motors are put in series with one another and with a resistance across the trolley wire and the rails. This prevents a sudden rush of current, as the difference of electric pressure is 500 volts. As the handle is turned, the resistance is gradually cut out until we have the two motors in series with 250 volts across the terminals of each. As the motors speed up the back, E.M.F. cuts down the current, hence they exert their maximum torque on starting just when it is most required. With the handle of the controller on this notch the speed is slow, but it is an economical position of working. On turning the handle, the fields of the motors are weakened so as to increase the speed; then one of them is cut out altogether, and a resistance is put in series with the other. Then the motors are put in parallel and the resistance cut out. We have now 500 volts at the terminals of each motor, and the speed of the motor is high. A higher speed can finally be got by shunting the field-magnets, thus weakening the fields and so allowing the armatures to rotate more quickly. The efficiency of the motor with the field-magnets shunted may be as high as with them unshunted, and hence this is an economical position. In the simplest form of controller there are thus four economical speeds: (1) the motors in series; (2) the motors in series, with their field-magnets shunted; (3) the motors in parallel; and (4) the motors in parallel, with their field-magnets shunted. Many forms of controller have much more elaborate arrangements. In this connection it is interesting to read the seventeenth of the Board of Trade Regulations issued in March, 1894: "In working the cars the current shall be varied as required by means of a rheostat containing at least twenty sections, or by some other equally efficient method of gradually varying resistance." If only resistance were used to vary the speed the working would not be economical. Sometimes four motors are used in a car, but the ordinary controllers can be easily adapted to this case.

The question of the site for a power-house is one of the greatest importance. Theoretically, of course, it ought to be near the centre of gravity of the lines supplied, but practically the engineer is restricted to the choice of two or three sites, none of which are very convenient; hence sub-stations, the power for which is transmitted electrically at high pressure from the central station, are necessary. In large systems it is customary to allow about 15 horse-power for every car that will be running at one time. Suppose, for example, that 10,000 horse-power is the maximum that will be required, then there ought to be in the station eight engines of 2,000 horse-power each, one or two being kept as a reserve. A tramway load sometimes fluctuates very rapidly, the instruments on the switchboard showing that the load may have altered by a thousand horse-power in a few seconds. It was at first thought that these sudden fluctuations of load would throw too great a stress on the engines if they were directly coupled to the dynamos, and hence rope-driving was used. It is found, however, that large engines run perfectly well when direct-coupled to traction generators, and hence direct-driving is used in all the new stations that are being built. Some of the dynamos used for traction work are very large, the whole machine sometimes weighing over a hundred tons, and the driving shaft being three feet in diameter. Mr. Parshall gives the following as the weights of the materials used in the construction of a 1,500 kilowatt traction dynamo:—

	lbs.
Copper in the armature winding...	4,000
Copper in the commutator	3,100
Copper in the shunt windings	5,700
Copper in the series windings	6,400
Total copper.....	19,200
Total cast steel.....	74,000
Total laminated steel	25,000
Total cast iron	38,000

The output of this machine was 2,500 amperes at 600 volts.

One of the earliest systems adopted for conveying the electric power to the cars was to make one rail the positive conductor, and the other the negative. It was found, however, that even with the low pressure of 100 volts, horses were thrown and badly hurt. Apart from this it was found that the electric leakage between the two was enormous, especially in wet weather, and hence this method is abandoned. For railways either overhead or underground, an insulated third rail between the other two is used and the current collected from it by a brush or shoe. For tramways, by far the most popular system is the overhead trolley. An insulated copper wire between a quarter and half-an-inch in diameter is suspended at a height of about twenty feet above the rails either from poles or by means of span wires. If span wires are used they are suspended either from poles on opposite sides of the street or from "rosettes" fixed on the walls of opposite houses. If poles are used they are generally of steel, and are fixed in concrete foundations and have brackets jutting out from them on which are insulators. The trolley wire is fastened to these insulators by means of "ears" made of bronze to which it is soldered. Great care has to be taken with the construction of insulators, as it is very difficult to insulate the trolley wire from the bracket arm. The current is collected from the trolley wire by means of a trolley wheel pressed against the wire by a trolley pole fixed on the roof of the car. After passing through the controller and motors it passes to the wheels and thence along the rails back to the station. The electrical connexion between the rails must, therefore, be good, and hence "bonding" them is an operation of great importance. When two overhead lines branch into separate circuits, "frogs" are used which guide the trolley wheel in the required direction.

The objection to the overhead system is that it is unsightly, and may prove dangerous in certain special circumstances. When telephone wires are stretched above the trolley wire, then, in the event of a break, if the telephone wire hit the trolley wire, a large current is sent through it, which may cause a disastrous fire at the telephone exchange or in a private house connected with it. This might be got over by putting fuses in the telephone circuits, and fire insurance companies now insist that this be done. Still, if a telephone or telegraph wire break it may touch the trolley wire and its free end rest on the ground. In this case any one lifting it up would get a serious, if not necessarily fatal, shock. "Guard wires" are sometimes hung over the trolley wire, or even a guard wire netting to prevent telephone wires falling on the trolley wire. From the point of view of the public these are objectionable, as they are very unsightly, and they are frequently a source of trouble to the company by touching and earthing the trolley wire. In America this method of protecting against the danger from falling wires is being abandoned.

Many attempts have been made to invent systems which will have no overhead wires at all. The most successful attempts can be divided into conduit and surface-contact systems. In the conduit system we have a conduit underneath the street containing the high tension cable. There is a narrow slit on the top of it through which the car makes contact with the cable by means of a shoe or skate which slides along it. This system is extensively used both on the Continent and in America, and was used for several years at Blackpool. The width of the slit (generally called slot) varies from ¾ to 1¼ inches. The drawbacks to the use of this system are the great expense of laying a conduit down the centre of a street which is often traversed by hundreds of pipes and mains of all kinds, and the great difficulty of keeping the conduit free from dirt and water. In a town in America it was found necessary to relay the whole sewerage system before the conduit could be laid.

The only difference in the appearance of surface-contact tramway systems from horse tramways is the appearance at intervals of four or five yards of one or more rounded knobs between the rails. As these knobs are 4 in. or 5 in. in diameter and only ½ in. high, they offer practically no obstruction to ordinary traffic. The cars in surface-contact systems have one or more bars underneath which made contact with the knobs as the car passes over them. The knobs can be connected to the positive underground main by electro-magnets attracting their keepers, and so completing the connexion or by other devices. The mere act of the contact bar touching a new knob makes that knob alive and at the same time disconnects the last knob from the main, and so leaves it perfectly safe to touch. In some systems, as the Westinghouse, the electro-magnet for each knob is actuated by a small battery in the car; in others it is actuated by current from the mains. Several miles of a surface-contact system have been operated in Paris and Lyons for the last four or five years, and there are several experimental lines in this country and America working successfully by means of surface contacts operated in various manners.

The design of brakes for electric cars has now been carried to great perfection. With the old hand-brakes quite a second was lost before the shoe touched the wheel. Hence, with a car moving at the rate of fifteen miles per hour, this meant that it had passed over 22 feet before the brake shoe touched the wheel. This 22 feet, therefore, has to be added to the distance in which the brake will stop the car. In the Bristol tramways the maximum speed allowed by the Board of Trade is eight miles an hour, but even in this case one second means 12 feet, and hence a rapid and efficient brake is necessary. We find, then, that the Board of Trade insist that the car must have an electric brake in addition to having brake blocks fitted to the wheels which can be worked by a screw or treadle. The principle of electric brakes is to convert the motors into generators operated by the momentum of the car, and at the same time an iron brake disc on the axle is rotated in the intense magnetic field caused by the currents, the iron brake shoe forming the magnetic circuit. We thus have three powerful forces tending to stop the car. First the force required to rotate the armatures in the strong magnetic fields; secondly, the drag on the brake disc due to eddy currents; and thirdly, the mechanical friction on the brake disc. The electric brake is operated by a controller similar to the series-parallel controller. The first notch converts the motors into generators, and succeeding notches gradually cut out the resistances across the terminals of the motors, thus increasing the currents and the braking effects. The electric brake is used for ordinary stopping as well as for emergencies, and will bring the car to rest on any grade.

When the rails are used to return the current to the power-house the Board of Trade insist that a continuous record be made of the difference of potential between the rails nearest and farthest from the station, and if this pressure be greater than seven volts the company have to take immediate steps to reduce it. The reason of this rule is to prevent current leaking from the rails and travelling to the power-station along gas or water mains. Where the current enters the water-pipe no destructive action takes place, but where it leaves the pipe the metal gets all eaten away, and the pipe soon bursts. A maximum pressure of seven volts distributed over several miles is not dangerous, although possibly after several years electrolytic actions may be noticed. It is the necessity of keeping down the "drop in

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volts" in the rails that makes good bonding so essential, as this drop is proportional to the resistance of the rails as well as to the current. In several places good electrical connexion is secured between consecutive rails by the heroic expedient of welding them together. This has been found possible as the rails are nearly entirely covered in by pavement of some kind, and hence are held practically immoveable. Buckling of the rails or distortion of the paving is very rare when the rails are once laid. If the lines are long, or if the traffic be heavy, the rails are unable to carry all the current with a pressure of only seven volts. In this case feeder mains to the rails at various points are necessary. In addition series dynamos are sometimes employed to take current by a main from the distant end of the line to the station so as to keep the distant end at zero potential. A motor-dynamo (negative booster) can be employed for this purpose so that the regulation is done automatically.

In order to prevent the possibility of contact with the trolley-wire from carts, &c., the Board of Trade insist that its height from the surface of the street shall be at least 17 ft. Of course, even at this height there is a risk. For example, a waggon carrying a boiler, or a curved girder, or the metal pole of the waggon of a travelling merry-go-round, might easily come into contact with it, and fatal results might ensue. The supports for the trolley-wire must not be farther apart than 120 ft., so as to avoid the risk of the wire sagging. The Board of Trade also insist that arrangements must be made so that every mile of the trolley-wire can be insulated for testing purposes. If at any time it be found that the leakage current from the trolley-wire be more than half an ampere per mile of tramway, then the leak must be localised and removed within twenty-four hours, or otherwise the running of the cars must be stopped.

Trouble is often caused by induction in telephone circuits when the telephone wire runs parallel to the trolley wire. Even at distances of 100 or 200 yards the variable currents in the trolley wire cause a crackling in the telephone that sometimes makes conversation impossible. The remedy is to use twin wire for the telephone circuit. Trouble also has been experienced when the end of a submarine cable line is near a tramway system. The opening of the electric tramways at Cape Town upset the working of the instruments in the cable office for several months before a remedy could be devised. Electric traction has also stopped the work on terrestrial magnetism at several observatories. Observations at the observatories at Washington and Toronto only show the resultant of the earth's field and the magnetic field due to the currents in trolley wires in the neighbourhood, and are useless for comparison with results elsewhere.

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23. LIGHT — THE ETHER — INDUCTION TELEGRAPHY — PREECE — LODGE — WIRELESS TELEGRAPHY — HERTZ — MARCONI — CONCLUSION.

IT is now nearly fifty years since Weber and Kohlrausch measured the charge of a Leyden jar first in terms of the electro-magnetic unit, and then in terms of the electrostatic unit. They measured the charge in electro-magnetic units by charging the jar to a known potential and then discharging it through a galvanometer. The needle of the galvanometer swung round to a certain deviation where its angular velocity was destroyed by the opposing effect of the earth's magnetism. Hence, knowing the constant of the galvanometer, the time of the swing and the strength of the earth's magnetic field, they calculated the quantity of electricity that had flowed through the galvanometer in electro-magnetic units. They also measured the capacity of the jar by comparing it with a sphere whose capacity in electrostatic units is known to be equal to its radius in centimetres, and they measured the difference of potential between the coatings of the jar in electrostatic measure by means of an electrometer. Then the charge equals the product of the capacity and the difference of potential. By dividing one of their answers by the other they found that the ratio of the electro-magnetic to the electrostatic unit of electricity was equal to $3{\cdot}107 \times 10^{10}$. Now theory shows that this ratio is the measure of a velocity in centimetres per second. If we express it in miles per second, we find that it is 193,000 miles per second. Now this is very nearly equal to the known velocity of light in air, which has been frequently determined experimentally, and it was this close agreement which led Clerk Maxwell to elaborate his electro-magnetic theory of light.

The fundamental hypothesis in the theory of light is that there is an all-pervading medium called the ether, which is capable of transmitting light vibrations. It is supposed that this ether fills up the interstices between the molecules of solid bodies. In transparent bodies it is still capable of transmitting light vibrations, although at a different velocity, but in opaque bodies it has lost the power of transmitting the light vibrations. In the undulatory theory of light the vibrations that constitute a ray of light are supposed to be perpendicular to the direction in which the ray is travelling. If we throw a stone in a pond, waves start from the splash and proceed to the sides. The vibrations of the particles of water causing the waves are simply vertical and perpendicular to the direction in which the wave is travelling. In the same way the transverse vibrations of the jelly-like substance called the ether form a ray of light. Newton showed that white light could be dispersed by means of a prism into its various fundamental colours. In the undulatory theory waves of different colour are supposed to be formed by transverse vibrations oscillating with different frequencies. It is known that waves of different colour are all propagated with the same velocity in free space. Now if v be the velocity of a wave, l its wave length, and t the time of a vibration, then $l = v\,t$ and v is a constant. Hence if t the time of vibration is different, so also is l the wave length. If we make the supposition that the wave lengths are different, then the phenomena of diffraction, interference, &c., are all easily and most satisfactorily explained. The wave length of red light is to the wave length of violet light in the ratio of five to three nearly. The wave length of greenish-blue light is about the fifty thousandth part of an inch. This is by no means inconceivably small. Gold leaf can be beaten out until its thickness is only one three-hundred-thousandth of an inch, and when as thin as this it allows light to pass through.

The eye is only affected by vibrations of the ether whose wave-lengths lie in value between the wave-lengths of the red and violet rays at the extreme ends of the spectrum. Vibrations of longer or shorter wave-length are invisible to the eye, and hence we have to invent an instrument to detect them. The ultra violet rays can be easily detected by a piece of canary glass which is filled with a faint nebulous light (fluorescence) when placed in their way. A thermopile will detect the infra red rays and might be called a detector for the red rays. Now in systems of telegraphy we need two stations, a sending and a receiving station. At the sending station signals are sent out which travel either along wires or through space to the receiving station, where there is some instrument to detect them. When the signals are optical the eye is the receiving instrument, but if we use electric currents carried by wires, then some kind of galvanometer is necessary.

Recently, several successful attempts have been made to get rid of the connecting wires between the sending and the receiving station, and instead of utilising electric currents to send the signals recourse has been had to the older method of sending waves through space, only instead of light waves electric waves of various kinds have been utilised. Sir William Preece, in 1884, found that crackling noises heard in certain telephone circuits, stretched over the London streets, were caused by induction from telegraph wires buried in iron pipes underneath the streets. A telegraph expert could read the messages going through the telegraph wires by simply listening to the telephone. It was proved conclusively that these noises were due to induction, and not to conduction; that is the signals were transmitted through space between the two circuits. In 1886, by stretching two parallel wires on both sides of the Severn between Bristol and Gloucester, at a distance of four and a half miles apart, it was possible to signal by making and breaking the circuit on one side, and having a telephone in the circuit on the other side. In 1892 communication was established between Lavernock and Flat Holme, in the Bristol Channel, by this method. The distance is about 3·3 miles, and messages are now being sent daily between the two stations. No special skill is required on the part of the operators, and ordinary dry cells are used to send the intermittent current through the wires.

In 1895, Sir William Preece tried to signal between England and Ireland. In Ireland the circuit stretched from Belfast to Wexford, and in England from Carlisle to Haverfordwest. From midnight to 2 a.m. the whole telegraphic system of the country was stopped one Sunday morning. He thus describes the results of the experiment. "Attempts were made to signal, but it was impossible to distinguish a signal through the wonderful, incessant, and strange sounds that filled the telephone and overpowered everything else. No telegraph was at work anywhere. The hum of two or three electric light installations working on the alternating current system was evident, but there was a weird, strange babel of noises that was mysterious and disappointing. I am strongly of opinion that these sounds were due to disturbances excited by primary electrical effects outside our globe."*

Professor Oliver Lodge has devised a most ingenious system of space telegraphy. The sending circuit consists of a large coil of wire which is excited by alternating currents from a dynamo. The receiving circuit consists of a coil of wire, a condenser, and a telephone all in series. If the capacity of the condenser be varied until we have the condition for "resonance" at the frequency of the waves the coil of wire attached to the alternator is sending forth into space, then the signals can be heard for some miles. The great advantage of this system of space telegraphy is that the sending and receiving instruments can be tuned to one another so that the receiver only signals when the electro-magnetic vibrations have a particular frequency. We can thus have a sending and receiving station, sending messages without interference with the instruments of other stations in the vicinity.

The system of wireless telegraphy which has excited the greatest interest, is that with which Mr. Marconi's name is associated. He makes use of the electric vibrations which radiate into space from the sparks between the terminals of an induction coil. The theory of these vibrations has been worked out by Clerk Maxwell, and Hertz has experimentally verified some of his conclusions. These vibrations are generally referred to as Hertzian vibrations. When an oscillatory discharge, such as that produced at the terminals of an induction coil or by a Leyden jar discharging through a thick copper rod, takes place in a room where there are several metal objects close together, we sometimes see sparks between adjacent objects. This phenomenon is due to resonance, and is analogous to a note played on a musical instrument or sung, causing a gas globe to sound the same note. Hertz made use of this phenomenon to find out the laws which govern the propagation of these vibrations.

The apparatus he used was an oscillator to produce the sparks, and an explorer to find out whether they were reflected, refracted, or scattered. The oscillator consisted of a brass rod cut in two with a spherical ball at each end. Each half of the rod was attached to a terminal of the coil and the sparks took place between the ends of the rod. The explorer consisted of two thin wires with balls at the end, separated from one another by a minute gap. Now every spark at the terminals of the induction coil consists of a series of rapid oscillatory discharges. If we hold the explorer near the oscillator so that they are parallel to one another then there will be a flow of sparks across the air gap of the explorer when the oscillator is in action. The farther we take away the explorer the more feeble will the sparks be, until finally they cease altogether. It is found that they go through stone walls and wooden doors, but metal sheets screen off the vibrations entirely. If we hold a sheet of metal perpendicular to the direction of the vibrations, then the ray is reflected straight back, and we get the phenomenon of interference. When the explorer is held at certain distances from the metal sheet we get a maximum flow of sparks, and midway between those points we get points where there are no sparks at all. The distance between two points where there is maximum disturbance gives us the wave length of the electric vibrations. The waves Hertz experimented with were 30 centimetres long.

Hertz proved that these electric vibrations obey all the ordinary laws of light. By means of a parabolic mirror of sheet zinc held so that

* Journal of the Inst. of E. E., vol. 27, p. 876.

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the oscillator was in the line of the foci, he managed to concentrate them into an electric beam, and by means of another parabolic mirror placed in the line of the beam, he concentrated the vibrations to the explorer placed in the focal line, and thus repeated the experiment of the conjugate mirrors in light. This proves that the electric vibrations are reflected in the same way as light vibrations. He also refracted an electric beam by allowing it to pass through a prism of pitch and found the index of refraction for pitch. Since also a metal sheet screens off the beam, this proves that it is propagated in straight lines. Again the vibrations are all parallel to the line joining the spark gap of the oscillator, they are therefore plane polarized, to use the language of optics. If we hold a screen of wires with the wires all parallel to the spark gap, the waves pass through it without difficulty, but if the wires are held perpendicular to the plane of vibration, the ray is quenched. The wire-screen is exactly analogous to a Nicol's prism. The phenomena are therefore identical with those of light and radiant heat. The only difference is that the wave length of the electrical vibrations is about a million times greater than that of the light vibrations. The explorer used by Hertz is, however, not sufficiently sensitive for telegraphy to any distance. The instrument used for this purpose is the coherer.

The coherer was invented by M. Branly, who described it in the *Comptes Rendus* (November 24, 1890.) It is a resistance made up of a substance in the form of powder or filings, contained in a glass or ebonite tube. In its natural state the electric resistance is very high, but when Hertz waves strike the tube, its resistance falls to only a few ohms. If the tube be now slightly tapped it will at once resume its normal condition, and the resistance rise to thousands of ohms, being virtually an insulator. The reason of this curious action seems to be that in its natural state the particles of powder lie about in all directions, touching one another lightly, but the moment they are subjected to the action of the electric vibrations they all become polarised and set themselves in a particular direction, the pressure between them making good contact, and hence lowering the resistance.

The transmitter used by Mr. Marconi in his system of wireless telegraphy is Professor Righi's form of Hertz oscillator. Two spheres of solid brass, each about 4 in. in diameter, fit inside a cylinder full of vaseline oil. We have two hemispheres in the air, and the other two are facing one another in a bath of oil. Close to the hemispheres in the air are placed two small brass balls, each of which is connected to a terminal of the induction coil. When the key of the induction coil is pressed the current from dry cells, with accumulators in parallel to them, excites the primary of the transformer, and we have sparks between the small brass balls and the large ones, and also between the large ones themselves. As the system possesses capacity and induction the sparks take place with extreme rapidity, and the electric vibrations starting into space have a wave length of about 4 ft. Now the latest determination of the velocity of light makes it very nearly 300,000 kilometres, or 187,000 miles per second, hence the frequency of the waves Marconi uses is $\frac{187,000 \times 5,280}{4}$ *i.e.*, 247 million per second.

The receiver used is a very sensitive coherer. It consists of a small glass tube about two inches long, into the ends of which two silver rods are tightly fitted. These rods are separated from one another by a space of about the fiftieth of an inch. The space between them is filled up with nickel and silver filings. The tube is then exhausted of air and sealed. In its normal condition this tube has a very high resistance, but when electric waves fall on it the resistance falls to about five ohms. This coherer forms part of a local circuit, being in series with a battery and an ordinary telegraph relay. Initially no appreciable current passes, but when electric waves fall on the coherer the resistance of the circuit at once falls, and the current works the relay. The relay closes a local circuit which works a Morse receiver and hence a permanent record is made of the signals in ink. At the same time the local circuit causes a small hammer to vibrate rapidly against the glass tube so as to make the filings decohere. Great care has to be taken that no sparking happens in the local circuit, otherwise the waves set up will affect the coherer and make signalling impossible. Sparking is avoided by shunting all the spark gaps with a non-inductive resistance. An essential and novel feature of Marconi's system is the long vertical conductor which is attached to one pole of the coherer, the other being connected to earth. The conductor is usually supported by a pole, but sometimes a kite or a balloon is used to suspend it.

A very simple experiment to illustrate wireless telegraphy can be shown by a Leyden jar, a coherer, a battery, and an ordinary electric bell. If the coherer, the battery, and the electric bell be joined up in series in one room and the Leyden jar be discharged in an adjacent one, then if the coherer is sensitive enough the bell will start ringing. A few taps on the coherer will make it decohere, and the bell will stop ringing.

Mr. Marconi has recently made many improvements in the apparatus he uses, which greatly increase its sensitiveness. He has sent signals over ninety miles without the necessity of an abnormally high wire, and there seems no reason to suppose that he has reached the outside limit. It seems probable that the curvature of the earth may impose some kind of limit, but it must be remembered that the great wave length of electric vibrations will enable them to bend round corners appreciably. At the present time experiments are being tried with wireless telegraphy on the North German Lloyd steamers. If we have steamers fitted with Marconi apparatus at equal distances from one another across the Atlantic, it will be obvious that continuous communication can be kept up from the shore with all of them. The Marconi Company are also fitting up stations for wireless telegraphy on various islands in the Pacific which it would be almost impossible to connect with one another by means of a submarine cable. It is to be hoped that Trinity House will see its way to fitting up permanently apparatus for wireless telegraphy on board lightships and in lighthouses.

In bringing these lessons to a conclusion, the writer feels that he has only touched the fringe of the subject. The commercial applications of electricity get wider every year, and during the last ten years the development has been increasing in a geometrical ratio, and in the future it will be necessary to specialise more and more. Again, although theory has advanced very rapidly, yet we are almost absolutely ignorant of what an electric current really is. When we close an ordinary electric circuit the starting current produces an electro-magnetic wave which travels into space with a velocity of about 187,000 miles per second. When the current is steady the ether round the wire is in a state of tension, tending to contract in the direction of the magnetic lines of force and to expand in the direction at right angles to them. We can suppose that there are cylindrical layers of ether round the conductor, those nearest being the most compressed. When the circuit is broken, these layers expand and give back energy to the circuit. An electric current is something very different from a fluid current; it heats the conductor, magnetises the surrounding medium, produces currents in masses of metal at a distance from it, and modifies the optical properties of bodies. The function of the conductor seems to be merely to direct the current, the real transport of energy taking place in the medium surrounding the conductor. If the conductor were at the absolute zero of temperature, then its resistance would be zero, and we need only have an infinitesimal filament of it to transport millions of horse-power thousands of miles. It is easier to imagine that the transfer of energy in this case takes place through the ether vortices round the wire than in the infinitesimal space occupied by the conductor itself. Speculation on this subject is very inviting, but until we know more about the constitution of the ether itself not very profitable. We hope that in the coming century a second Newton will arise to tell us what the ether really is.

MANCHESTER SEAMEN'S INSTITUTE.—The Committee of the Missions to Seamen has purchased a site, near the Docks in Trafford-road, for a seamen's institute and chapel. The new buildings will have two stories besides the basement. On the ground floor will be a large room, and behind and adjoining is a business-room for the chaplain. The chapel for daily and Sunday services will be on the first floor, approached by porches and staircases at each end. There will also be a clubroom for captains and other officers, and a small dwelling-house for the lay missioner. The estimated cost of the building will be 4,000*l.* The chapel will provide accommodation for 255 persons. The plans have been prepared by Messrs. Medland Taylor & Son, of Manchester.

OBITUARY.

MR. J. P. M'CANN.—The death is announced of Mr. John P. M'Cann, architect, of Aberdeen. Mr. M'Cann was at one time an assistant teacher in the Mechanics' Institute, and afterwards taught at the School of Art. After leaving the Art School he instituted the School of Design in Union-row, and conducted it for a time on behalf of the Aberdeen School Board. Deceased was forty-six years of age.

GENERAL BUILDING NEWS.

PRIMITIVE METHODIST CHURCH AND SCHOOLS, TRIMDON, NORTHUMBERLAND.—A new Primitive Methodist church and school premises, which have been erected near the railway station at Trimdon, were opened on the 14th inst. Mr. James Hunter was the architect.

PRESBYTERIAN CHURCH, STAFFORD. — The Presbyterian church in Mount-street, Stafford, was reopened on the 11th inst. after undergoing extensive alterations. A new wing has been added on the south side, together with a square tower with a spire. The new portion is of red pressed bricks with stone dressings. The work was carried out under the supervision of Mr. R. A. Glass, of Stafford. The cost was about 1,600*l.*

REOPENING OF LOXTON CHURCH, SOMERSETSHIRE.—The parish church at Loxton has just been reopened after restoration. The old roof has been replaced by one of pitch-pine, covered with Bridgwater tiles; an organ-chamber, to accommodate a new organ, has been built; and the church has been redecorated. The work was carried out by Mr. C. Addicott, of Weston-super-Mare, under the direction of Mr. Hans Price, of the same place.

PRIMITIVE METHODIST CHAPEL, BURTON.—The foundation-stones for the new Primitive Methodist structure at Wetmore-road, Burton, have just been laid. The buildings have been designed by Mr. Thomas Jenkins, architect, and are in the Early English style. The general contractor is Mr. J. Harlow, the stonemasons being Messrs. Parker & Stamp.

SUNDAY SCHOOL BUILDINGS, BASINGSTOKE.—The Sunday schools which have been erected on the site of the Hospital of St. Mary the Virgin and St. John the Baptist, in connexion with the parish church of Basingstoke, were opened recently. Mr. A. D. Sharp, of London, was the architect, and Mr. J. Thumwood, of Basingstoke, was the builder.

CHILDREN'S HOSPITAL, NOTTINGHAM. — Forest House, a mansion situated on Mansfield-road, has just been opened as a new children's hospital for Nottingham. The original building has not been much altered, but several additions have been made, the chief of which are a pavilion ward on the south side, an operating theatre, and several small wards. Messrs. R. Evans & Son, of Nottingham, were the architects for the alterations and additions, while the contractors employed were Mr. S. Ward and Mr. Henry Vickers, both of Nottingham.

EMPIRE THEATRE, SWANSEA.—On the 10th inst. was opened the new building which is to take the place of the old Swansea Empire. The building is of brick and stone, with a frontage of 72 ft. It consists of three tiers, viz., pit, pit stalls, and fauteuils, grand circle, gallery, and amphitheatre. The grand circle is entered from Lower Oxford-street through a wide vestibule and hall up a wide staircase. On each side of the grand circle is a staircase leading to the fauteuils; at the back of the circle is a corridor, off one side of which the foyer or lounge is approached, and this overlooks the street with swing doors opening upon a balcony, and on the other side of the corridor are the entrances to the private boxes at the back of the grand circle. The pit, pit stalls, gallery, and amphitheatre are provided with wide entrances and staircase from Lower Oxford-street, and the two latter are so arranged that the public can be under cover while waiting for the doors to open, and in all other cases waiting-rooms are provided. The buildings are of fireproof materials including the staircases. Hydrants are provided on each level, and also on the stage and dressing-rooms, and the auditorium is shut off from the stage by a fireproof curtain, along the top of which is a row of sprinklers. The building is heated by hot-water on the low pressure system by means of radiators. The interior is decorated in Italian Renaissance style by means of fibrous plaster. The dome is divided up into panels, filled in with paintings. The dome and proscenium arch are provided with electric light fittings. On the top of the dome is a sliding roof. The dressing-rooms are in a block by themselves, shut off from the stage by iron doors. The proscenium opening is 30 ft. wide and 30 ft. high, the stage is 32 ft. from the curtain line to the back wall, and the width 62 ft., and the distance from the grid to the stage is 57 ft. 6 in. In addition to the Empire with its frontage in Lower Oxford-street is the new tavern to take the place of the old Oxford Tavern, consisting of a saloon, private and public bars on the ground floor level, and a lounge on the first floor with living rooms over. Mr. John Linton, of Newport, was the contractor, and the carrying out of the work has been in the hands of Mr. Moon. Messrs. Dawnay & Co., of London, have provided the iron-work; Messrs. De Jong & Co., of London, the

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decorative plastering and painting; Messrs. Merryweather, London, fire appliances and fireproof curtains; Mr. Cawdery, London, the stage; Messrs. Edwards & Armstrong, Cardiff, electric lighting fixtures; Messrs. Vaughan & Brown, London, gas-work, heating and speaking tubes, and electric bells; Messrs. Lazarus, London, seating; Messrs. Gibbons & Co., London, patent panic bolts; Messrs. Tyler & Son, London, sanitary fittings; Mr. Dutton, of Gloucester, the stone carving; and Mr. W. R. Brown, London, lead glazing. The architects were Mr. Walter Emden, of London, and Mr. W. L Griffiths, Newport, Mon.

CO-OPERATIVE SOCIETY STORES, BRENTWOOD.—The new stores of the Brentwood Provident Co-operative Society were opened on the 8th inst. The stores are situated at the corner of Crescent-road and Milton-road. The contract for the building amounted to 1,600*l*. Mr. T. W. Yirrell, of Brentwood, was the architect; and Mr. Ernest West, of Chelmsford, was the contractor.

EXTENSION OF CHESTER TRAINING COLLEGE.—On the 15th inst. a new practising school, which has been built in connexion with Chester Diocesan Training College, was opened. The new building, which has cost 4,000*l*., is a brick block, and has a frontage to Parkgate-road. It has been designed by Mr. H. Beswick, Chester, and built by Mr. W. W. Freeman. It will provide accommodation for 300 children as compared with 200 in the case of the old school. It consists of a central hall with gallery, five classrooms, head-master's room, lavatory, &c. The floors are all laid with wooden blocks, there is an improved heating system, and the building is lighted throughout by electricity.

WAREHOUSE, GLASGOW.—A large warehouse is being erected in the business centre of Glasgow. The block has frontages to Buchanan-street, Argyle-street, and Mitchell-street, the principal elevations being to the two first-named thoroughfares. Mr. Horatio K. Bromhead is the architect.

THE AUCTION MART, TOKENHOUSE-YARD.—Mr. Charles Herbert Shoppee has just carried out some interior improvements at the Mart, including a re-arrangement of the main stairs, which he has extended upwards to the second floor, with Portland stone steps, supported by girders of wrought steel, so as to provide better, and greatly-needed, means of access to the various salerooms above the first floor. The business of the Auction Mart was transferred to the premises, which, we believe, were not originally designed for that purpose, after the demolition in 1865 of the former auction rooms erected at the corner of Bartholomew-lane and Throgmorton-street in 1808 9, from the designs and plans of John Walters, who died in 1831.

BRADLEY HALL SCHOOL-CHAPEL, NELSON.—This building, just completed, has been designed primarily as a Sunday school, but with a view also to its use for a few years as a chapel, pending the erection of a chapel on part of the same site. The hall and gallery are seated for 500, while the classrooms give accommodation for 350 Sunday scholars. Externally the building is faced with Yorkshire parpoints and stone. The internal joinery is of Kauri pine. The cost of the building, with electric lighting and furnishing, will be 3,000*l*. The architects are Messrs. Shaw & Vowles, of Nelson and Burnley.

SANITARY AND ENGINEERING NEWS.

A MIDLAND WATERWAY SCHEME.—A deputation endeavoured on the 17th inst. to enlist the support of the Birmingham Corporation for a movement which has in view the opening up of free water communication between the Midlands and Bristol Channel ports. It was urged that Birmingham and the surrounding towns would reap immense advantage by the cheapening of freights on imports and exports. Sir Alfred Hickman, M.P., contended that this was the kernel of the commercial struggle between British and American manufacturers.—No hope was held out that Birmingham ratepayers would back the project.

NEW PIER FOR YARMOUTH.—A new pier is being erected at Yarmouth in place of the old Britannia pier. The pier will have an extreme length of 810 ft., with a pavilion and landing-stage at the sea end. The engineers are Messrs. Mayoh & Haley, of London, and the contractors are the Widnes Foundry Company, Limited.

FOREIGN.

FRANCE.—The cost of the proposed enlargement of the Paris Bourse by the addition of two side aisles, as proposed the architect M. Cavel, is estimated at 4,000,000 frs. The addition will give to the plan the form of a cross. The Municipal Council is in favour of the scheme.——M. Blavette, the architect, has been commissioned to prepare a design for the rebuilding of the Conservatoire de Musique, on the present site of the Caserne de Nouvelle France in the Avenue de Poissonniere.——One hundred and fourteen competitors have sent in designs for the pictorial decoration of the Salle des Fêtes of the new Mairie at Asnières. The jury, which includes several of the leading painters of the day, have selected the designs by MM. Henri Bouvet, Darieu, and Paul Schmitt, who are each to submit a panel of the size of execution, when the final decision will be made.——The Conseil-Général of the Seine have commissioned from M. René Billotte, the landscape painter, two large decorative panels for the principal staircase of the Mairie of Courbevoie; and from M. Steck and M. Eugene Bourgeois' two decorative paintings for the Mairie of Bagneux.——The authorities of Chalons-sur-Marne are about to lay out about 900,000*l*. francs on various important public works, especially the completion of the Museum and the rebuilding of the College.——M. Monzelas, architect, has been commissioned to make a study for the rebuilding of the church of Saint Pierre de Gros Caillou, in the seventh arrondissement of Paris.——The death is announced, at the age of seventy-two, of M. Charles Emile Saulmier, member of the Société Centrale des Architectes. Among the works in which he took part was the restoration of the Cathedral of Albi, the completion of the Palais de Justice at Carcassonne, as well as the museum in the same town, the Prefecture at Castlenandary and the savings bank at Carcassonne.

AUSTRALASIA.—At the time of the opening of the Federal Parliament it is proposed to hold a conference of architects, engineers, and surveyors in Melbourne. The Institutes represented are the Royal Victorian Institute of Architects, the Victorian Institute of Engineers, the Victorian Institute of Surveyors, the Architectural and Engineering Association, and the T-square Club of Victoria. The work of the conference will consist in making practical suggestions regarding the general conditions of site, the climatic influences, the setting-out, building, ventilating, lighting, tramway, water supply, drainage, &c., in connexion with the Federal capital, and impressing its decisions on the Federal Parliament. The movement is designed to provide all necessary data and information regarding the erection of a new and model city under most perfect conditions The Governor-General will be asked to be President of the Convention, and the State Governors of the different Australian colonies will be invited to be Vice-presidents.——Competitive designs have been invited by the Wellington (New Zealand) City Council for a town hall and municipal buildings. The estimated cost of the whole buildings is 50,000*l*.——The statue of Commerce proposed to be placed upon the pediment of the new additions of the Exchange building, Sydney, is practically completed, and is to be unveiled on January 1 next; Mr. James White is the artist.——A large warehouse is being erected at Newtown, Sydney, from designs by Mr. James Nangle, architect, of Sydney.——The Metropolitan Water Supply and Sewage Board, Sydney, has adopted a recommendation from their Engineer that the sum of 15,000*l*. be expended for the erection of ventilating shafts in connexion with the sewage systems.——The works of supplying the town of Geelong, Victoria, with water are almost completed. The high levels of the town are to be supplied from what is called the Montpelier basin, the Engineer's estimate for which was 75,000*l*. About 400,000*l*. have been spent in connexion with the whole water supply scheme.

MISCELLANEOUS.

NATIONAL PHOTOGRAPHIC RECORD ASSOCIATION.—At the last Council meeting of this Association, 366 photographs were presented from all parts of the kingdom, forming a most valuable addition to the collection, recording, as they do, some of the most interesting subjects, both from an antiquarian and historical point of view. The President, Sir J. Benjamin Stone, M.P., sent in 100 prints taken in Warwickshire, including a series of Stratford-on-Avon and an interesting record of collecting the "wroth money" at sunrise at Ryton-on-Dunsmore. Mr. Sulman gave a set of the old historical houses of Hornsey and Highgate, many already removed; 103 from Mr. Geo. Scamell, Hon Sec., of the historical houses of London and the old Sussex churches, including Bosham, Sompting, Shoreham, &c.; some of Old Newgate by Mr. T. Bolas; Canonbury Tower and other contributions by E. Scamell; Worcester Cathedral by F. Littledale; many especially interesting records of Irish life and antiquities by Mrs. Muriel and A. Hogg, the latter sending a particularly fine series of the Tunnulus of New Grange, the interior views being splendid specimens of flash-light work. The Rev. A. C. Hervey contributed an interesting set of photographs of the old parish register showing extract of Act for burying in woollen—affidavits that such had been done—and another page certifying that certain families had paid the penalty of 5*l*. that their friends might be buried in linen. Mr. Clark forwarded a set of old crosses at Llantwit Major; Mr. Calcott an interesting record of many of the old houses of Bristol, several of which have been already removed; Mr. Felce a fine series of Norman capitals and misereres in the Northampton churches; Mr. Hodgson a long record from Kingston-on-Thames, and Mr. F. Parkinson a very complete set of the Easter sepulchre at Heckington Church. These photographs have now been forwarded to the British Museum, and together with those already deposited, make up a collection of nearly 1,600 prints contributed by members of the Association.

SCARBOROUGH MASTER BUILDERS' ASSOCIATION.—The annual dinner of the Scarborough Master Builders' Association was held at the Albemarle Hotel, Mr. A. W. Sinclair (president) occupying the chair. Mr. J. F. Wilson proposed "Our Trades," to which Mr. C. Peckett responded; Mr. A. Moore proposed "The Master Builders' Association," and the President replied; Mr. G. F. Wells submitted "The Architects and Surveyors," which Mr. F. A. Tugwell and Mr. J. Caleb Petch acknowledged; and Mr. J. Atkinson gave "Yorkshire Federation of Building Trades," to which Mr. Ankers and Councillor Mansfield replied. Other toasts were "The Municipality and Trade of Scarborough," proposed by Mr. Woodhouse, and acknowledged by Councillor J. Bland; "Our Guests," proposed by Mr. G. Cail, and responded to by Mr. H. Wood; and "Our President," submitted by Mr. Horner, and supported by Mr. Barry, being received with musical honours.

THE OLD RED LION, STRAND.—The site of this old tavern will be taken for the new Gaiety Theatre and Gaiety Restaurant to be rebuilt after the plans and designs of Mr. Ernest Runtz, at the west end of the ground between the Strand and the proposed "island" block of buildings. An early mention of the tavern occurs in a list of tenements and holdings scheduled for an Act of Parliament, 1650. That Act was passed for purposes of the sale of "the honours, manors, and lands belonging to the late King, Queen, and Prince.' Ludlow avers that in pursuance of a resolution of the House of Commons, Denmark, or Somerset, House, together with its appurtenances, the chapel excepted, were sold for 10,000*l*.

GLASGOW ARCHITECTURAL CRAFTSMEN'S SOCIETY.—The usual meeting of the Society was held on Friday, 21st inst., Mr. Isaac Low presiding. Papers were read on the subject of "Conditions of Contract," by Mr. Jas. A. Ferguson on joiners' work, Mr. Robert Ackenhead on masons' work, and Mr. Isaac Low on plumbers' work. Deducing the contents of the three papers, the following were the most important of the items commented on:—The upholding of work for the customary two years by the contractor was considered excessive, six months to one year being suggested as ample; arbitration in cases of disputes arising in the carrying-out of the contract; it was suggested that, in conditions wherein disputes were to be referred to the architect, whose decision would be final and binding, this might be more justly dealt with by the appointing of a representative of both the architectural and legal professions as arbitrators. The questions of time-clauses, extras, after measurement system, testing of materials, &c., were also discussed.

THE INSTITUTE OF SANITARY ENGINEERS (INCORPORATED).—At the half-yearly general meeting held on the 12th inst., the following officers were elected for the year 1901:—President: Dr. J. B. Wilkinson, D.P.H., &c, M.O.H. County Borough of Oldham and Consulting M.O.H. County of Huntingdonshire. Vice-Presidents: Dr. Thresh, M.O.H., Chelmsford; S. I. Adams, Mem.San.Inst.; H. M. Dove, Assoc.San.Inst.; J. Farley, C.E.; S. Minty, Assoc.San.Inst.; W. J. Wells, Assoc.San.Inst. Honorary Directors: Messrs. H. M. Dove, J. Farley, and W. J. Wells. Council: Messrs. J. Allan, F. P. Barber, E. Berrington, C. E. Butcher, H. G. Beams, G. H. Carter, E. D. Cecil, W. H. Coltart, T. W. Deadman, C. Dobbs, J. T. Griffin, R Horton, N. W. Hoskins, A. R. Hutson, J. Jenkins, W. E. Markham, F. W. Mason, T. R. Nash, E. R. Palmer, F. B. Patch, F. J. Rayner, W. Strachan, T. M. Taylor, and J. Thompson. Auditor: R. J. Ward, C.A., 2, Clements Inn, W.C.

CAPITAL AND LABOUR.

WAGES IN THE BUILDING TRADE.—A meeting of the Lancashire and Cheshire and North Wales Building Trades' Federation was held in the board-room of the Liverpool Master Builders' Association, Duchy Chambers, Sir Thomas-street, on the 19th inst. Mr. James Storrs (Stalybridge), the president, occupied the chair, and amongst those present were Messrs. Samuel Smethurst (Oldham), A. G. White, R. Stevenson Jones, C. W. Green, J. S. Brown, C. Tomkinson (Liverpool), G. M'Farlane, W. Marshall, H. Matthews (Manchester), T. H. Kellitt (Preston), W. Powell (St. Helens), J. Tomlinson (secretary) and Bertram B. Moss (secretary of the Liverpool Master Builders' Association). There were about 100 gentlemen present, and in addition two deputations, one from Newcastle and another from the Yorkshire Federation. After considerable discussion it was decided to support the Newcastle employers in their dispute with the bricklayers, who went out on strike in June last owing to the masters refusing to grant them an increase in wages of one penny an hour, the reason given by the employers being that the men were already receiving the maximum rate of wages paid in England.

THE PENRHYN QUARRY DISPUTE.—The conference between the Penrhyn quarrymen's delegates and Mr. Young, Lord Penrhyn's chief quarry manager, terminated in London on Saturday, and the delegates returned home to Bangor at midnight. The net result of the conference is that the men have gained no single concession except a promise that the stringency of the quarry rules will be somewhat relaxed, and the acceptance in a

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modified form of a suggestion by the men that an experiment in co-operative bargains shall be tried in certain portions of the quarry. The men allege that this method of working would pay the management as well as, if not better than, the present contract system. No alteration is to be allowed in the present system of representation, a point which the men hold to be vital, and a minimum wage will not be guaranteed, as was requested. If the men accept the terms they may resume work on January 10.—*Standard.*

LEGAL.

THE ANCIENT LIGHT DISPUTE IN FINSBURY.

IMPORTANT ACTION AGAINST A BUILDER—JUDGMENT.

MR. JUSTICE JOYCE, on the 20th inst., delivered a considered judgment in the case of the Home and Colonial Stores *v.* Coles, an action brought by the plaintiffs to restrain the defendant from erecting a proposed building so as to obstruct the plaintiffs' ancient lights. The case was fully reported in the *Builder* of December 8 last.

The facts were shortly these: The plaintiffs were an incorporated company, having a number of shops in different parts of the country, and the premises now in question were the head offices of the plaintiffs, situate in Worship-street, City. At these premises the plaintiffs had something like 120 clerks. The plaintiffs' building was at the corner of Paul-street and Worship-street, Finsbury, and the only part concerned was the Worship-street frontage. The plaintiffs were lessees of the premises for twenty-eight years from the Ecclesiastical Commissioners. The defendant was a builder, and also lessee of premises which he was about to erect on the opposite side of the road. The premises which formerly stood on the site were 19 ft. 6 in. in height, and the defendant proposed to erect a building to a height of 42 ft., which the plaintiffs said would obstruct their lights. A great amount of conflicting expert evidence was called at the trial as to the probable effect of the defendant's proposed building on the plaintiffs' lights, and this was fully reported in the *Builder.*

Mr. Justice Joyce, in his judgment, after shortly stating the facts, said that upon the evidence he was of opinion that the building which the defendant proposed to erect would not materially interfere with the access of light to the windows on the first floor of the plaintiffs' premises. The only question he had to decide was as to the apprehended injury to the light coming to the windows on the ground floor of the plaintiffs' premises. "These windows are of large size, but, although the top light is said to be the most valuable and important, the uppermost part of each of the windows is filled with coloured glass to a depth of 20 in. from the top, and there are wire blinds fixed at the bottom of each window. The portion of the ground floor of the plaintiffs' building which is opposite the defendant's premises is used as an office. It consists of a large room 11 ft. 10 in. high and of unusual depth, the back wall being upwards of 50 ft. from the Worship-street front, and it has no window nor source of natural light at the back. This room contains several desks used by clerks in the employment of the plaintiffs for the purposes of their business. It is fitted with electric light, there being five rows of lamps in or near to the ceiling and arranged parallel to Worship-street. It is, I think, the result of the evidence that it has ordinarily, if not always, been the custom to use the electric light in the back part of the room, and it would require a most extraordinary amount of light from the windows in Worship-street to enable such use of the electric light to be dispensed with even on ordinary days. Practically I think it may be assumed that the use of electric or some other artificial light is now, and must always be, necessary in order to illuminate the back part of the room in the daytime. There is no evidence to show that any such extraordinary amount of light from the Worship-street windows has been enjoyed or required for anything like the period of twenty years. Probably the ground-floor rooms in the plaintiffs' premises were reconstructed or rearranged as they now are within quite a recent period. Various expert witnesses were examined, and, as the result of their evidence, I am of opinion that the proposed new building of the defendant would not affect the selling or letting value of the plaintiffs' premises. If erected to the proposed height of 42 ft. no part of the defendant's building would be high enough to reach any line drawn at an angle of 45 deg. to the horizon from any point in the base or sill of either of the windows in question belonging to the plaintiffs. But the defendant's building would, for its width of 36 ft. directly south of these windows, cut off a portion of the sky area now visible from within the plaintiffs' office, and it would, I think, to some extent necessitate, more frequently and during somewhat longer hours than at present, the use of artificial light in the front part of the office. It is practically admitted that the defendant's building might be raised a certain height—the plaintiffs' principal witness said to a total height of 25 ft. from the ground—without any material injury to the plaintiffs. Apart from any question with respect to the back part of the plaintiffs' premises and to the extraordinary amount of light required (if it could possibly be obtained) therefor in the absence of illumination by artificial light, the plaintiffs' premises would still, in my opinion, after the erection of the defendant's building, be well and sufficiently lighted for all ordinary purposes of occupancy as a place of business. If they were of only ordinary depth, they would have amply sufficient light." At present, in his Lordship's opinion, the plaintiffs' premises were unusually well lighted. If, as the plaintiffs contended, they were always entitled to the full amount of light they at present enjoyed, they would have had a good cause of action, although it might be doubted whether the diminution of light to their building by the defendant's proposed building would entitle them to an injunction. His Lordship could not reconcile the authorities which had been cited, but after considerable hesitation he had come to the conclusion that he must follow the decision of Mr. Justice Wright in the case of Warren *v.* Brown, and that the decision in that case ought, until it was reversed by the Court of Appeal, to govern this case. In those circumstances he thought that the action ought to be dismissed with costs.

Order accordingly.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

17,220.—AN APPLIANCE FOR WINDOW SASHES: *F. B. Marshall.*—In order that the sashes may be taken out of their frame or be turned into the room for purposes of cleaning them, the pulley stiles are fashioned with vertical grooves in which will slide some studs that are affixed to the sashes near the lower and upper rails, whilst the upper studs will move within horizontal grooves when the window is to be cleaned. Notches are cut in the detachable portions of the inside beads for engagement with the webs of T-shaped plates upon the beads' upper portions. For removal of the sashes from the frame one moves the two sets of studs along the upper and lower horizontal grooves which may be opened by turning pivoted plates backwards. In another form recessed plates that are let into the pulley stiles receive pivot pins mounted upon spring-plates attached to the sashes, or the upper sash can be moved into the frame's inner 'guiding-grooves by making the upper portions of the parting-beads detachable, one pair only of recessed plates being then necessary.

17,232.—A WATER-HEATER FOR BATHS: *A. Prost.*—Either wood or coal may be used in the furnace or fireplace. Water flows from the supply-pipe into two hollow vessels and thence into a boiler fitted with a double wall and a discharge pipe, a trough collects the products of combustion as they condense upon the boiler's inner wall, and the boiler is set upon a base which is provided with fire-bars.

17,241.—A MORTISING MACHINE: *W. Langner.*—The machine is intended for the cutting of mortises, channels, &c., in window-frames, doors, and so on. A crank-handle and bevel-gearing turn the cutting-tool, which is also traversed by means of a pinion geared within a rack upon the guiding-bed and driven from the cutter-shaft with reduction-gearing; the cutter is caused to traverse in the opposed direction through the impact at the end of a stroke of a bell-crank lever against a stop whereby the pinion is thrown out of gear with one rack and into gear with another rack upon the opposite side. A screw, fitted with hand-wheels, feeds the cutter forwards.

17,244.—PAINTS: *G. von Reinolts.*—A composition for use instead of white lead in the preparation of paints is made by mixing equal, or nearly equal, parts of carbonate of lead, sulphate of lead, oxide of zinc, sulphate of lime, and carbonate of lime. Of the last two ingredients one or the other may be discarded.

17,268.—MAN-HOLES, COAL-PLATES, &C.: *W. H. Kember.*—A flanged metal ring supports the door or plate, which is retained in its place by means of projections from either side of a stud upon the ring, a gravity catch which engages with a projection upon a bracket is pivoted upon lugs, a chain pulls a hooked lever so as to force its point against the catch, whose release lifts the plate, which can then be taken up by the hand.

17,272.—MEANS OF ESCAPE FROM FIRE: *L. Weber.*—By this contrivance the window-frame can be lowered to the ground, and a person can at the same time be carried with it. The cords which sustain the window-frame are passed over drums and through the eyes of upper and lower pivoted arms, which are disposed in pairs, and are to be held in their places with segmental guiding-plates. The lower arm of each pair is bent so as to serve for a strut through its pressure against the front wall of the building, whilst the upper arm of each pair is so hooked that it shall slide within a guiding-groove which extends up and down the face of the wall. As the frame is being lowered a cord, fitted with a counter-weight, becomes wound upon the axle of the drum. The frame, which may be hung upon only one pair of arms at each of its sides, is mounted upon rollers laid upon the window-sill.

17,284.—A METHOD OF GLAZING ROOFS: *A. S. Deacon.*—The sheets of glass are retained in their position by means of beaded wings fashioned upon drawn lead caps in which the sash-bars, whether of metal or of wood, are cased. According to one shape of the device, the edges of the cap act as a support of the lower lead-casing strip, and the wings are strengthened with plates or pins made of copper, brass, or other metal. In another adaptation, so that the glass shall not slide downwards, a pin or bolt is employed for fastening an end shoe or stop-piece on to the web at the bar's end. Expansion and contraction are provided for by joining the sash-bars to forked brackets upon the ridge-bars in which slots are cut for bolts that are passed through the bars.

17,319.—A GRIP FOR ELECTRICAL CONDUCTORS: *Steel Nut and Joseph Hampton, Limited, and S. Hampton.*—The grip is devised for use in hauling electrical conductors into tubular conduits; it consists of a tapered casing within which are attached three tapering guides, whose outer ends form three parallel guides having a screw box-head (with an eye) at their common end; between the guides of the outer ends slides a plate in which is pivoted the screw that turns in the box-head, the plate resting upon three slides whose toothed inner surfaces afford a grip for the cable.

17,359.—SCALES FOR SLIDE-RULES: *R. H. Smith.*—Around the middle and slightly recessed part of a cylinder is marked, spiral-wise, a logarithmical scale that ends in a circular scale divided into fifty equal parts; a slotted holder slides and turns over the cylinder, and over the holder slides an index ring having pointers, by means of which readings can be taken. The two slots of the holder are made wider than are the intermediate bars, whereof one—at the corners of one slot—carries four index-horns, the other bar being fitted with a straight scale divided into twenty equal parts; the zero of the scales become displaced accordingly with the circumferential and axial dimensions of the horns, the distance between them being equal to the distance from mark 100 to mark 1,000 upon the logarithmical scale.

17,366.—A METHOD OF GLAZING ROOFS: *W. Lawson.*—Tubular rivets made of lead or some soft metal are used for securing the supporting strips to the web of the glazing-bar; then through the rivets and through holes in the cap are passed bolts or other tubular rivets so as to fix the cap or cover in its place.

17,377.—HOISTING MACHINERY: *W. T. Eades & E. Allday.*—The lifting chain's sprocket-wheels are secured to a screwed axle upon which the hand-wheel also is mounted; a roller clutch set for engagement with the hub of a friction pulley that, under normal conditions, rests upon a band, prevents the outer sprocket-wheel from rotating in one direction, whilst a pawl and a ratchet-wheel likewise regulate the motion of the other sprocket-wheel. As the hand-wheel is turned in one direction it becomes jammed against the inside sprocket-wheel, and by causing it to turn, raises the load with the slow speed, but when the hand-wheel is reversed in direction it jams the other sprocket-wheel, and thereby raises the load with the faster speed. For an exertion of greater power the inventors put spur-gearing between the sprocket-wheels and the hand-wheel; for lowering purposes, the friction pulley is lifted from its contact with the band by the action of a lever upon the end of the shaft.

17,583.—JOINTING OF PIPES: *L. H. Holliday.*—The inventor fashions wedges upon the spigot ends and the socket ends of the pipes, in order that when the spigot end has been turned within the socket the engagement of the wedges shall effect a sure joint

17,584.—A CONTRIVANCE FOR HEATING OR COOLING PURPOSES: *R. Commichau.*—The device consists of spiral metal ribs made in various shapes for attachment to the pipes of a heating, cooling, or refrigerating apparatus by means of grooves that are fashioned upon the pipes, or by an expansion of the pipes, or by the shrinking of the ribs on to the pipes, or with solder. The ribs can be used for heating-coils and stoves as well as for spirally-coiled pipes.

17,608.—CEMENTS FOR BUILDERS' USE: *W. Seidel.*—A paste containing 32 per cent. of moisture is made of argillaceous and calcareous marls mixed together with water in spherical mills; it is then finely ground between millstones, and mixed with dry cement materials in a kneading-machine so as to reduce the ratio of moisture by about one-third. Cement is made by drying and burning bricks composed of the admixture.

17,648.—EXTINCTION OF FIRE: *C. J. Patton and J. C. Grant.*—The extincteur consists of a casing of metal within which is an inner vessel of glass that encloses two smaller glass containers. The containers, having been filled with substances that will generate gas when they fall into a solution poured into the inner glass vessel, are hermetically sealed. For operative purposes the two containers are broken with a rod forced downwards upon them, and then will discharge their contents into the inner vessel. The resultant gas finds its escape through a Y-shaped tube upon inversion of the extincteur.

17,715.—SAFETY APPLIANCES FOR USE WITH ELECTRICAL LIFTS: *J. H. Johnson and W. R.*

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COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Additions to Northfield, Bridlington	Mr. W. T. Foster	J. Earnshaw, Architect, Bridlington	Jan. 1
Widening Radyr-road	Llandaff R.D.C.	J. Holden, Civil Engineer, 35, St. Mary-street, Cardiff	do.
Lych Gateway	Cranleigh Parish Council	E. L. Lunn, Architect, 36, High-street, Guildford	Jan. 2
Rebuilding Blue Bell Inn, Ryhope, near Sunderland	Mr. J. Johnson	H. Grieves, Architect, Albany Chambers, South Shields	do.
Wood Paving (2,500 square yards)	Ramsgate Corporation	T. G. Taylor, Borough Surveyor, Broad-street, Ramsgate	do.
Sewerage Works, Dunham Massey	Bucklow (Cheshire) R.D.C.	J. McKenzie, Engineer, 7, Market-street, Altrincham	do.
Additions to Workhouse	Stoke-on-Trent Guardians	C. Lynam, Architect, Stoke-on-Trent	do.
Workshops, Stores, &c., Milford Haven	.....	D. E. Thomas, Architect, Haverfordwest	do.
Three Shelters, Darlow's Green	Southend-on-Sea Corporation	A. Fidler, Civil Engineer, Clarence-road, Southend	Jan. 3
Residence, Bowness	Mr. T. Harrison	R. Walker, Architect, Windermere	Jan. 4
Additions, &c., to Police Station, Holt	Denbigh County Council	W. R. Evans, County Offices, Ruthin	Jan. 5
Granite Road Metal (2,000 yards)	Hampton Wick U.D.C.	J. N. Horsfield, Surveyor, Hampton Wick	do.
Schools, Siddick, Cumberland	Workington School Board	Donald & Tate, Architects, 14, John-street, Workington	do.
Stables and House, Cragg Hall, near Mytholmroyd	.....	T. H. & F. Healey, Architects, 42, Tyrrel-street, Bradford	do.
Vicarage, Stable, &c., Rosedale Abbey, near Pickering	.....	J. Kirk & Sons, Architects, Huddersfield	do.
Chimney Shaft at Electric Lighting Station	Eastbourne Corporation	Borough Engineer, Town Hall, Eastbourne	Jan. 7
Steel Girder and Concrete Bridge	Clitheroe (Lancs) Corporation	J. Eastham, Town Hall, Clitheroe	do.
Widening Salterhebble Bridge	Halifax Corporation	J. Lord, Civil Engineer, Town Hall, Halifax	do.
Sewerage Works	Gildersome (Yorks) U.D.C.	J. Waugh, Civil Engineer, Tunbridge-chambers, Bradford	do.
Whinstone, &c.	Kingstown (Ireland) U.D.C.	J. Donnelly, Town Hall, Kingstown	do.
Five Houses, Boothtown, Halifax	.....	R. Berry, Architect, Commercial-street, Halifax	Jan. 8
Station Buildings, Glanamman, Carmarthen	Great Western Railway Company	G. K. Mills, Paddington Station, W.	do.
Well Sinking, Horsenden Hill	Thame U.D.C.	Taylor, Sons, & Santo Crimp, Engineers, 27, Great George-street	do.
*Electric Light Station and Destructor	Whitby U.D.C.	Clerk, Council Offices, Whitby, Yorks	do.
Additions to Mayfield Baths	Manchester Corporation	City Surveyor, Town Hall, Manchester	Jan. 9
Wesleyan Chapel, Swaledale	.....	Secretary, Building Committee, Kearton, Reeth, Yorks	Jan. 10
Additions to Business Premises, Elworth	Sandbach Co-operative Society	A. Price, Architect, Elworth, Sandbach	do.
*Postmen's Office at Clapham	Office of Works	J. Wager, Office of Works, Storey's Gate, S.W.	Jan. 15
Sewerage Works	Lutterworth R.D.C.	W. H. Simpson, Civil Engineer, Market Place, Leicester	Jan. 17
*Alterations and Additions to Laundry Machinery, &c.	Metropolitan Asylums Board	Offices, Embankment, E.C.	do.
*Brick Storm-water Culvert	Hornsey U.D.C.	Engineer, Council Offices, Southwood-lane, Highgate, N.	Jan. 21
*School	Metropolitan Asylums Board	Newman & Newman, Architects, 31, Tooley-street, S.E.	Jan. 30
Factory, Holloway-road, N.	.....	A. Monk, 556, Holloway-road, N.	No date
Road Works	Yell (Shetland) Parish Council	J. N. Barclay, Mid Yell, Shetland	do.
Shop and Five Houses, Whitehouse, Belfast	Mr. J. Cassidy	W. J. Moore, Architect, Whitehall-buildings, Ann-street, Belfast	do.
Ice Factory, Milford Haven	.....	Freeman, Son, & Gaskell, Architects, Albert-chambers, Hull	do.
Additions to Foundry, Kendal	.....	J. Stalker, Architect, Kendal	do.
Mission Room and School, Churwell, Yorks	.....	E. Castle & Son, Architects, Cleckheaton	do.
Three Houses, &c., Dick-lane, Tyersal, Yorks	.....	F. Moore, Architect, 40, Sunbridge-road, Bradford	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Application to be in
*Building Inspector	Tottenham U.D.C.	150*l.* per annum	Jan. 9
*Draughtsman	Chiswick U.D.C.	100*l.* per annum	do.
*Assistant	E. Sussex County Council	75*l.* per annum	Jan. 12

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. —. Contracts, pp. iv, vi. viii. & xviii. Public Appointments, pp. xvi. & xviii*

Weeks.—The inventors' object is to provide means for operating a cut-out switch in the case of the cage being raised too high or too fast and for arresting its descent through a breakage of the rope or other accidental cause. The current is supplied by a cut-out switch to an electrical motor which drives the drum around which the lifting-rope is wound, the lift being normally regulated with a pull-rope which works the reversing switch. As the cage reaches its limit upwards a piece upon it strikes against a stop upon the upper end of a rod that moves in guides and to which is fastened a rope which works the cut-out switch. Should the speed prove to be in excess, a governor—driven with a weighted rope—operates upon a clamp, which in its turn grips the cut-out switch rope, and so moves that switch to arrest the cage. The cut-out switch may be also worked with a hand-clamp inside the cage that will grip the rope. In the event of the cage breaking away, the hinged sections that constitute one of the guides will thereupon be pressed inwards so as to stop the fall of the cage, the sections being so moved by a drum turned by a rope; the rope is gripped with a clamp that is worked with a governor driven by a weighted rope, or the rope may be held fast by a hand-clamp provided within the cage.

17,764.—SQUARES AND BEVELS: *E. W. Hutchinson and F. M. Wright.*—A right-angled extending-piece having round-ended prongs is attached to the one blade of the square, and the other blade is formed with a grooved tongue that fits into the double-bevelled edges of the extension-piece, a spring catch retaining the two blades together in position. A separate bevel, whose two parts are secured to one another with bolts, whilst each of them includes an adjustable and slotted blade, may be caused to slide upon the extension-piece, and so to take the place of the other blade, a grooved tongue being fitted upon one of the two parts of the bevel.

MEETINGS.

SATURDAY, DECEMBER 29.

Royal Victoria Hall (Waterloo-road, S.E.).—Professor Capper on "Niagara Water Power Installation." 8.30 p.m.

WEDNESDAY, JANUARY 2.

Institute of Sanitary Engineers.—Council meeting, 7 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

THURSDAY, JANUARY 3.

Civil and Mechanical Engineers' Society.—Mr. W. B. Esson on "The Case for Electric Power Distribution." 8 p.m.

FRIDAY, JANUARY 4.

Architectural Association.—Professor Beresford Pite and Mr. R. Weir Schultz on "The Preparation of Studentship Drawings." 7.30 p.m.

Architectural Association of Ireland (Technical Demonstrations).—Mr. J. McGloughlin on "Ironwork" (at No. 47, Great Brunswick-street). 4.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

December 14.—By DAVID J. CHATTELL (at Chislehurst).

Chislehurst, Kent.—Green-lane, 9 freehold building sites £1,270

By H. J. WAY & SON (at Totland Bay).

Totland, Isle of Wight.—The Avenue, Kernswald, u.t. 993 yrs., g.r. 15*l.* 770

December 17.—By GEORGE STOCKINGS.

Enfield.—Chase Side, Home Cottage, f., r. 80*l.* .. 300

Dalston.—77, Navarino-rd., u.t. 51 yrs., g.r. 5*l.*, r. 34*l.* 310

December 18.—By JOHN BOTT & SONS.

Herne Hill.—90, Railton-rd., u.t. 69 yrs., g.r. 5*l.* 450

By DAVID BURNETT & CO.

Lakenheath, Suffolk.—A freehold and copyhold estate, area 420 a. 2 r. 37 p. 2,000

By MARK LIELL & SON.

Stratford.—143 to 149 (odd), Leyton-rd., u.t. 80 yrs., g.r. 22*l.*, r. 112*l.* £1,095

Ilford.—1 to 35 (odd), Pyrmont-rd., u.t. 77 yrs., g.r. 108*l.* 3,165

2 to 36 (even), Pyrmont-rd., u.t. 77 yrs., g.r. 108*l.* 3,150

Plaistow.—New Barn-st., a plot of building land, f. 195

By TRAFFORD & CARTER.

Camberwell.—126 and 130, Camberwell-grove, u.t. 14½ yrs., g.r. 20*l.*, r. 70*l.* 14*s.* 265

Kennington.—44 and 46, Finchley-rd., u.t. 50 yrs., g.r. 8*l.*, r. 60*l.* 615

Brixton.—18 and 20, Millbrook-rd., u.t. 22 yrs., g.r. 8*l.*, r. 58*l.* 400

Stepney.—11 and 12, Trafalgar-sq., f. 990

Hackney.—15, King Edward-rd., u.t. 22½ yrs., g.r. 6*l.* 16*s.*, e.r. 70*l.* 330

By HEPPER & SONS (at Leeds).

Bramley, Yorks.—Hough End Tannery, together with 2 houses, 23 cottages, &c., area 10 a. 3 r. 9 p., f. 12,200

Swinnow-rd., 3 closes of building land, 9 a. 1 r. 23 p., f. 1,585

By S. P. GRAVES & SON (at Southam).

Southam, Warwick.—The Holt Farm, 94 a. 2 r. 6 p., f. 1,450

Oven and Holt Church Meadows, 19 a. 3 r. 11 p., f. 580

The Allotments, 59 a. 2 r. 30 p., f. 1,700

By CRAFTER, HARRIS, & CO. (at Masons' Hall Tavern).

Streatham.—Mitcham-lane, The Streatham Park Hotel, u.t. 60 yrs., g.r. 20*l.*, r. 1,000*l.* 2,650

December 19.—By FRANCIS DOD & CO.

Woodford.—George-lane, Laurestinus Villa, f. 650

Stoke Newington.—78, Park-st., u.t. 47½ yrs., g.r. 2*l.* 18. 3*d.*, e.r. 34*l.* 335

Dalston.—21, Ferncliff-rd., u.t. 60½ yrs., g.r. 6*l.*, e.r. 40*l.* 420

By CHARLES HALL.

Clapham Common.—105, North Side, u.t. 70 yrs., g.r. 24*l.* 470

By G. F. HAWKINS.

Maida Vale.—62, Sutherland-av., u.t. 63 yrs., g.r. 11*l.*, e.r. 65*l.* 700

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Portman-sq.—14 and 15, Dorset-st., u.t. 13¼ yrs., g.r. 80*l.*, r. 245*l.* £880

By F. PEKES.

Paddington.—Delamere-ter., i.g.r.'s 34*l.* 10s., u.t. 48 yrs., g.r. nil 690
Blomfield-pl., i.g.r. 33*l.* 4s., u.t. 48 yrs., g.r. 2*l.* 535
Blomfield-pl., i.g.r.'s 45*l.* 8s., u.t. 48 yrs., g.r. nil 791

By ROBINS, GORE, & MERCER.

Tottenham Court-rd. — 33, Percy-st., beneficial lease for 15½ yrs., r. 90*l.* 250

By THURGOOD & MARTIN.

East Molesey, Surrey.—12 to 23, Avern-rd., f. .. 2,120
December 20.—By EDWIN EVANS.
Stroud Green.—117, Ferme Pk.-rd., u.t. 89 yrs., g.r. 8*l.*, e.r. 45*l.* 485
Portman-sq.—15, King-st., u.t. 5½ yrs., g.r. 35*l.*, r. 100*l.* 125
Wandsworth-rd.—No. 555, u.t. 63 yrs., g.r. 10*l.*, e.r. 50*l.* 495

By SIBLEY, COOKES, & BURRELL.

Peckham.—59, 61, 63, and 65, Lower Park-rd., f., r. 80*l.* 1,485

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 16 0	per 1,000 alongside, in river.
Rough Stocks and Grizzles	1 12 0	,, ,, ,,
Smooth Bright Facing Stocks..	2 18 0	,, ,, ,,
Shippers	2 6 0	,, ,, ,,
Flettons.....	1 10 6	,, at railway depôt.
Red Wire Cuts ..	1 15 6	,, ,, ,,
Best Fareham Red	3 11 6	,, ,, ,,
Best Red pressed Ruabon Facing.	5 5 0	,, ,, ,,
Best Blue Pressed Staffordshire ..	4 7 0	,, ,, ,,
Do., Bullnose ...	4 12 0	,, ,, ,,
Best Stourbridge Fire Bricks	4 4 6	,, ,, ,,
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers.....	13 0 0	,, ,, ,,
Headers	12 0 0	,, ,, ,,
Quoins, Bullnose, and Flats	17 0 0	,, ,, ,,
Double Stretchers	19 0 0	,, ,, ,,
Double Headers..	16 0 0	,, ,, ,,
One Side and two Ends	19 0 0	,, ,, ,,
Two Sides and one End	20 0 0	,, ,, ,,
Splays, Chamfered, Squints	20 0 0	,, ,, ,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,, ,, ,,
Quoins, Bullnose, and Flats	14 0 0	,, ,, ,,
Double Stretchers	15 0 0	,, ,, ,,
Double Headers..	14 0 0	,, ,, ,,
One Side and two Ends	15 0 0	,, ,, ,,
Two Sides and one End	15 0 0	,, ,, ,,
Splays, Chamfered, Squints	14 0 0	,, ,, ,,
Seconds Quality White and Dipped Salt Glazed ...	2 0 0	,, less than best.

	s. d.	
Thames and Pit Sand	8 0	per yard, delivered.
Thames Ballast	6 9	,, ,,
Best Portland Cement	38 0	per ton ,,
Best Ground Blue Lias Lime..	24 6	,, ,,

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
Ancaster in blocks ...	2 0	per ft. cube, deld. rly. depôt
Bath ,, ...	1 7	,, ,,
Farleigh Down Bath ..	1 8	,, ,,
Beer in blocks	1 6½	,, ,,
Grinshill ,, ...	1 10	,, ,,
Brown Portland in blocks	2 2	,, ,,
Darley Dale in blocks..	2 1½	,, ,,
Red Corsehill ,,	2 5	,, ,,
Red Mansfield ,,	2 4½	,, ,,
Hard York in blocks ..)	2 10	,, ,,
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super. at rly. depôt.
,, ,, 6 in. Rubbed Ditto..	3 0	,, ,,
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,, ,,
,, ,, 3 in. self-faced Ditto	0 9½	,, ,,

PRICES CURRENT (*Continued*).

SLATES.

in. in.	£ s. d.	
20 × 10 best blue Bangor ..	11 5 0	per 1000 of 1200 at rly. dep.
,, best seconds ,,	10 15 0	,, ,,
16 × 8 best ,,	6 2 6	,, ,,
20 × 10 best blue Portmadoc ..	10 18 0	,, ,,
16 × 8 best blue Portmadoc	6 0 0	,, ,,
20 × 10 best Eureka unfading green.....	11 2 6	,, ,,
16 × 8 ,, ,,	6 15 0	,, ,,
20 × 10 Permanent green	10 0 0	,, ,,
16 × 8 ,, ,,	5 12 6	,, ,,

TILES.

	s. d.	
Best plain red roofing tiles...	41 6	per 1,000 at rly. depôt
Hip and valley tiles....	3 7	per doz. ,, ,,
Best Broseley tiles	48 6	per 1,000 ,, ,,
Hip and valley tiles....	4 0	per doz. ,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 ,, ,,
Do. ornamental Do.	60 0	,, ,, ,,
Hip tiles.....	4 0	per doz. ,, ,,
Valley tiles.....	3 9	,, ,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50 9	per 1,000 ,, ,,
Hip tiles	4 1	per doz. ,, ,,
Valley tiles.....	3 8	,, ,, ,,

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.....	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds.....	0 10 0	,, ,, ,,
	At per load of 50 ft.	
Fir timber: Best middling Danzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks.....	2 15 0	3 0 0
Pitch pine timber (35 ft. average)..	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.....	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens.....	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.....	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens.....	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.....	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens.....	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in..	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in. ..	14 0 0	15 0 0
Battens.....	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 2 8
Small ,, ,, ...	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
¾ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch.....	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube.....	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	8 7 6	9 7 6
Compound Girders ,, ,,	10 5 0	11 10 0
Angles, Tees and Channels, ordinary sections	11 2 6	13 2 6
Flitch Plates	11 0 0	11 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	8 15 0	10 10 0

PRICES CURRENT (*Continued*).

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars.....	9 15 0	- - -
Staffordshire Crown Bars, good merchant quality	10 5 0	10 10 0
Staffordshire "Marked Bars" ..	12 0 0	- - -
Mild Steel Bars.....	10 10 0	11 0 0
Hoop Iron, basis price.....	10 10 0	11 0 0
,, ,, galvanised	16 10 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 0 0	- - -
,, ,, to 24 g.	12 0 0	- - -
,, ,, to 26 g.	13 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	13 5 0	- - -
,, ,, 22 g. and 24 g.	14 5 0	- - -
,, ,, 26 g.....	16 0 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	17 10 0	- - -
,, ,, 22 g. and 24 g.	18 0 0	- - -
,, ,, 26 g.....	19 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	13 10 0	- - -
,, ,, 22 g. and 24 g.	14 0 0	- - -
Cut nails, 3 in. to 6 in.....	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	19 5 0	- - -
Pipe in coils	19 15 0	- - -
Soil Pipe..	22 15 0	- - -
ZINC—Sheet—		
Vieille Montagne ..... ton	26 0 0	- - -
Silesian.....	25 10 0	- - -
COPPER—		
Strong Sheet..... per lb.	0 1 1	- - -
Thin ..... ,,	0 1 3	- - -
Copper nails ..... ,,	0 1 3	- - -
BRASS—		
Strong Sheet..... ,,	0 0 11	- - -
Thin ,, ... ,,	0 1 1	- - -
TIN—English Ingots ..... ,,	0 1 4½	- - -
SOLDER—Plumbers' ..... ,,	0 0 7½	- - -
Tinmen's ..... ,,	0 0 9½	- - -
Blowpipe ..... ,,	0 0 11	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, ,, fourths.....	3d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths.....	5d. ,, ,,
Fluted sheet, 15 oz.	3¼d. ,, ,,
,, ,, 21 ,, ...	4¼d. ,, ,,
½ Hartley's Rolled Plate.....	3d. ,, ,,
⅝ ,, ,, ,, ...	3½d. ,, ,,
¾ ,, ,, ,, ...	4d. ,, ,,

OILS, &c.

	£ s. d.	
Raw Linseed Oil in pipes	per gallon	0 2 10
,, ,, ,, in barrels	,,	0 2 11
,, ,, ,, in drums	,,	0 3 1
Boiled ,, ,, in pipes.....	,,	0 3 1
,, ,, ,, in barrels	,,	0 3 2
,, ,, ,, in drums	,,	0 3 4
Turpentine, in barrels	,,	0 2 8
,, in drums.....	,,	0 2 10
Genuine Ground English White Lead ...per ton		27 0 0
Red Lead, Dry.....	,,	24 10 0
Best Linseed Oil Putty.....per cwt.		0 9 6
Stockholm Tar	per barrel	1 10 0

VARNISHES, &c.

	per gallon £ s. d
Fine Elastic Copal Varnish for outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work....	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

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TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

DUNSTABLE.—For the construction of sewerage and sewage disposal works, for the Corporation. Mr. W. H. Radford, C.E., Albion Chambers, King-street, Nottingham:—

Hiram Morecroft	£17,500	0 0	Johnson Bros.	£12,516	0 0
Cooke & Co.	16,687	0 0	C. F. Tomlinson	12,400	0 0
Thos. Adams	15,967	0 0	Clift Ford	12,389	0 0
W. Manders	15,587	4 0	W. Cunliffe	12,370	0 0
R. Ballard, Ld.	15,377	0 0	Geo. Bell	12,290	0 0
Geo. Osenton	15,334	0 0	Siddons & Freeman	12,055	0 0
Joseph Young	13,783	0 0	H. H. Barry	11,390	10 0
Geo. Powdrill	13,736	0 0	Bower Bros.		
James Dickson	13,498	11 0	West Bridgford*	11,200	0 0
Wilkinson Bros.	13,161	0 0	Jowett Bros. (withdrawn)	10,443	0 0
John Jackson	13,086	14 8			
Nowell & Son	13,000	0 0			

GRIMSBY.—For extension to offices for Messrs. Hewitt Bros., Limited, Tower Brewery, Grimsby. Mr. Herbert C. Scaping, architect, Grimsby. Quantities by Mr. J. Watson, Hull:—

William Ion	£633	8	Gilbert & Kirton	£578	4
H. Marrows	580	0	Thompson & Sons*	550	0

LONDON.—For the pulling-down and rebuilding of shop and premises, No. 901, Old Kent-road, S.E., for Mrs. M. A. Chalk, Caterham, Surrey. Mr. J. Halsted Waterworth, architect and surveyor, 281A, Queen's-road, New Cross Gate, S.E.:—

Sydney R. Best, Brockley* £915 15 0

RAUNDS.—For erecting shops and factory, Raunds, for Mr. W. Lawrence. Mr. H. Knight, architect, Rushden:—

Kettering Co-operative Builders, Limited	£1,405	F. Barlow	£1,255
W. H. Lovell	1,300	R. Marriott	1,248
T. Swinda l	1,288	Hacksley Bros.	1,189
Freeman & Son	1,260	J. Lawrence	1,155
		Smith & Sons	1,147

RUSHDEN.—For erecting a factory for Messrs. Skerritt & Co., Sarton-road, Rushden. Mr. H. Knight, architect, Rushden:—

H. Sparrow	£1,313	Freeman & Sons	£1,200
The Kettering Co-operative Builders, Limited	1,257	Thos. Willmott, Jun.	1,199
Geo. Henson	1,224	R. Marriott, Jun.	1,190
Fred Barlow	1,200	Thos. Swindall	1,147
		Wm. Packwood	1,108
		Hacksley Bros.	1,099

SIDCUP (Kent).—For the new children's homes, the Guardians of Greenwich Union have accepted the tender of

Pattinson & Son £104,040

Quantities by Mr. Louis Jacob, New Cross, S.E.

WANSTEAD.—For erecting a pair of semi-detached houses at Wanstead, N.E., for Mr. C. G. Poupard. Mr. S. Jackson, architect, 65, Fenchurch-street, E.C.:—

J. W. Jerram	£3,500	C. North	£2,750
J. B. Hutchins	3,000	J. Joliffe, Wanstead*	2,735

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Telegraphic Address, "THE BUILDER, LONDON."

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Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

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PERSONS Advertising in "The Builder" may have *Replies addressed to the Office*, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

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Architects' Designs are carried out with the greatest care.

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CHURCH BENCHES & PULPITS.

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Nos. 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, & 17, BACK HILL, HATTON GARDEN, and 29, RAY STREET, FARRINGDON ROAD, E.C.

THE LARGEST STOCK OF ALL KINDS OF WOODS IN EVERY THICKNESS, DRY, AND FIT FOR IMMEDIATE USE.

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FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(Incorporating the Ham Hill Stone Co. and C. Trask & Son, The Doulting Stone Co.)
Chief Office:—Norton, Stoke-under-Ham, Somerset.
London Agent:—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

SPRAGUE & CO., Ltd.,
PROCESS BLOCK MAKERS
of all descriptions.
4 & 5, East Harding-street, Fetter-lane, E.C.

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch. [Telephone No. 634 Westminster.
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"QUANTITY SURVEYORS' DIARY AND TABLES," For 1901, price 6d. post 7d. In leather 1/- Post 1/1.

PILKINGTON & CO
(ESTABLISHED 1838),
MONUMENT CHAMBERS,
KING WILLIAM STREET, LONDON, E.C.
Telephone No., 2751 Avenue
Registered Trade Mark.
Poloncean Asphalte.
PATENT ASPHALTE and FELT ROOFING.
ACID-RESISTING ASPHALTE.
WHITE SILICA PAVING.
SEYSSEL ASPHALTE.

DRY PLANKS and BOARDS.
IN ALL KINDS OF HARDWOODS.
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WAINSCOT OAK BIRCH BROWN OAK
PENCIL CEDAR ASH—WHITEWOOD ROSEWOOD
CEDAR HONDURAS and PENCIL Large Stock of FIGURED WOODS

WM. MALLINSON & CO.,
(Telephone, 1319 Avenue.) Offices, 136 and 138, HACKNEY ROAD, LONDON, N.E.
Store Yards: DISS STREET, MENOTTI STREET, DERBYSHIRE STREET, CHESHIRE STREET, HAGUE STREET, BETHNAL GREEN.
PARNELL WHARF: OLD FORD.
LARGE STOCK of
FASCIAS, COUNTER-TOP BOARDS
Always on hand, also VENEERS.
THE LARGEST STOCK OF CUBA IN THE COUNTRY.

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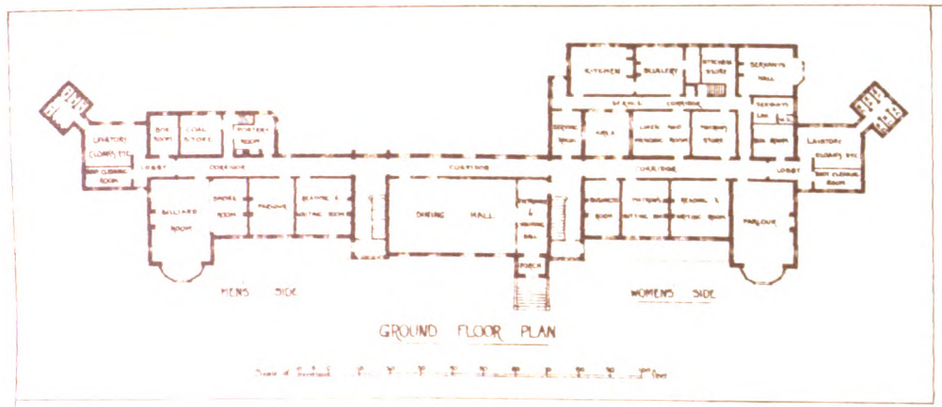
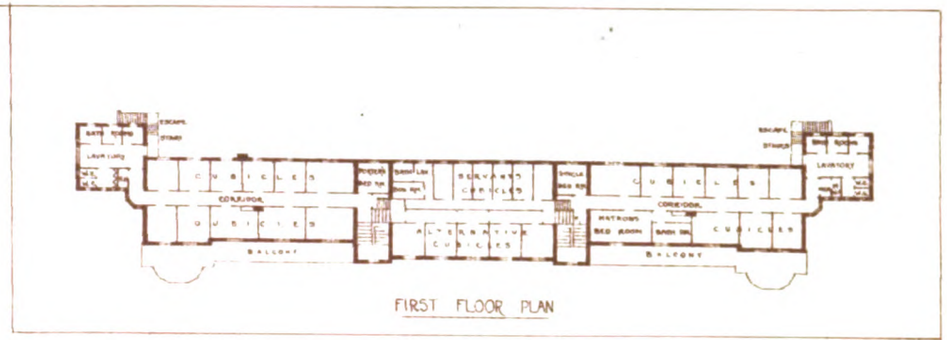


GROUND FLOOR PLAN



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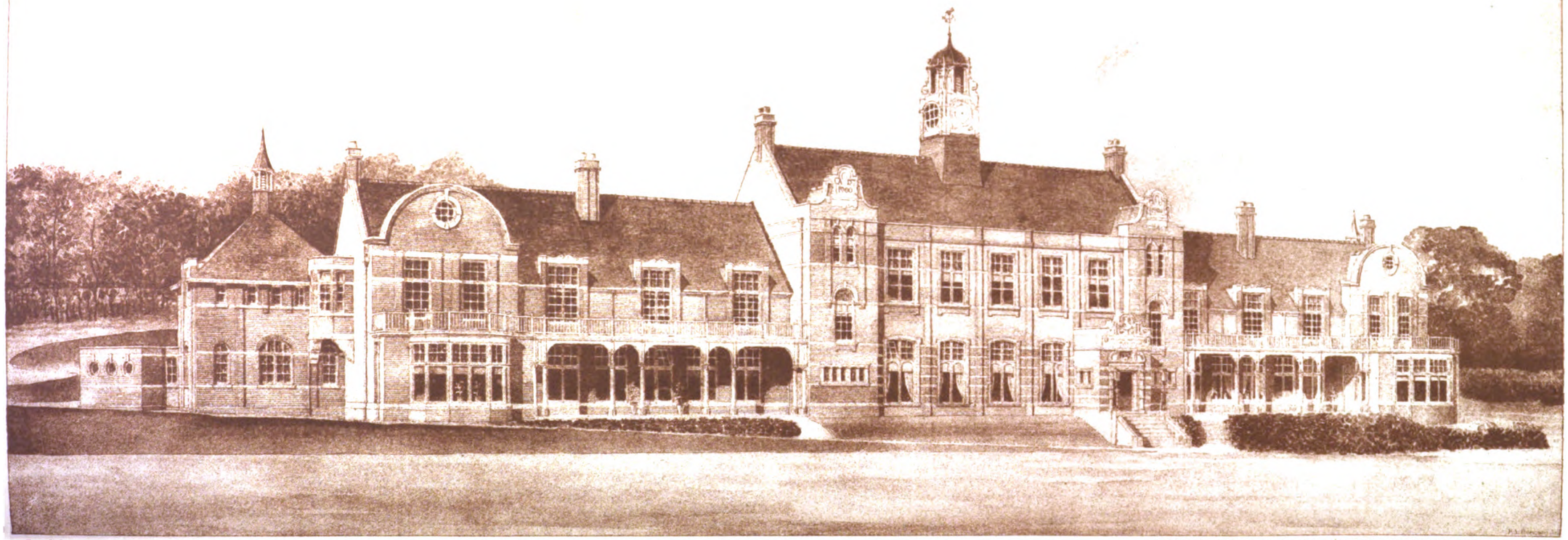

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CONVALESCENT HOME, NEAR SHEFFIELD.—Messrs. Hemsoll & Paterson, Architects

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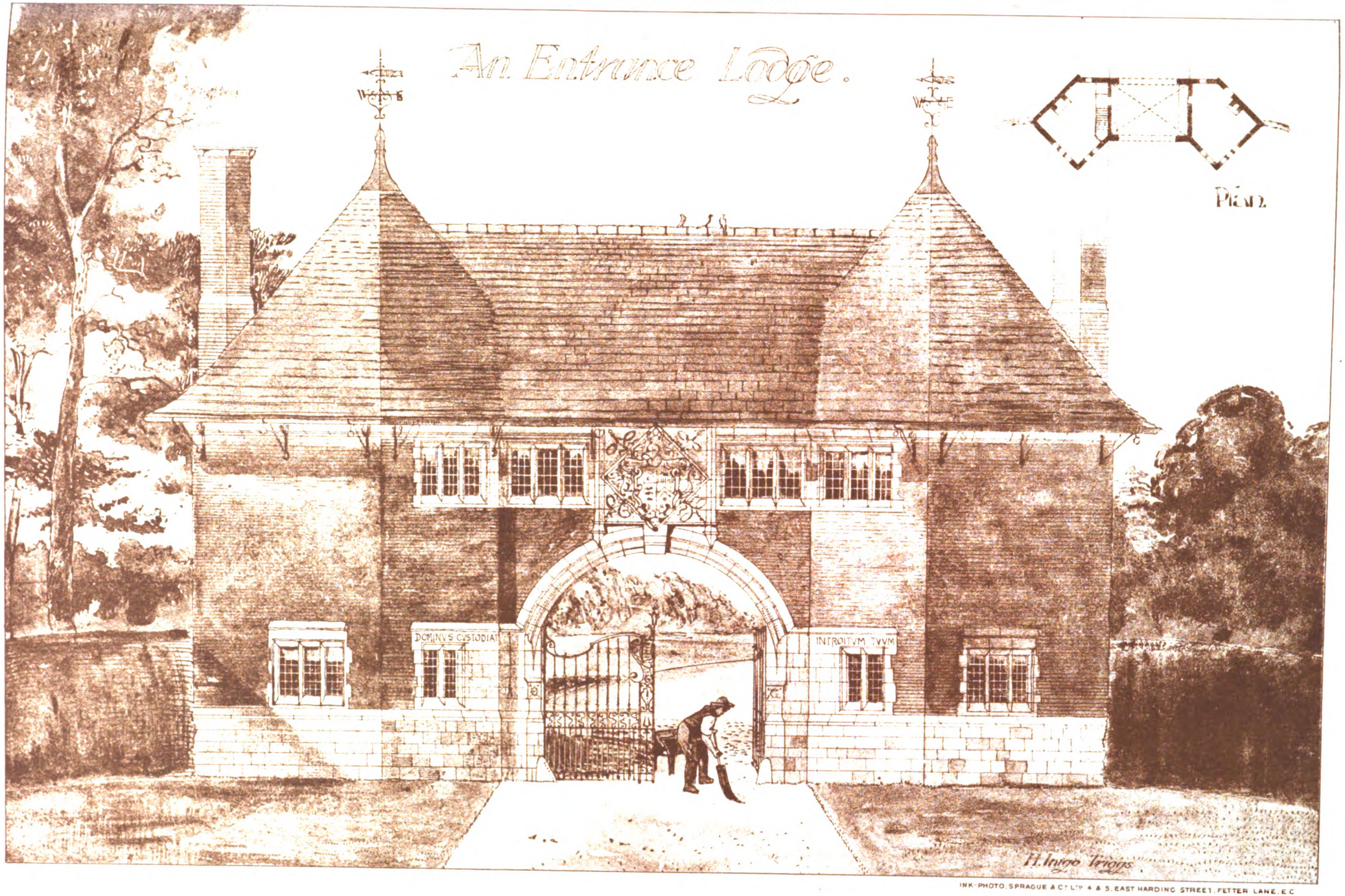
An Entrance Lodge.



Plan.

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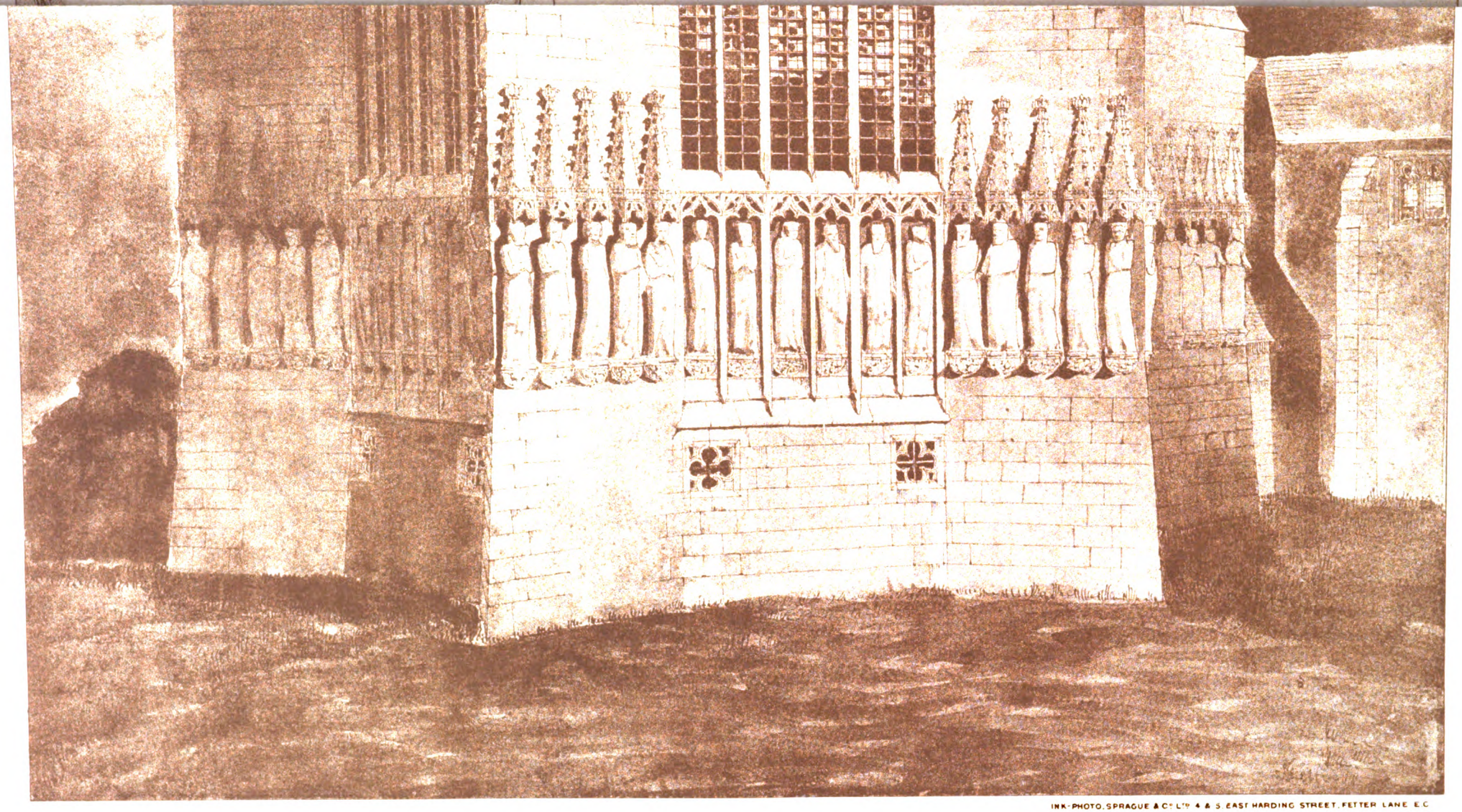
DESIGN FOR A CHAPTER-HOUSE.



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The Builder

A JOURNAL FOR THE

Architect, Engineer, Operative & Artist.

VOL. LXXIX. No. 3021. *Fifty-eighth Year.*

DECEMBER 29, 1900.

REGISTERED AT THE GENERAL POST OFFICE AS A NEWSPAPER.

PRICE FOURPENCE. *By Post, 4½d.*

Telegraphic Address—"THE BUILDER, LONDON."

THE ARCHITECTURAL ASSOCIATION JANUARY 4th.—ORDINARY GENERAL MEETING at No. 9, Conduit-street, W. at 7.30 p.m. Papers by Professor BERESFORD PITE and Mr. R. WEIR SCHULTZ, entitled, "Hints on the Preparation of Studentship Drawings."

G. B. CARVILL, R. S. BALFOUR, } Hon. Secs.

Price 4d., by Post, 4½d.

Our "NEW CENTURY" No.

The first "BUILDER" of the 20th Century, to be published on FRIDAY, JANUARY 4th, 1901, will be a very attractive number. Among the Illustrations and original Articles which it will contain may be mentioned the following:—

(*a*) **An Essay on the genius and works of Sir Charles Barry** (with portrait), illustrated by large reproductions of the original drawings of his great scheme for the concentration of the Government Offices and the Architectural improvement of the Westminster district, and one of an original drawing of Karnac, made on the spot in, or about, the year 1818. Also a View of the Halifax Town Hall, and of the Victoria Tower as seen from the roof of the Houses of Parliament—these latter drawings of two of this great Architect's works have been made by Mr. W. MONK specially for this issue.

(*b*) **Old Westminster** and its changes during the Century, with views and plans reproduced from old drawings.

(*c*) **Milton Abbas Abbey.** View, plan and sketches, by Mr ROLAND W. PAUL, with descriptive article, bringing to a conclusion the series of the "Abbeys of Great Britain."

(*d*) **"The Heart of Rouen,"** a fine characteristic drawing by Mr. H. W. BREWER.

(*e*) **Newgate Prison,** shortly to be demolished—drawn by Mr. W. CURTIS GREEN.

(*f*) **The smaller Fine Art Palace on the Champs Elysees Paris.** Views of the Front and of the Interior Court from Photographs, specially taken.

(*g*) **"The Portal of the New Century,"** by THE EDITOR.

&c. &c.

From the above list it will be seen that the contents—Artistic as well as Literary—will be so varied, that the number must necessarily appeal to a very wide circle.

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Imperial Stone Co. Ltd.

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Dennis, Henry
Doulton & Co. Ltd.
Dunton Green Brick & Tile Co.
Farnley Iron Co. Ltd.
Hartshill Brick and Tile Co.
Hooper & Ashby
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Knowles, J. & Co.
Lawrence, T. & Son
Milton Brick Co.
Newton, J. Sons
Pearce, A.
Richardson, A. & W. T.
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Whittlesea Central Brick Co.
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Sesslous & Sons, Ltd

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Pennington, J.

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Lascelles, W. H. & Co.

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Tucker, G. & Son
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Hartshill Brick & Tile Co.
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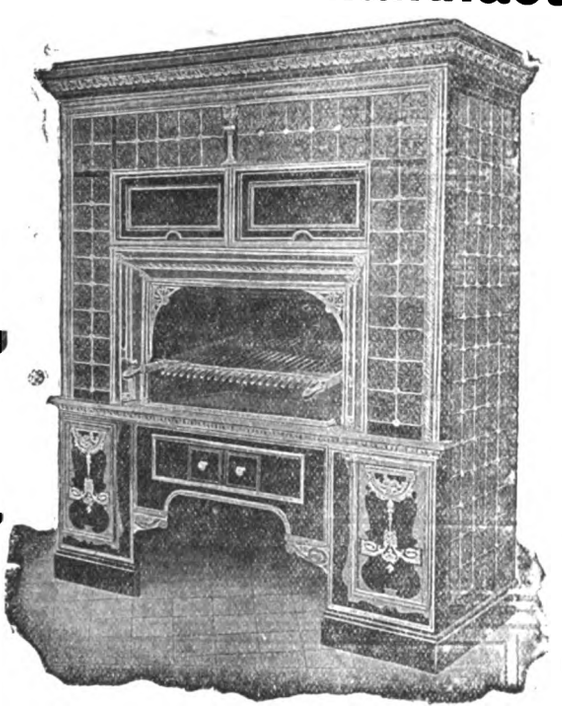

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CONTRACTS.

TO BUILDERS.

The Commissioners of H.M. Works and Public Buildings are prepared to receive TENDERS for the ERECTION of a POST-MEN'S OFFICE at Clapham, S.W.

Drawings, specification, and a copy of the conditions and form of contract may be seen on application to Mr. J. WAGER, at H.M. Office of Works.

Bills of quantities have been prepared for the use of builders by Messrs. GRITTEN & SON, of 8, Princes-street, Westminster, and together with forms of Tender may be obtained at the undermentioned Office on payment of One Guinea. The sums so paid will be returned to those persons who send in Tenders in conformity with the conditions specified below.

The Commissioners do not hold themselves responsible for the accuracy of the quantities, nor do they bind themselves to accept the lowest or any Tender.

Tenders are to be delivered before TWELVE o'clock noon on TUESDAY, the 15th proximo, addressed to The Secretary, H.M. Office of Works, &c. Storey's Gate, London, S.W. and endorsed "Tender for Clapham Sorting Office."

H.M. Office of Works, &c.
December 22nd, 1900.

THE URBAN DISTRICT COUNCIL of WHITBY.

BUILDINGS FOR ELECTRIC LIGHT STATION.

The Urban District Council of Whitby are prepared to receive TENDERS for the ERECTION of an ELECTRIC LIGHT STATION and DESTRUCTOR.

General conditions, form of Tender, and bills of quantities can be obtained on and after TUESDAY, 1st JANUARY, 1901, and drawings can be inspected on application to the Clerk at the Offices of the Council, Whitby.

Tenders upon printed forms, and endorsed "Electric Light Station," to be delivered at the Offices of the Council, not later than TWO o'clock on TUESDAY, the 8th JANUARY, 1901.

A 10*l.* to be enclosed with each Tender, which will be returned to all unsuccessful contractors immediately Tenders are accepted.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
WM. SEATON GRAY,
Clerk to the Council.

Offices,
Whitby, Yorks.

[*See also page* vi.

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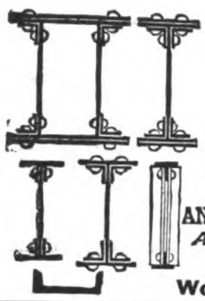

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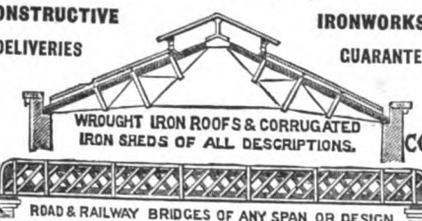

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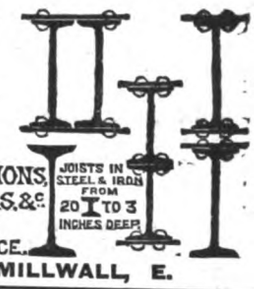

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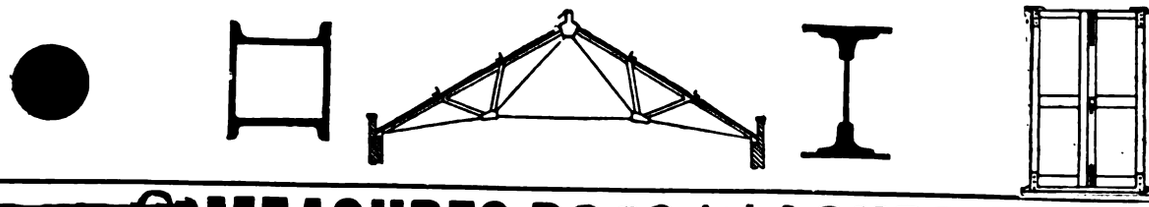

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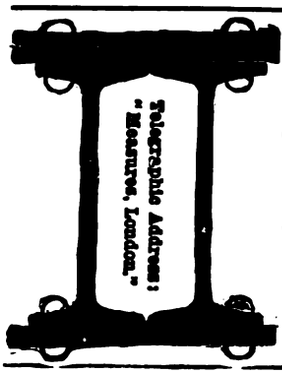

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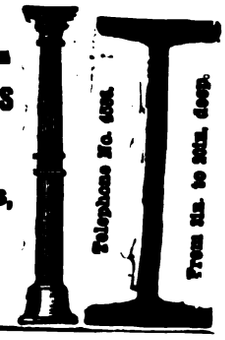

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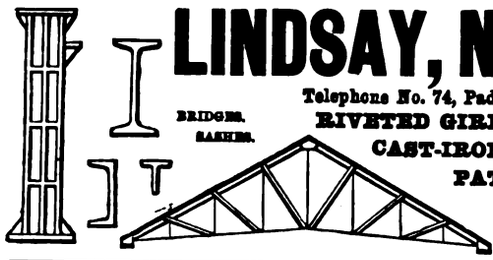

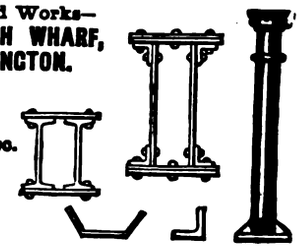

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Faithfully yours,

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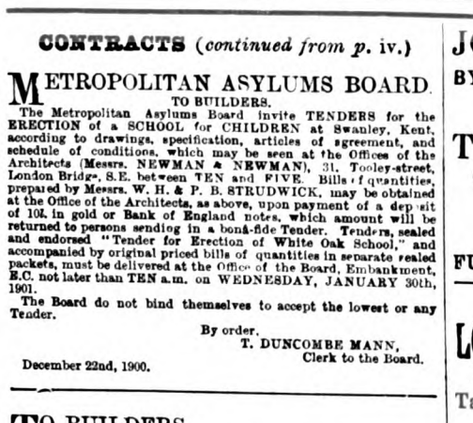

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REPLIES REFER TO THIS ADVERTISEMENT.

CONTRACTS (*continued from p.* iv.)

METROPOLITAN ASYLUMS BOARD.

TO BUILDERS.

The Metropolitan Asylums Board invite TENDERS for the ERECTION of a SCHOOL for CHILDREN at Swanley, Kent, according to drawings, specification, articles of agreement, and schedule of conditions, which may be seen at the Offices of the Architects (Messrs. NEWMAN & NEWMAN), 31, Tooley-street, London Bridge, S.E. between TEN and FIVE. Bills of quantities, prepared by Messrs. W. H. & P. B. STRUDWICK, may be obtained at the Office of the Architects, as above, upon payment of a deposit of 10*l.* in gold or Bank of England notes, which amount will be returned to persons sending in a bonâ-fide Tender. Tenders, sealed and endorsed "Tender for Erection of White Oak School," and accompanied by original priced bills of quantities in separate sealed packets, must be delivered at the Office of the Board, Embankment, E.C. not later than TEN a.m. on WEDNESDAY, JANUARY 30th, 1901.

The Board do not bind themselves to accept the lowest or any Tender.

By order,
T. DUNCOMBE MANN,
Clerk to the Board.

December 22nd, 1900.

TO BUILDERS.

The Metropolitan Asylums Board invite TENDERS for ALTERATIONS and ADDITIONS to LAUNDRY MACHINERY and FITTINGS, at St. Anne's Home, Herne Bay, Kent.

A copy of the conditions of contract, plan, specification, and form of Tender may be obtained at the Office of the Board (corner of Carmelite-street), Embankment, E.C.

The Tender must be upon the form issued by the Board, enclosed in a sealed envelope, and endorsed "Tender for Laundry, St. Anne's Home," addressed to the Clerk of the Board, and delivered at the Office of the Board by TEN a.m. on THURSDAY, 17th JANUARY, 1901.

The Managers do not bind themselves to accept the lowest or any Tender.

By order,
T. DUNCOMBE MANN,
Clerk to the Board.

December 24th, 1900.

[*See also page* viii.

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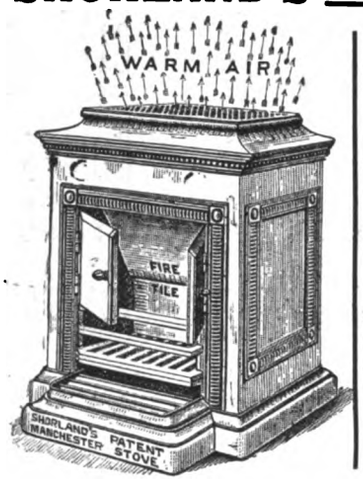

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Telegrams—WARMING, Manchester.

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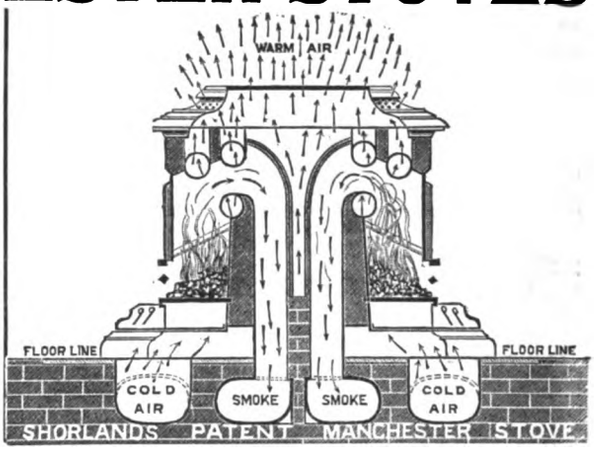

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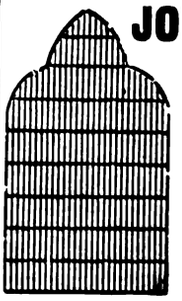

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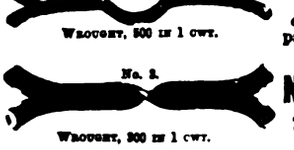

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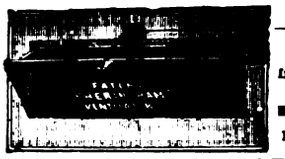

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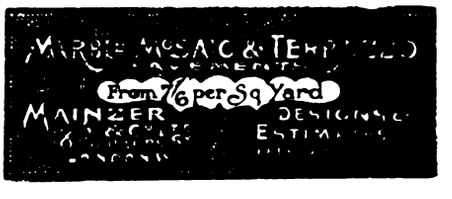

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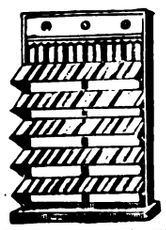

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CONTRACTS (*continued from p.* vi.).

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If a Tender is made which is not accepted, the sum deposited will be returned, and if a Tender is accepted, such sum will be retained by the Council until the Contract has been executed by the depositor, and will be forfeited in the event of his or his sureties failing or neglecting to execute such Contract, or the Bond accompanying the same, within seven days after he or they respectively shall have been requested to execute the same.

No Tender will be considered except on the prescribed form. Sealed and endorsed Tenders are to be delivered or sent by post so as to be deposited in the Tender box in my department not later than FOUR o'clock p.m. on MONDAY, the 21st day of JANUARY proximo. The quantities, duly completed, must accompany the Tenders.

The Council reserve to themselves the right to decline all or any of the Tenders so sent in.

By order,
F. D. ASKEY,
Clerk to the District Council.

Offices: Southwood-lane, Highgate, N.
December 20th, 1900.

Refer also to "Too Late" *column, page* xviii

CAST-IRON STANCHIONS (24) Wanted, second-hand, 11 ft. 6 to 12 ft. long; also 24 10 by 4½ or nearest section rolled joist, 16 ft. long.—Send particulars and price to E. C. CHRISTMAS, Builder, Forest Hill.

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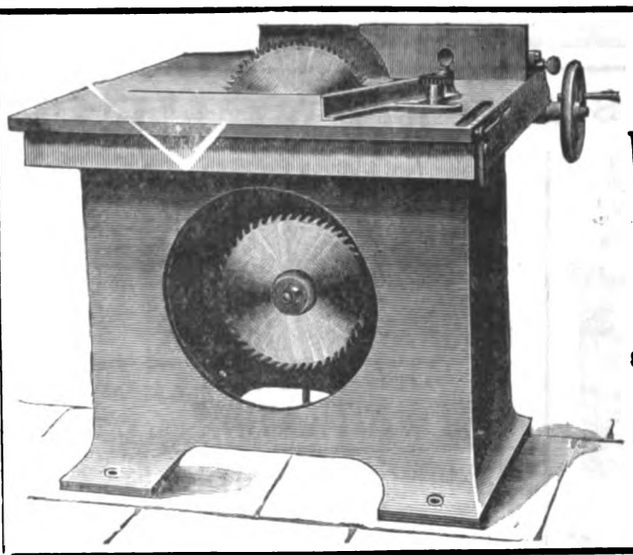

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Refer also to "Too Late" *column, page* xviii

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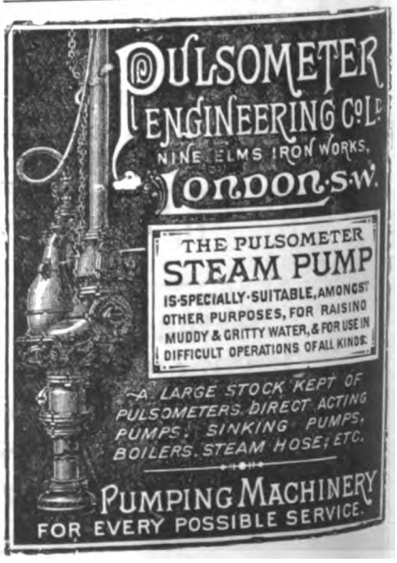

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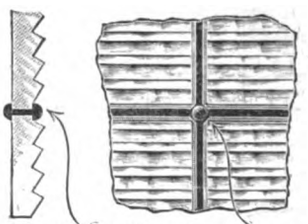

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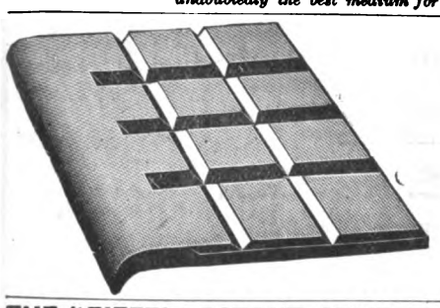

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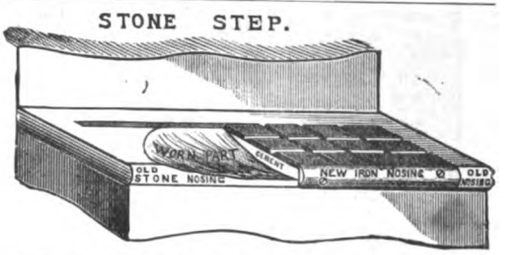

Samples and Price Lists on Application. *National Telephone* 1810.

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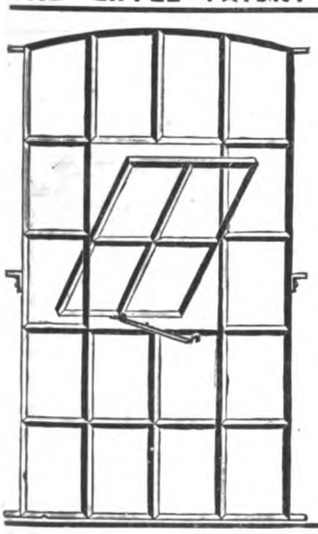

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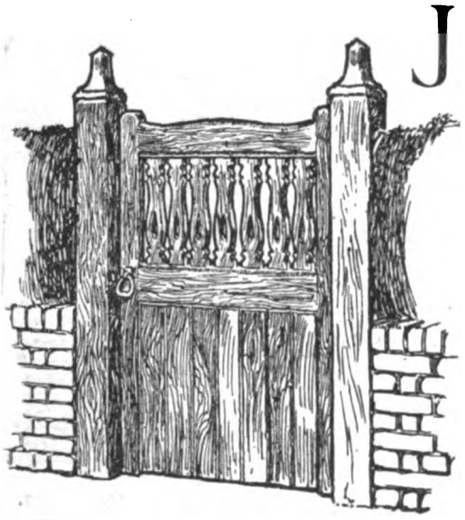

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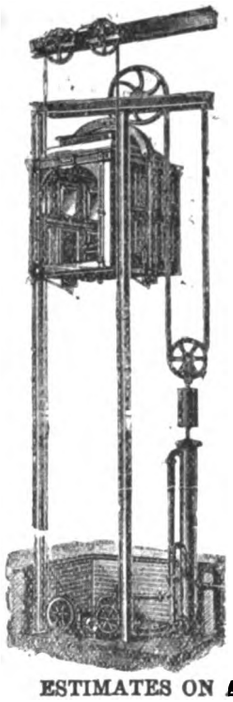

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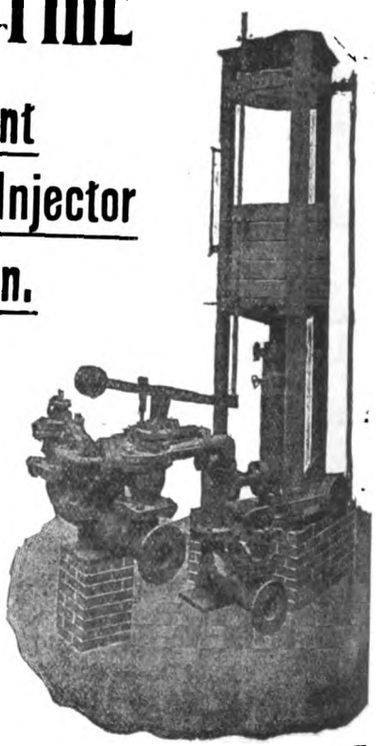

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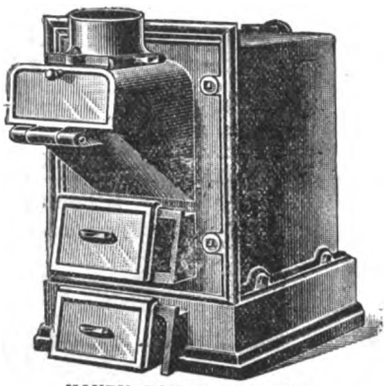

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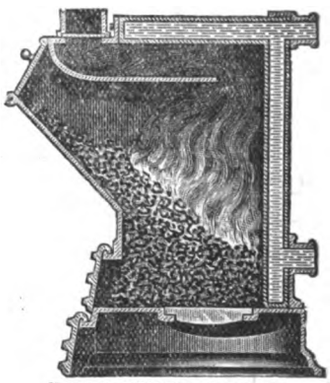

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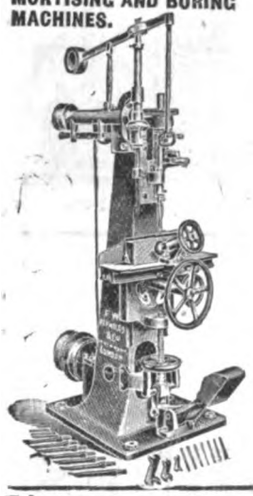

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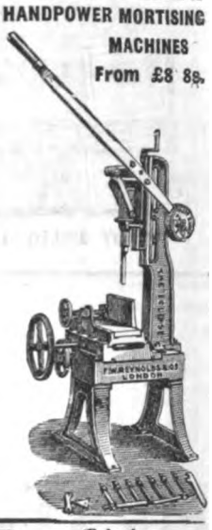

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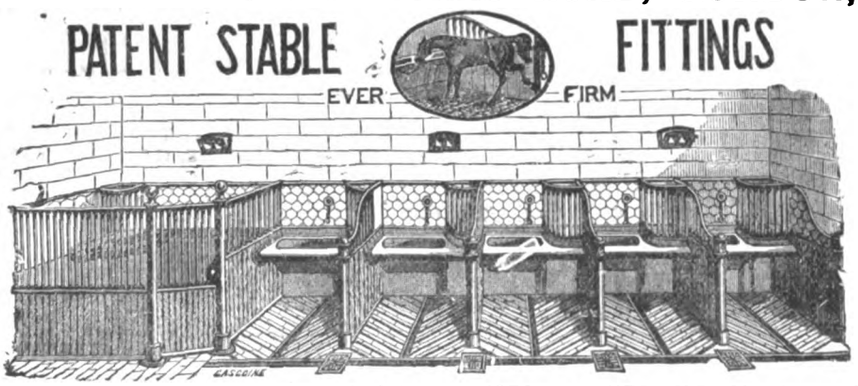

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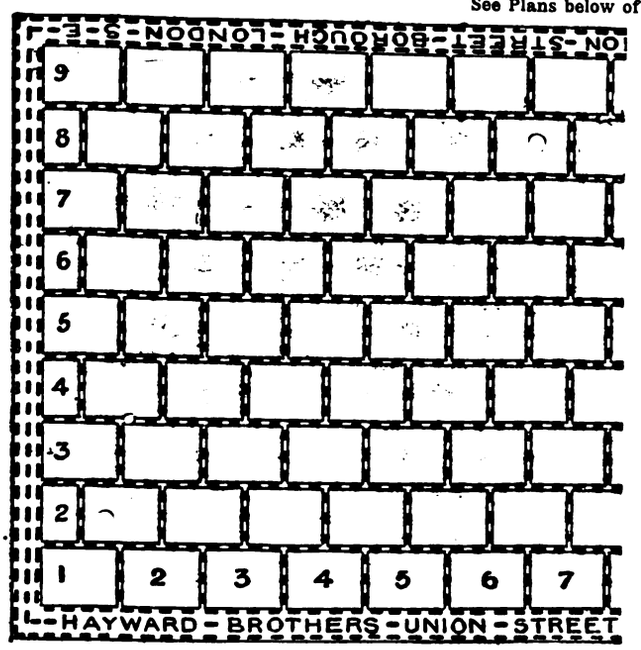

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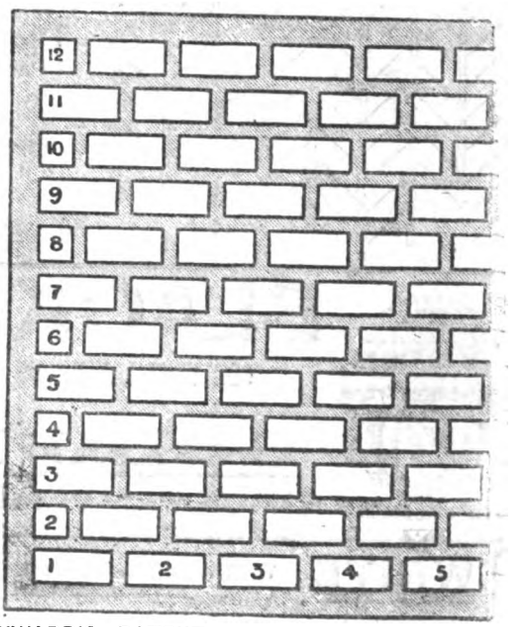

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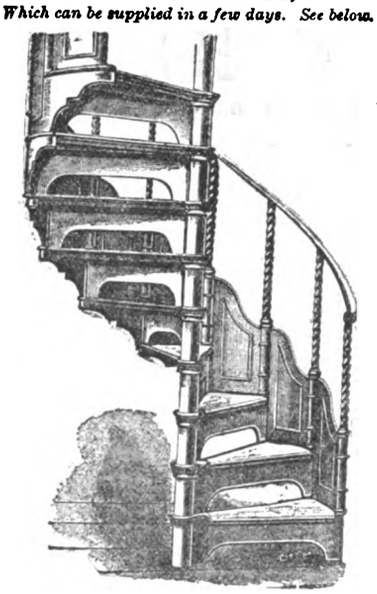

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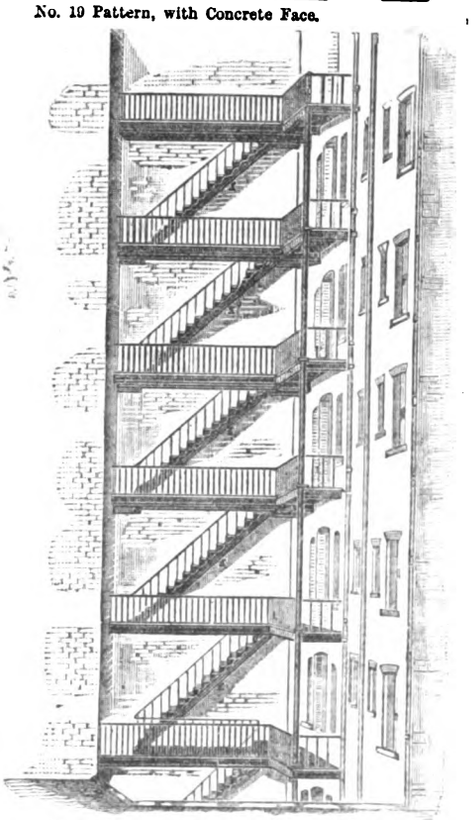

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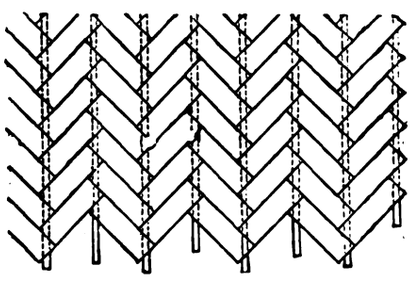

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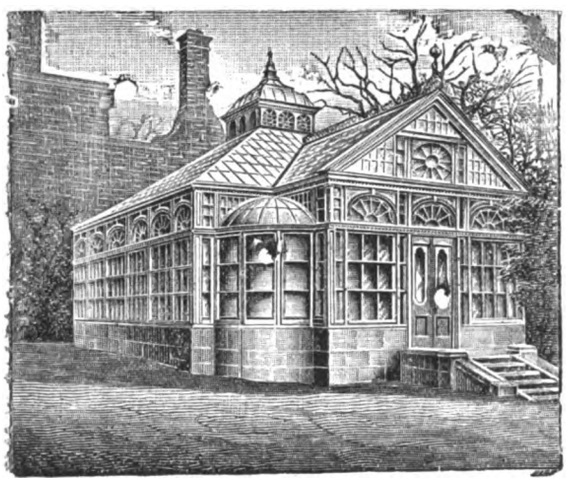

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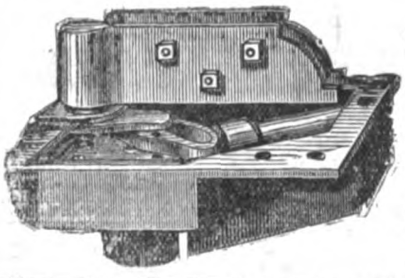

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[Received after 1.30 p.m. on Thursday.]

THE COUNCIL of the METROPOLITAN BOROUGH of FULHAM hereby give notice that they will be prepared at their meeting to be held on WEDNESDAY, the 9th JANUARY, 1901, at SEVEN p.m. to receive TENDERS for MAKING-UP and PAVING FOOTWAY and STRIP of CARRIAGEWAY of Dawes-road (Sec I.).

Plans and specifications of the works may be seen, and any information obtained from Mr. CHARLES BOTTERILL, Surveyor.

The contractors are to attend personally or be represented at the Council meeting to deliver their own Tenders, together with a 10*l.* note and a schedule of prices, upon which the value of any extras or omissions shall be based, and to make a declaration that they pay the union rate of wages, observe such hours of labour as are generally accepted as fair in their trade, and that all unskilled labour shall be paid the minimum wage of sevenpence per hour.

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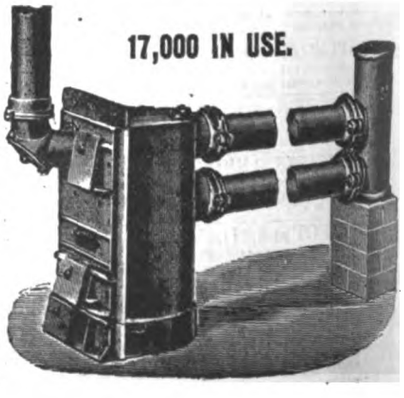

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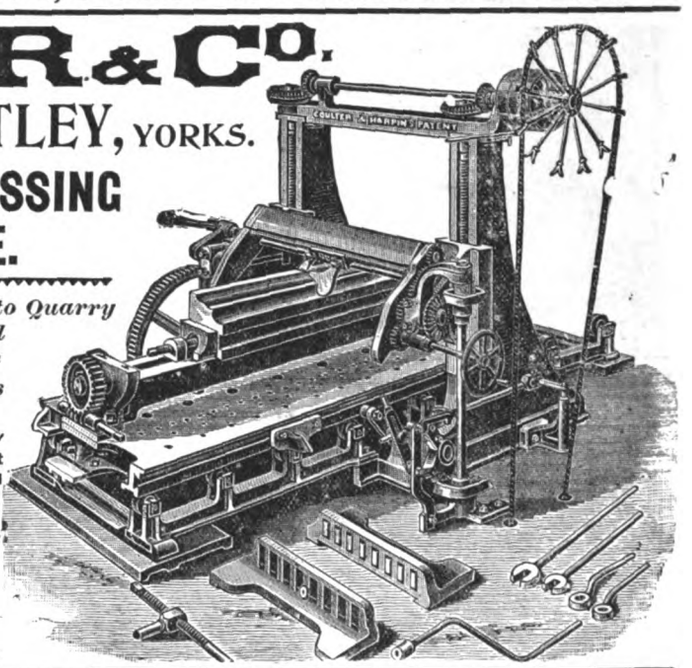

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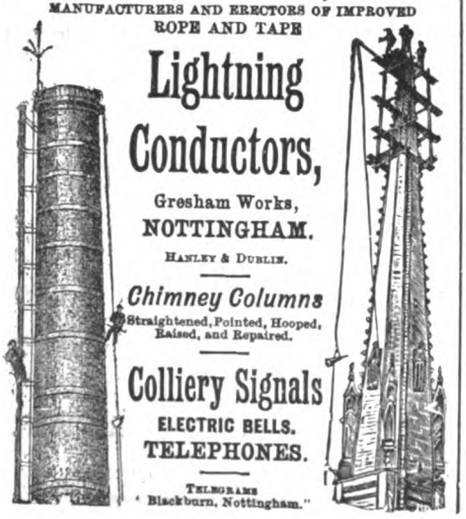

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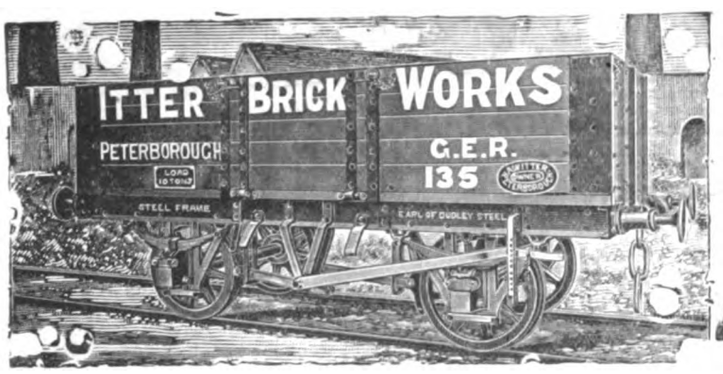

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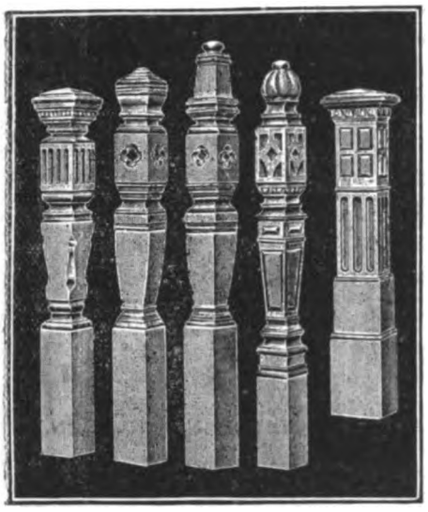

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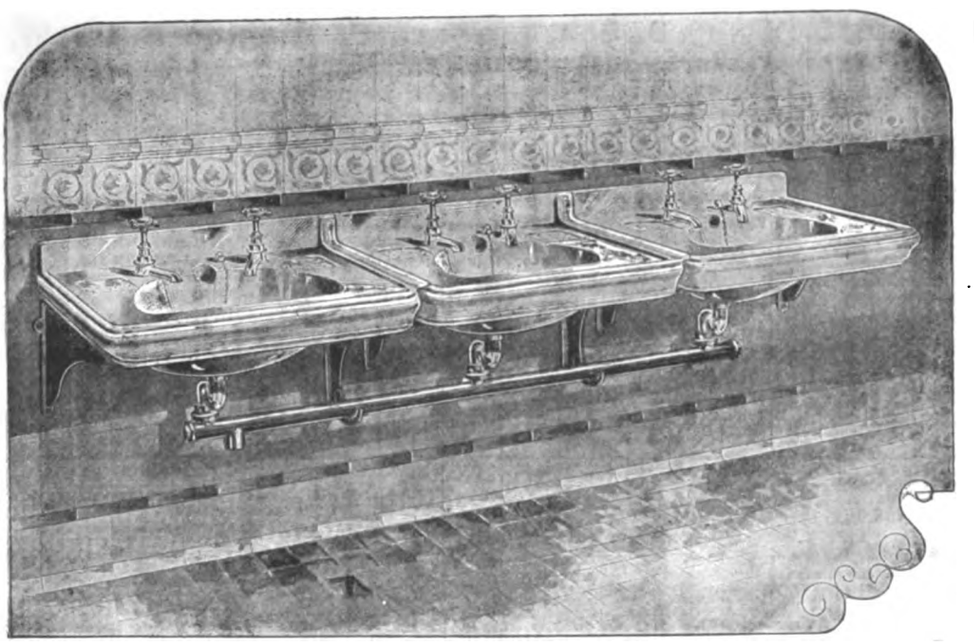

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Refer also to "TOO LATE" column, page xviii

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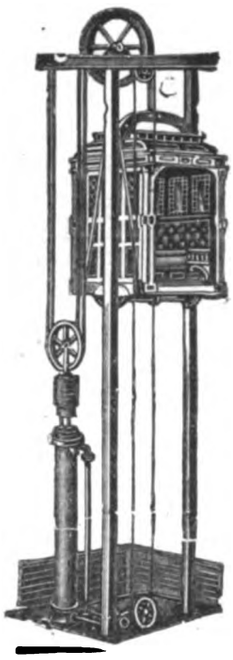

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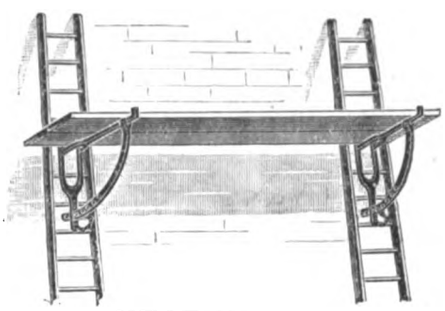

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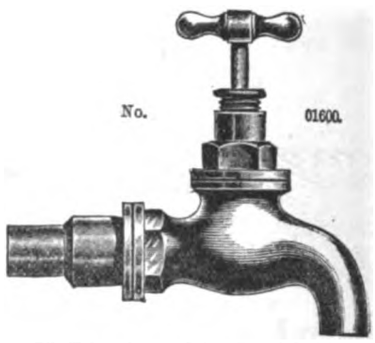

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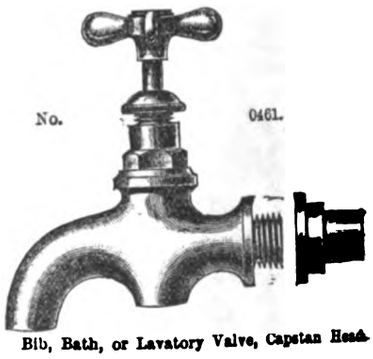

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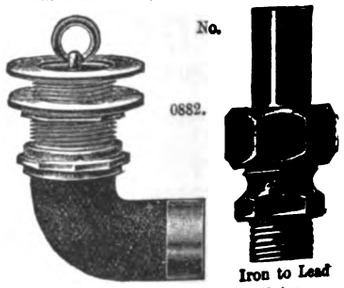

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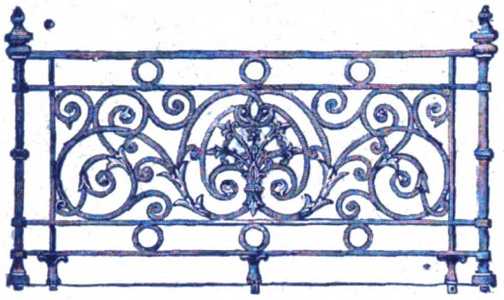

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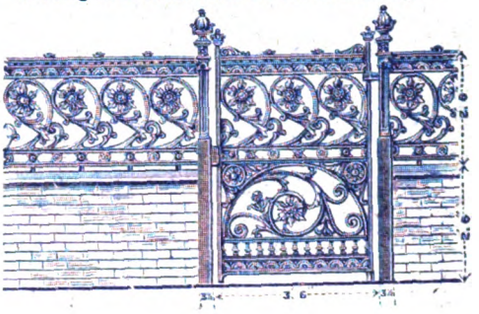

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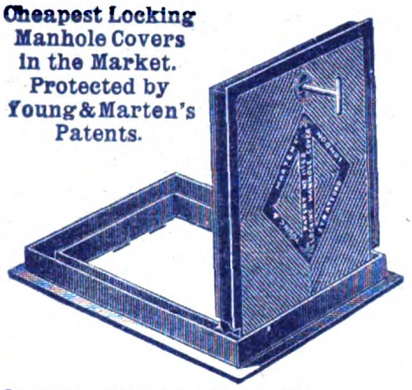

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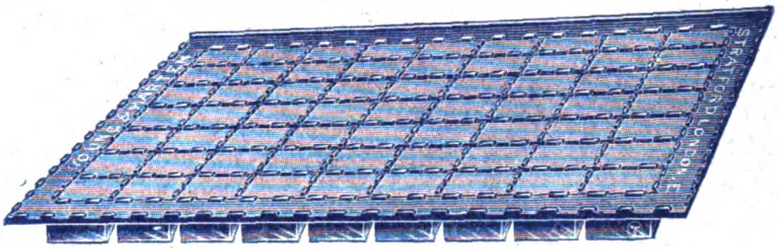

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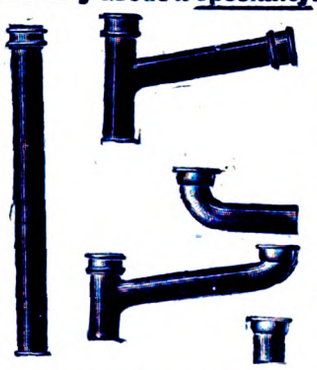

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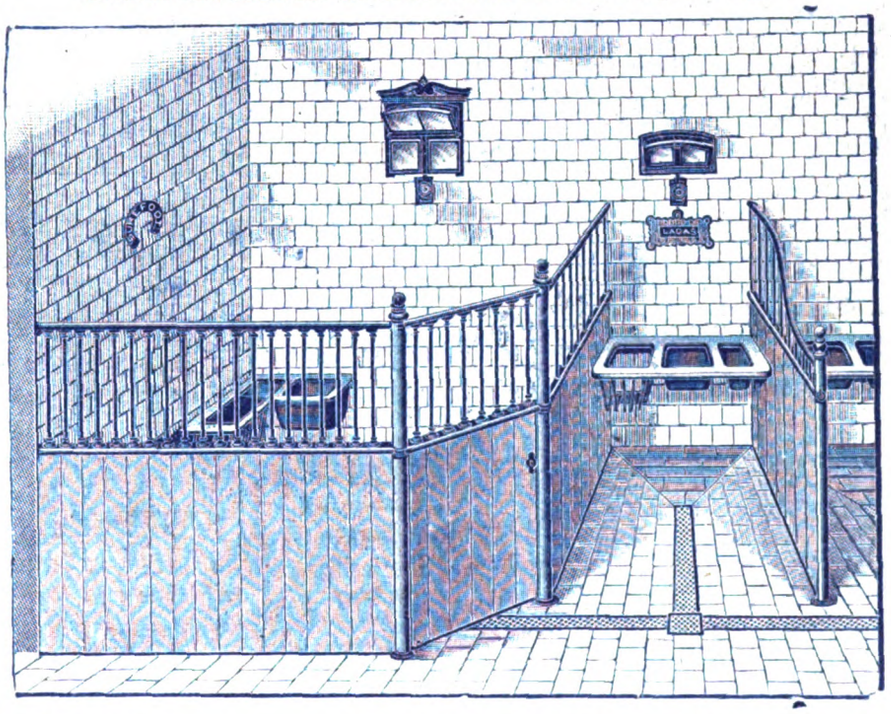

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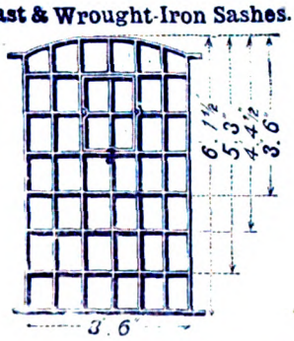

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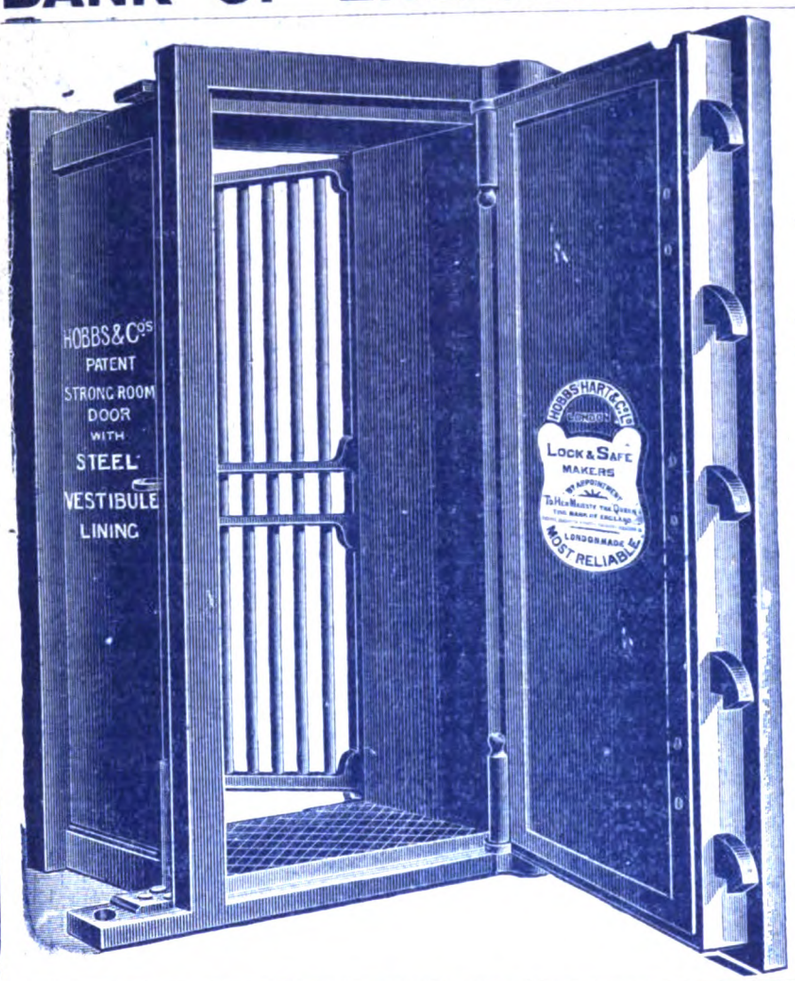

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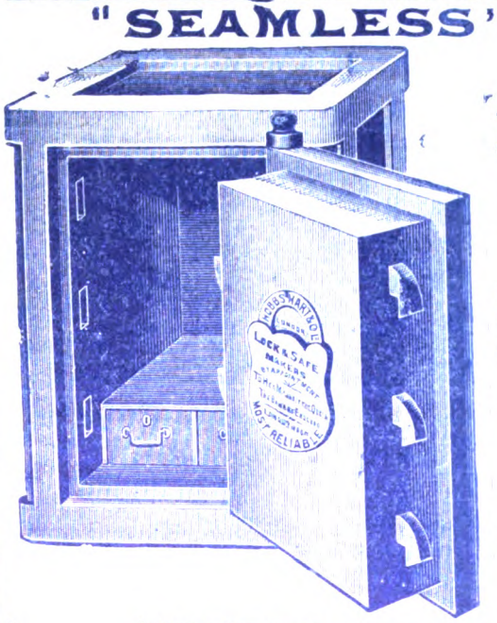

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